

**Date and Time:** Monday 9 September 2024 16:50:00 CEST

**Job Number:** 233028315

**Documents (100)**

1. [*Hancock mulls timber and ag vehicle that prioritizes carbon capture*](https://advance.lexis.com/api/document?id=urn:contentItem:61T4-H6M1-JCXV-K40P-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** removals and target or removals and emissions or removals and land or removals and forest or target and emissions or target and land or target and forest or emissions and land or emissions and forest or land and forest

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| News | Tijdlijn: jul 14, 2020 tot jul 14, 2021; Locatie: International; Plaats van publicatie: Europe; Taal: English |

2. [*Forest service protections sought for wolves in Idaho , Montana wilderness areas*](https://advance.lexis.com/api/document?id=urn:contentItem:62WG-YCT1-JDG9-Y30Y-00000-00&idtype=PID&context=1516831)

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3. [*Vast swathes of forest and bog lost to fires last year*](https://advance.lexis.com/api/document?id=urn:contentItem:62N1-XCB1-DY4H-K2X1-00000-00&idtype=PID&context=1516831)

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4. [*Human Otoacariasis in Two Climatically Diverse Districts in Sri Lanka : Seasonality, Risk Factors, and Case Notes*](https://advance.lexis.com/api/document?id=urn:contentItem:693W-H7V1-F129-P50D-00000-00&idtype=PID&context=1516831)

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5. [*£150 million government investment to save the world's rainforests*](https://advance.lexis.com/api/document?id=urn:contentItem:626F-NM11-F0YC-N2JM-00000-00&idtype=PID&context=1516831)

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6. [*Minister watching livestock herd 'very carefully'*](https://advance.lexis.com/api/document?id=urn:contentItem:6262-VRG1-JC8V-40B0-00000-00&idtype=PID&context=1516831)

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7. [*Unilever procurement chief talks climate crisis: The world's food system needs to change*](https://advance.lexis.com/api/document?id=urn:contentItem:60CF-KYR1-JC6M-X2YF-00000-00&idtype=PID&context=1516831)

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8. [*Climate transition depends on shifting finance*](https://advance.lexis.com/api/document?id=urn:contentItem:625N-9F71-DYXB-V2DX-00000-00&idtype=PID&context=1516831)

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9. [*Trump stripping protections from Alaska 's Tongass forest, one of the world's largest temperate rainforests*](https://advance.lexis.com/api/document?id=urn:contentItem:615H-40J1-DY4H-K0HS-00000-00&idtype=PID&context=1516831)

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10. [*EU approves 2021 forestry programme but licence logjam still hinders progress*](https://advance.lexis.com/api/document?id=urn:contentItem:6238-44Y1-DYRW-V34M-00000-00&idtype=PID&context=1516831)

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11. [*Poots: Planting for our Future*](https://advance.lexis.com/api/document?id=urn:contentItem:62J8-P4D1-JDG9-Y205-00000-00&idtype=PID&context=1516831)

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12. [*"Harvest does not equal deforestation"*](https://advance.lexis.com/api/document?id=urn:contentItem:60SK-K5S1-F0YS-W000-00000-00&idtype=PID&context=1516831)

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13. [*Ardern says climate crisis is 'life or death' as New Zealand landmark report calls for sweeping changes*](https://advance.lexis.com/api/document?id=urn:contentItem:62W6-RK71-DY4H-K4X6-00000-00&idtype=PID&context=1516831)

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14. [*3 reasons companies are investing in forest conservation and restoration, and how they do it*](https://advance.lexis.com/api/document?id=urn:contentItem:62WG-YCT1-JDG9-Y2YR-00000-00&idtype=PID&context=1516831)

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15. [*Mosaic puts the pieces in place to imagine a new system of land use*](https://advance.lexis.com/api/document?id=urn:contentItem:6286-2VD1-F0JC-M078-00000-00&idtype=PID&context=1516831)

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16. [*£150 million government investment to save the world's rainforests*](https://advance.lexis.com/api/document?id=urn:contentItem:628M-13K1-JD3Y-Y4KH-00000-00&idtype=PID&context=1516831)

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17. [*Persistent organic pollutant cycling in forests*](https://advance.lexis.com/api/document?id=urn:contentItem:693W-H851-F129-P0DC-00000-00&idtype=PID&context=1516831)

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18. [*- Salesforce -Fighting Climate Change: Salesforce Surpasses 10 Million Tree Milestone in 12 Months*](https://advance.lexis.com/api/document?id=urn:contentItem:6262-BVD1-JD3Y-Y0SR-00000-00&idtype=PID&context=1516831)

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19. [*England's biggest landowners not growing enough trees - report Church of England and Duchy of Cornwall come last in ranking of major landowners by forest cover*](https://advance.lexis.com/api/document?id=urn:contentItem:60H9-XHK1-F021-63BK-00000-00&idtype=PID&context=1516831)

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20. [*EU wants to tax aviation fuel and phase out polluting cars by 2035*](https://advance.lexis.com/api/document?id=urn:contentItem:634S-1DY1-DXJ7-N36P-00000-00&idtype=PID&context=1516831)

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21. [*EU climate package will also help Finland achieve climate neutrality*](https://advance.lexis.com/api/document?id=urn:contentItem:634X-16J1-JDG9-Y0H0-00000-00&idtype=PID&context=1516831)

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22. [*How Government's climate plan will change your farm Focus on: Climate action targets*](https://advance.lexis.com/api/document?id=urn:contentItem:61HP-2K41-JCBW-N03H-00000-00&idtype=PID&context=1516831)

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23. [*'Tree Oscars' search for Scotland's finest farm woodlands*](https://advance.lexis.com/api/document?id=urn:contentItem:61WY-8PJ1-F0JC-M24V-00000-00&idtype=PID&context=1516831)

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24. [*Eating more pulses and legumes could cut carbon emissions - and improve our health Switching meat for lentils and beans could cut carbon emissions by "more than a decade", according to a new study*](https://advance.lexis.com/api/document?id=urn:contentItem:60T7-HBX1-JCJY-G23B-00000-00&idtype=PID&context=1516831)

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25. [*The Brazilian forestry giant striking a blow for sustainability*](https://advance.lexis.com/api/document?id=urn:contentItem:610C-P1D1-JCM7-G3TW-00000-00&idtype=PID&context=1516831)

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26. [*Amazon rainforest will dry out and become arid, scrubby plain by 2064 due to climate change and deforestation, scientist predicts*](https://advance.lexis.com/api/document?id=urn:contentItem:61MY-8761-DY4H-K0PK-00000-00&idtype=PID&context=1516831)

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27. [*How scientists are restoring boreal peatlands to help keep carbon in the ground*](https://advance.lexis.com/api/document?id=urn:contentItem:62GW-28J1-JDG9-Y0C6-00000-00&idtype=PID&context=1516831)

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28. [*Growing Climate Solutions Act Passes U.S Senate*](https://advance.lexis.com/api/document?id=urn:contentItem:6314-6JG1-JDG9-Y2KJ-00000-00&idtype=PID&context=1516831)

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29. [*The EU’s biomass dilemma: can burning trees ever be green?*](https://advance.lexis.com/api/document?id=urn:contentItem:631X-V271-F039-633J-00000-00&idtype=PID&context=1516831)

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30. [*We're a long way from ending deforestation, but we can still stop it*](https://advance.lexis.com/api/document?id=urn:contentItem:61G0-7F21-JDG9-Y1BN-00000-00&idtype=PID&context=1516831)

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31. [*We CAN create a world in which 9+ billion people live within planetary boundaries, by 2050*](https://advance.lexis.com/api/document?id=urn:contentItem:631S-1HG1-JDG9-Y303-00000-00&idtype=PID&context=1516831)

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32. [*Farmers, Ranchers and Landowners Doing Their Part to Improve Water Quality*](https://advance.lexis.com/api/document?id=urn:contentItem:60MB-8R91-F0YC-N4SH-00000-00&idtype=PID&context=1516831)

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33. [*Daines’ Bipartisan Wildfire Prevention Bill Takes Center Stage at Senate Hearing*](https://advance.lexis.com/api/document?id=urn:contentItem:60W4-SDV1-JDG9-Y1P1-00000-00&idtype=PID&context=1516831)

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34. [*How big a challenge is carbon neutrality?*](https://advance.lexis.com/api/document?id=urn:contentItem:62BX-BP61-JC8V-4022-00000-00&idtype=PID&context=1516831)

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35. [*Dynamic global monitoring needed to use restoration of forest cover as a climate solution*](https://advance.lexis.com/api/document?id=urn:contentItem:671W-P2B1-JCWX-C2R2-00000-00&idtype=PID&context=1516831)

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36. [*Five Projects Split $860,000 to Further Grow Natural Climate Solutions in U.S*](https://advance.lexis.com/api/document?id=urn:contentItem:60W4-SDV1-JDG9-Y099-00000-00&idtype=PID&context=1516831)

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37. [*Register of Commission documents: Written answer : Climate taxes and their importance for food production and carbon leakage P9\_RE(2020)003169 / FULL / EN19/08/2020*](https://advance.lexis.com/api/document?id=urn:contentItem:60RT-67D1-JDG9-Y04W-00000-00&idtype=PID&context=1516831)

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| News | Tijdlijn: jul 14, 2020 tot jul 14, 2021; Locatie: International; Plaats van publicatie: Europe; Taal: English |

38. [*BBC Radio 4 - 05:05 AM GMT*](https://advance.lexis.com/api/document?id=urn:contentItem:61DP-8FP1-DY08-311D-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

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39. [*Biochar's ability to store carbon explored*](https://advance.lexis.com/api/document?id=urn:contentItem:62T4-CJ81-JDG9-Y3D6-00000-00&idtype=PID&context=1516831)

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40. [*Pesticides and fertilisers have overtaken fossil fuels as the largest human source of sulphur in the environment, study shows*](https://advance.lexis.com/api/document?id=urn:contentItem:60JN-7W51-F021-60CF-00000-00&idtype=PID&context=1516831)

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41. [*the future is forestry*](https://advance.lexis.com/api/document?id=urn:contentItem:60X6-FGP1-DYTY-C3J5-00000-00&idtype=PID&context=1516831)

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42. [*Roberts, Sen Malcolm speech on ADJOURNMENT - Banking and Financial Services, Land Clearing, Foreign Investment, Water*](https://advance.lexis.com/api/document?id=urn:contentItem:61DX-WBC1-JDG9-Y1FJ-00000-00&idtype=PID&context=1516831)

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43. [*Senate OKs bill to certify farm practices limiting emissions*](https://advance.lexis.com/api/document?id=urn:contentItem:630P-SST1-JBNF-W4VS-00000-00&idtype=PID&context=1516831)

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44. [*USDA Requests Information on USDA’s Climate-Smart Agriculture and Forestry Strategy*](https://advance.lexis.com/api/document?id=urn:contentItem:6275-FCK1-F0YC-N30F-00000-00&idtype=PID&context=1516831)

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45. [*There's a Booming Business in America 's Forests. Some Aren't Happy About It.*](https://advance.lexis.com/api/document?id=urn:contentItem:62GM-GDK1-JC85-N0CK-00000-00&idtype=PID&context=1516831)

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46. [*Financial assistance available to Oregon farmers, ranchers, forest owners*](https://advance.lexis.com/api/document?id=urn:contentItem:614C-86J1-JDG9-Y1BV-00000-00&idtype=PID&context=1516831)

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47. [*Bennet Surveys Wildfire Damage in Grand County , Renews Call to Scale Up Forest and Watershed Restoration in the West*](https://advance.lexis.com/api/document?id=urn:contentItem:62M5-S1V1-F0YC-N4F1-00000-00&idtype=PID&context=1516831)

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48. [*52% of global viscose supply now verified as low risk*](https://advance.lexis.com/api/document?id=urn:contentItem:616H-FP61-JDNW-40BV-00000-00&idtype=PID&context=1516831)

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49. [*Nature's great struggle There is much debate about the precise quantity of carbon plants can absorb from the atmosphere but there will never be enough trees to offset emissions, reports Bonnie Waring*](https://advance.lexis.com/api/document?id=urn:contentItem:62RJ-VWJ1-F072-40HG-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

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50. [*Federal Register: Notice of Intent To Prepare an Environmental Impact Statement for the Husky 1 North Dry Ridge Phosphate Mine and Notice of Cancellation of Environmental Impact Statement Preparation for the Nu-West Mining Husky 1-North Dry Ridge Phosphate Mine Project Pages 83994 - 83996 [FR DOC #2020-28242]*](https://advance.lexis.com/api/document?id=urn:contentItem:61KG-1661-JDG9-Y3N7-00000-00&idtype=PID&context=1516831)

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51. [*The Green Brief: The die is cast for ETS reform*](https://advance.lexis.com/api/document?id=urn:contentItem:6336-FM31-DYXB-V000-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

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52. [*Improved management of farmed peatlands could cut 500m tonnes of CO2.*](https://advance.lexis.com/api/document?id=urn:contentItem:62HG-58X1-JDG9-Y4FT-00000-00&idtype=PID&context=1516831)

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53. [*A global analysis of the social and environmental outcomes of community forests*](https://advance.lexis.com/api/document?id=urn:contentItem:671W-P2M1-JCWX-C2BV-00000-00&idtype=PID&context=1516831)

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54. [*Economic and social constraints on reforestation for climate mitigation in Southeast Asia*](https://advance.lexis.com/api/document?id=urn:contentItem:671W-P2B1-JCWX-C2HM-00000-00&idtype=PID&context=1516831)

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55. [*How we can use carbon to our advantage in the fight against climate change*](https://advance.lexis.com/api/document?id=urn:contentItem:62Y5-R461-F0YC-N4CV-00000-00&idtype=PID&context=1516831)

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56. [*Federal Register: National Environmental Policy Act Implementing Procedures for the Bureau of Land Management (516 DM 11) Pages 79517 - 79529 [FR DOC #2020-27159]*](https://advance.lexis.com/api/document?id=urn:contentItem:61GV-7HF1-F0YC-N1TB-00000-00&idtype=PID&context=1516831)

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57. [*Back from the brink*](https://advance.lexis.com/api/document?id=urn:contentItem:621J-VWH1-DY5K-Y1XR-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

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58. [*Britain will use its financial and diplomatic power to help save the planet*](https://advance.lexis.com/api/document?id=urn:contentItem:60XX-TYG1-DY4H-K1DF-00000-00&idtype=PID&context=1516831)

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59. [*Biodiversity–productivity relationships are key to nature-based climate solutions*](https://advance.lexis.com/api/document?id=urn:contentItem:671W-P2B1-JCWX-C2SG-00000-00&idtype=PID&context=1516831)

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60. [*A rescue plan for nature*](https://advance.lexis.com/api/document?id=urn:contentItem:621J-VWH1-DY5K-Y1XP-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

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61. [*National Environmental Policy Act Compliance (Updated on 19-11-2020)*](https://advance.lexis.com/api/document?id=urn:contentItem:61C8-TNH1-JDG9-Y3XF-00000-00&idtype=PID&context=1516831)

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62. [*Vow ASA : A breakthrough solution in the fight against climate change*](https://advance.lexis.com/api/document?id=urn:contentItem:61GF-BVK1-JDPT-Y501-00000-00&idtype=PID&context=1516831)

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63. [*Federal Energy Regulatory Commission Issues Environmental Assessment Report for Columbia Gas Transmission, LLC 's Sections 157.205 and 157.216- Prior Notice Filing- Abandonment of Natural Gas Storage Facilities under CP20-501*](https://advance.lexis.com/api/document?id=urn:contentItem:60XD-KBB1-F0YC-N2G1-00000-00&idtype=PID&context=1516831)

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64. [*The climate change mitigation potential of bioenergy with carbon capture and storage*](https://advance.lexis.com/api/document?id=urn:contentItem:671W-P2B1-JCWX-C2JN-00000-00&idtype=PID&context=1516831)

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65. [*EIGHT AREAS WHERE URGENT EFFORTS ARE NEEDED TO PROTECT UK FROM CLIMATE IMPACTS*](https://advance.lexis.com/api/document?id=urn:contentItem:62XK-BR91-JCBD-Y1N4-00000-00&idtype=PID&context=1516831)

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66. [*Summary report of sectoral low-carbon roadmaps published*](https://advance.lexis.com/api/document?id=urn:contentItem:615P-2XC1-F0YC-N2BM-00000-00&idtype=PID&context=1516831)

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67. [*These 5 beer companies are taking steps to protect the planet*](https://advance.lexis.com/api/document?id=urn:contentItem:62WG-YCT1-JDG9-Y395-00000-00&idtype=PID&context=1516831)

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68. [*Holyrood election 2021: What the parties are pledging on the climate emergency*](https://advance.lexis.com/api/document?id=urn:contentItem:62H2-3JP1-F0JC-M4W4-00000-00&idtype=PID&context=1516831)

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69. [*Vow ASA: A breakthrough solution in the fight against climate change*](https://advance.lexis.com/api/document?id=urn:contentItem:61GV-0M51-F0YC-N3T7-00000-00&idtype=PID&context=1516831)

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70. [*Study: U.S and Minnesota Need to Boost Nursery Production*](https://advance.lexis.com/api/document?id=urn:contentItem:624H-FGK1-F0YC-N33D-00000-00&idtype=PID&context=1516831)

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71. [*Hemp proving a worthy contender to cotton in denim*](https://advance.lexis.com/api/document?id=urn:contentItem:62JJ-PTT1-F14X-V3R2-00000-00&idtype=PID&context=1516831)

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72. [*FIRE FACTS; Congressional Record Vol. 166, No. 171 (House of Representatives - October 01, 2020)*](https://advance.lexis.com/api/document?id=urn:contentItem:6104-C431-JDG9-Y450-00000-00&idtype=PID&context=1516831)

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73. [*Brazil political press review 21 April 2021*](https://advance.lexis.com/api/document?id=urn:contentItem:62H0-K5M1-DYRV-34M2-00000-00&idtype=PID&context=1516831)

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| News | Tijdlijn: jul 14, 2020 tot jul 14, 2021; Locatie: International; Plaats van publicatie: Europe; Taal: English |

74. [*Science, not sanctions, will save our planet*](https://advance.lexis.com/api/document?id=urn:contentItem:62KD-3V71-F0JV-82K6-00000-00&idtype=PID&context=1516831)

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75. [*Federal Register: National Environmental Policy Act Implementing Procedures for the Bureau of Land Management (516 DM 11) Pages 79504 - 79517 [FR DOC #2020-27158]*](https://advance.lexis.com/api/document?id=urn:contentItem:61GV-7HF1-F0YC-N1T9-00000-00&idtype=PID&context=1516831)

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76. [*House of Commons - 9:20 PM GMT*](https://advance.lexis.com/api/document?id=urn:contentItem:60D6-T7S1-DY08-30FJ-00000-00&idtype=PID&context=1516831)

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77. [*Advanced biofuels show real promise for replacing some fossil fuels*](https://advance.lexis.com/api/document?id=urn:contentItem:60RH-RJX1-F0YC-N3YW-00000-00&idtype=PID&context=1516831)

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78. [*USDA Announces Targeted Signup Period to Support Climate-Smart Agriculture and Forestry in Georgia*](https://advance.lexis.com/api/document?id=urn:contentItem:6314-6JH1-JDG9-Y3CN-00000-00&idtype=PID&context=1516831)

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79. [*USDA Announces Targeted Signup Period to Support Climate-Smart Agriculture and Forestry in Mississippi*](https://advance.lexis.com/api/document?id=urn:contentItem:6314-6JH1-JDG9-Y3CT-00000-00&idtype=PID&context=1516831)

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80. [*Federal Register: Payment Limitation and Payment Eligibility Pages 52033 - 52041 [FR DOC #2020-18148]*](https://advance.lexis.com/api/document?id=urn:contentItem:60NT-GPY1-JDG9-Y4BK-00000-00&idtype=PID&context=1516831)

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81. [*Federal Register: Payment Limitation and Payment Eligibility Pages 52033 - 52041 [FR DOC #2020-18148]*](https://advance.lexis.com/api/document?id=urn:contentItem:60NT-GPY1-JDG9-Y4C7-00000-00&idtype=PID&context=1516831)

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82. [*Payment Limitation and Payment Eligibility*](https://advance.lexis.com/api/document?id=urn:contentItem:60P1-4JB1-JDG9-Y3CV-00000-00&idtype=PID&context=1516831)

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83. [*Managing peatlands to cut greenhouse gas emissions*](https://advance.lexis.com/api/document?id=urn:contentItem:62H2-9KX1-F0YC-N211-00000-00&idtype=PID&context=1516831)

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84. [*SENATE COMMITTEE MEETINGS; Congressional Record Vol. 167, No. 100 (Extensions of Remarks - June 09, 2021)*](https://advance.lexis.com/api/document?id=urn:contentItem:62WN-CVX1-JDG9-Y48K-00000-00&idtype=PID&context=1516831)

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85. [*The race to zero emissions, and why the world depends on it*](https://advance.lexis.com/api/document?id=urn:contentItem:61DX-WBB1-JDG9-Y452-00000-00&idtype=PID&context=1516831)

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86. [*SNP fails to hit carbon targets again as land use and forestry now 'net source'*](https://advance.lexis.com/api/document?id=urn:contentItem:62XJ-HFX1-F0JC-M3VN-00000-00&idtype=PID&context=1516831)

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87. [*Advanced biofuels feedstock list should be enlarged to meet EU target: industry*](https://advance.lexis.com/api/document?id=urn:contentItem:633D-DRK1-DYXB-V2JH-00000-00&idtype=PID&context=1516831)

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| News | Tijdlijn: jul 14, 2020 tot jul 14, 2021; Locatie: International; Plaats van publicatie: Europe; Taal: English |

88. [*Endangered and Threatened Species: Coastal Distinct Population Segment of the Pacific Marten*](https://advance.lexis.com/api/document?id=urn:contentItem:611M-K9S1-F0YC-N12H-00000-00&idtype=PID&context=1516831)

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89. [*Climate Change (Kyoto Protocol) Order 2020*](https://advance.lexis.com/api/document?id=urn:contentItem:61JR-T7C1-JDG9-Y40Y-00000-00&idtype=PID&context=1516831)

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90. [*New Coalition “Forest for All NYC” Releases NYC Urban Forest Agenda*](https://advance.lexis.com/api/document?id=urn:contentItem:62WW-9GD1-F0YC-N3YB-00000-00&idtype=PID&context=1516831)

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91. [*Study shows only 2-3% of Earth's land is ecologically intact. Here's what we can do*](https://advance.lexis.com/api/document?id=urn:contentItem:62FH-FBN1-JDG9-Y3SG-00000-00&idtype=PID&context=1516831)

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92. [*Vegetation uptake of mercury and impacts on global cycling*](https://advance.lexis.com/api/document?id=urn:contentItem:693W-H851-F129-P0HJ-00000-00&idtype=PID&context=1516831)

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| News | Tijdlijn: jul 14, 2020 tot jul 14, 2021; Locatie: International; Plaats van publicatie: Europe; Taal: English |

93. [*SENATE RESOLUTION 166--RECOGNIZING THE DUTY OF THE FEDERAL GOVERNMENT TO CREATE A GREEN NEW DEAL; Congressional Record Vol. 167, No. 68 (Senate - April 20, 2021)*](https://advance.lexis.com/api/document?id=urn:contentItem:62GV-W171-JDG9-Y1XP-00000-00&idtype=PID&context=1516831)

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| News | Tijdlijn: jul 14, 2020 tot jul 14, 2021; Locatie: International; Plaats van publicatie: Europe; Taal: English |

94. [*Environmentalists cast doubt on carbon offsets*](https://advance.lexis.com/api/document?id=urn:contentItem:634F-V401-JCM7-G1N7-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

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95. [*Almost everything you need to know about carbon capture technology*](https://advance.lexis.com/api/document?id=urn:contentItem:62FB-VXD1-JBNF-W2CJ-00000-00&idtype=PID&context=1516831)

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96. [*Beginning Session, Forum Releases Global Forest Goals Report, as Speakers Underline Ways Conservation Can Be Used to Build Back Better*](https://advance.lexis.com/api/document?id=urn:contentItem:62J8-P4D1-JDG9-Y1J8-00000-00&idtype=PID&context=1516831)

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97. [*What we must do to tackle the climate and nature crises together*](https://advance.lexis.com/api/document?id=urn:contentItem:62WG-20D1-DY4H-K2NT-00000-00&idtype=PID&context=1516831)

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98. [*What we must do together*](https://advance.lexis.com/api/document?id=urn:contentItem:62WM-6GK1-F072-426M-00000-00&idtype=PID&context=1516831)

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99. [*- Walmart 's Regenerative Approach: Going Beyond Sustainability*](https://advance.lexis.com/api/document?id=urn:contentItem:60WT-MYC1-JD3Y-Y26W-00000-00&idtype=PID&context=1516831)

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100. [*How to identify win–win interventions that benefit human health and conservation*](https://advance.lexis.com/api/document?id=urn:contentItem:671W-P2M1-JCWX-C2C3-00000-00&idtype=PID&context=1516831)

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# [***Hancock mulls timber and ag vehicle that prioritizes carbon capture***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61T4-H6M1-JCXV-K40P-00000-00&context=1516831)

Agri Investor

January 19, 2021 Tuesday

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**Length:** 768 words

**Byline:** Chris Janiec

**Body**

[*Hancock Natural Resource Group*](https://www.agriinvestor.com/database/#/profile/19404)  is exploring the possibility of a distinct vehicle for timber and ag investments that prioritizes carbon sequestration over financial returns.

The potential for a vehicle that would take such an "impact-first" approach was included in the inaugural  [*Task Force on Climate-related Financial Disclosures*](https://www.fsb-tcfd.org/about/) -aligned  [*report*](https://www.manulifeim.com/institutional/global/en/resources/documents/hnrg-climate-report) , released in late December.

HNRG is the ag and timber-focused subsidiary of  [*Manulife Investment Management*](https://www.agriinvestor.com/database/#/profile/2240) .

Manulife sustainability head Brian Kernohan told Agri Investor discussions about any potential vehicle are at a "very exploratory" stage and come at a time of  [*growing prominence*](https://www.agriinvestor.com/decarbonization-momentum-will-continue-to-support-ag/)  for carbon  [*markets*](https://www.agriinvestor.com/carbon-credit-prices-supply-and-demand-have-no-idea-where-to-meet-truterra/) .

"We are thinking about whether or not there is a way to offer - if there is an appetite for it among investors - the asset class specifically for the purposes of mitigating climate change," he explained.

Kernohan assumed his current position overseeing sustainability for all of Manulife's private investments in September. This comes after an eight-year stint with HNRG that culminated in six years as its chief sustainability officer, according to his LinkedIn  [*profile*](https://www.linkedin.com/in/brian-kernohan-99178518/) .

He pointed to the  [*Net-Zero Asset Owners Alliance*](https://www.unpri.org/climate-change/un-convened-net-zero-asset-owner-alliance/5370.article#:~:text=The%20UN%2Dconvened%20Net%2DZero,greenhouse%20gas%20emissions%20by%202050.&text=The%20alliance%20was%20launched%20in,UN%20Secretary%20General's%20Climate%20Summit.)  of institutional investors aiming to ***remove*** greenhouse gas ***emissions*** from their portfolios by 2050 as just one of many recent indications of demand to allocate capital toward climate change mitigation.

"The prominence of natural climate solutions is gaining a lot of traction and we believe if investors are serious about contributing positively to mitigating climate change, they may be interested in natural climate solutions from timberland and ***agriculture***," he said.

Among the sustainability practices mentioned in the report is a link between 20 percent of annual employee incentive plan compensation and certification of HNRG's 5.4-million-acre timber portfolio under  [*Sustainable Forestry Initiative*](https://www.forests.org/)  standards. Kernohan explained that some form of stewardship performance has been a part of compensation for a portion of HNRG employees for at least the past five years and that the portion subject to the policy had expanded to the entire firm within about the last two years.

A 2019 sustainable investing  [*report*](https://www.manulifeim.com/institutional/global/en/sri-report)  stated 101,000 of the 447,000 farmland acres  managed by HNRG had attained third party certification of farming practices and committed the firm to certifying the remainder by the end of this year.

HNRG opted to release its climate disclosure report in compliance with the TCFD framework established in 2017 by the  [*Financial Stability Board*](https://www.fsb.org/about/) , said Kernohan, because it is likely to become the "gold standard" for transparency.

The TCFD's framework suggests disclosures in four categories: governance; strategy; risk management and metrics; and ***targets***. Specific disclosures include information about oversight of climate-related risks and opportunities governance, resilience of strategy under different climate-related scenarios and identification of metrics used to track progress toward environmental and social goals.

"There does seem to be movement to have firms like ours acknowledge the importance, and have awareness of, climate change and the risks and opportunities it can provide," Kernohan said.

HNRG's report identifies  [*carbon*](https://www.agriinvestor.com/carbon-markets-could-be-outstripped-by-demand-for-next-handful-of-years-indigo-ag/)  ***removal*** as the "most beneficial" climate-related opportunity within timber and ***agriculture***. Kernohan said the firm is studying how growing attention to sustainability and carbon should shape management of assets, both in existing  [*vehicles*](https://www.agriinvestor.com/database/#/fund-profile/45470)  and through potential "impact-first" offerings prioritizing carbon sequestration.

"We do know that you have to manage a ***forest*** differently if you want more carbon than if you want two-by-fours. We're not illuminating whether or not there is a tradeoff in value, it's that you manage for a different product from the ***forest***," he said. "That is the second stream we are thinking about."

HNRG's report includes reference to climate scenarios in which carbon prices in advanced economies rise to as high as $100 per ton of CO2 by 2030 and further to $140 per ton by 2040. Kernohan declined to discuss how the firm's interpretation of those projections is informed by its own experience selling 6.1 million metric tons of carbon credits, which is also referenced in the report.

He added that the firm monitors developments throughout related markets closely.

"The question we are asking ourselves, and many  [*others*](https://www.agriinvestor.com/westchesters-davies-on-investors-moral-obligation-to-natural-capital/)  are as well, is: 'If not just carbon offsets as we know the markets today, what could carbon be used for?'" Kernohan asked. "That's where there is an interesting question mark around the investment of ***forest*** and farmland."

**Load-Date:** April 19, 2021

**End of Document**



[***Forest service protections sought for wolves in Idaho, Montana wilderness areas***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62WG-YCT1-JDG9-Y30Y-00000-00&context=1516831)

Impact News Service

June 10, 2021 Thursday

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**Length:** 1197 words

**Body**

Washington, DC: The Humane Society of the United States has issued the following press release:

A coalition of wildlife advocates and hunters, represented by the non-profit environmental law firm Earthjustice, today asked the U.S ***Forest*** Service to issue new protections for wolves in designated wilderness areas following Idaho and Montana’s enactment of a rash of aggressive anti-wolf laws.

The petition, submitted to ***Agriculture*** Secretary Tom Vilsack and top ***Forest*** Service officials, asks the ***Forest*** Service for protection of wolves in national ***forest*** wilderness areas from new Idaho and Montana laws allowing professional contractors and private reimbursement programs--resembling 19th-century wolf bounties--to dramatically reduce wolf populations in the two states.

During their 2021 sessions, the Montana and Idaho legislatures enacted harsh anti-wolf laws that ***target*** up to 1,800 wolves. One goal of the laws is to artificially inflate elk populations – which are currently at or above population objectives in most management units – to levels last seen in the mid-1990s, before wolves were reintroduced to their historical range in the Northern Rockies. Wolves are being ***targeted*** even though scientific studies show that drought and excessive hunting quotas, not predation, caused some elk populations to decline.

“A wilderness is supposed to be a wild place governed by natural conditions, not an elk farm,” said Earthjustice attorney Timothy Preso. “We are calling on the ***Forest*** Service to prevent Montana and Idaho from taking the wild out of wilderness through their aggressive wolf-***removal*** campaigns. ”

The petition asks the ***Forest*** Service to issue new regulations and closure orders to prevent wolf killing by professional and subsidized hunters and trappers across nearly 8 million acres of designated wilderness in Idaho and Montana, including such flagship areas as the Bob Marshall Wilderness in northwest Montana and the Frank Church-River of No Return and Selway-Bitterroot Wildernesses in central Idaho. These proposed measures include:

Initiating a new rulemaking to safeguard the wilderness character of these protected places. Imposing restrictions on bounty hunting of wolves to prevent wilderness degradation. Prohibiting wolf hunting and trapping activities by private contractors in congressionally designated wilderness areas.

The groups’ petition focuses on a guarantee in the 1964 Wilderness Act that the ***Forest*** Service must manage designated wilderness as “an area where the earth and its community of life are untrammeled by man, … retaining its primeval character and influence, … which is protected and managed so as to preserve its natural conditions. ” New laws that authorize professional contractors and subsidized trappers to drive down wolf populations threaten to degrade wilderness conditions by upsetting the balance of predator and prey and eliminating a keystone wildlife species that is an icon of the wilderness landscape.

The petitioner groups include the Center for Biological Diversity, Defenders of Wildlife, Friends of the Clearwater, the Humane Society of the United States, the Humane Society Legislative Fund, International Wildlife Coexistence Network, Montana Wildlife Federation, Sierra Club, Western Watersheds Project, Wilderness Watch and Wolves of the Rockies.

The following are statements from the petitioner groups:

“Dispatching trappers and private contractors to cruelly and ruthlessly kill wolves on public ***lands*** threatens both the survival of the species and the character of the wilderness areas where they range,” said Nicholas Arrivo, managing attorney for the Humane Society of the United States. “The ***Forest*** Service must take action to mitigate the damage that Idaho and Montana’s reckless wolf-killing legislation will cause. ”

“The ***Forest*** Service has long recognized that the presence of the Northern Rockies' treasured wolves on the landscape enhances and preserves congressionally designated wilderness areas,' said Keisha Sedlacek, director of regulatory affairs for the Humane Society Legislative Fund. “The agency must carry out Congress’ intent to protect wolves from commercially driven slaughter. ”

“Wolves need wildernesses to serve as a refuge where they can be safe from the slaughter they face across Idaho and Montana,” said Andrea Zaccardi, a senior attorney with the Center for Biological Diversity. “Protecting wilderness requires the ***Forest*** Service to also protect wolves, which are so ecologically important to our national ***forests***. ”

“The state-sanctioned killing of wolves in Idaho and Montana threatens to needlessly damage the natural balance within our wilderness areas in these states for years to come,” said McCrystie Adams, managing attorney at Defenders of Wildlife. “We urge the U.S ***Forest*** Service to abide by its duty and take immediate action to safeguard the unique character of our wilderness areas against these states’ wolf-killing measures. ”

“The wild Clearwater region is the northern half of the largest relatively intact ecosystem in the lower 48 states,” said Gary Macfarlane, ecosystem defense director for Friends of the Clearwater. “Wolves and other species make places like the Selway-Bitterroot Wilderness truly wild. This petition seeks to keep it that way. ”

“The Montana Wildlife Federation supports ethical, fair chase hunting of wolves, but this is anything but ethical or fair chase,” said Nick Gevock, conservation director of Montana Wildlife Federation. “Paying contractors to go into wilderness areas and kill wolves amounts to an all-out eradication effort that harkens back to the 19th Century. These are wild areas that offer some of the best hunting in the country for all species, and these moves degrade that. It’s disgraceful and it needs to be stopped. ”

“Wolves are essential to the overall health of ecosystems, but Montana and Idaho’s new laws aim to decimate their populations in the Northern Rockies. We cannot allow the modern equivalent of a bounty system for wolf killing to operate in wilderness areas— the very places meant to provide refuge for wildlife to thrive,” said Dan Ritzman, director of ***lands***, water and wildlife at the Sierra Club. “With the extinction crisis bearing down, we need wilderness areas to remain intact and in support of life-sustaining biodiversity more than ever. ”

“Wilderness is a place where natural processes should prevail, and the howl of the wolf should echo from peak to vale,” said Erik Molvar, executive director of Western Watersheds Project. “Healthy populations should be allowed to thrive throughout the range of the gray wolf, and their ability to flourish should not be impeded by commercially-driven killing, especially in Wilderness. ”

“Montana and Idaho have declared a despicable war on wolves and on the very idea of Wilderness itself,” said George Nickas, executive director of Wilderness Watch. “The ***Forest*** Service has the authority and mandate to protect these special places and their wildlife. It needs to put a stop to this ugly slaughter. ”

“Americans need to know that wolves can exist unmolested by man in our few remaining wildernesses,” said Marc Cooke, representative of Wolves of the Rockies.

**Load-Date:** June 10, 2021

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[***Vast swathes of forest and bog lost to fires last year***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62N1-XCB1-DY4H-K2X1-00000-00&context=1516831)

Belfast Telegraph Online

May 11, 2021 Tuesday 7:14 AM GMT

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**Section:** NORTHERN IRELAND; Version:1

**Length:** 589 words

**Byline:** Andrew Madden

**Highlight:** Destruction of 180 hectares of woods and peatland in 2020 prompts call for action

**Body**

Almost two million square metres of ***forest*** and peatland across Northern Ireland were destroyed by wildfires last year, new figures have revealed.

Staff at the Department of ***Agriculture***, Environment and Rural Affairs' ***Forest*** Service dealt with 22 blazes in 2020. As a result, a total of 70 hectares of ***forest*** and 110 hectares of peatland were burnt.

The news comes following a devastating gorse fire that engulfed the Mourne Mountains last month. That took three days and more than 100 firefighters to bring under control.

Around 3.5 square kilometres of ***land*** around the lower slopes of Donard, at Millstone and Thomas's Mountain, were destroyed.

It is thought the blaze at the beauty spot was deliberate. The NI Fire and Rescue Service declared a major incident, with Coastguard helicopters and 12 fire appliances brought in to tackle it.

Alliance rural affairs spokesman John Blair MLA called for action to prevent further destruction. "The devastating fires at the Mournes caused shockwaves across communities due to the significant biodiversity loss and the destruction of this scenic area," he said.

"However, it is important we don't lose sight of the fact many fires across Northern Ireland cause damage on an annual basis; the overall picture is extremely concerning. I recognise the department is paying particular attention to the damage of ***forests*** and peatlands, and we must do all we can going forward in this regard. This might include reviewing penalties of these responsible."

Yesterday MLAs debated the second stage of Northern Ireland's first Climate Change Bill, which would commit to reaching net zero ***emissions*** by 2045.

The SDLP's Dolores Kelly is sponsoring a separate Environment and Nature Restoration Bill calling for the introduction of strategies to protect woodlands and peatlands.

"Woodlands and peatlands in the North are an important source of biodiversity for plant and animal life. We know that our woodland coverage is among the worst on these islands, and without intervention the life that thrives on peatland is also at risk," she said.

"The Environment Minister spent a long time in the Assembly on Monday opposing cross-party climate crisis legislation. It is time he got real and moved to deal with the ecological crisis facing us.

"Wildfires and biodiversity loss will only worsen if we don't take action now.

"That means introducing tougher controls on burning peatland to protect our natural environment, it means introducing training opportunities and incentives for ***land*** managers to engage in rewetting or woodland management as ecosystem services.

"We have the opportunity to address the crisis we're all facing. But it first demands that we face up to the scale of the crisis and commit to acting quickly."

Party colleague Colin McGrath added: "We need to take action now to prevent wildfires and to encourage ecological recovery from these events.

"We are calling on the Environment Minister to introduce resourced strategies to protect our woodlands and peatlands from destruction.

"That should include additional regulation of sensitive areas so that rewetting and cutting are the methods of choice for ***land*** managers."

Wildfires do not just impact on nature and wildlife, but they could also contaminate our drinking water supply, it has been warned

Rebecca Allen of NI Water explained: "Wildfires within these catchments not only pose a terrible risk to all life, but ***removes*** the primary layer of vegetation, leaving the burned bare soil exposed to erosion, which then makes its way into the reservoirs."

**Load-Date:** May 11, 2021

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[***Human Otoacariasis in Two Climatically Diverse Districts in Sri Lanka: Seasonality, Risk Factors, and Case Notes***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:693W-H7V1-F129-P50D-00000-00&context=1516831)

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**Section:** Pg. 1326-1340; Vol. 66; No. 4; ISSN: 1230-2821,1896-1851

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**Byline:** [*rupikar@pdn.ac.lk*](mailto:rupikar@pdn.ac.lk)

**Body**

Introduction

The presence of ticks in the external auditory canal is known as otoacariasis, a common occurrence in domesticated and wild animals, but not often reported in the medical literature. The human otoacariasis case reports have come from South Africa, Chile [], USA [], Nepal [], Malaysia [, ], India [], Israel [], Turkey [], Japan [], South Korea [], and Sri Lanka []. The ticks are often attached to the bony part of the auditory canal, tympanic membrane, cartilage part of the ear canal and ear pinna, and some with multiple ticks []. Indudharan et al. (1999) [] presented a descriptive study of human otoacariasis, reporting a high incidence of otoacariasis predominantly with cattle tick in Malaysia.

The first record of otoacariasis in Sri Lanka reported the occurrence of intra-aural nymphal Dermacentor auratus in 29 patients (2 infants, 15 children aged < 12 years, and 12 adults) from a private hospital in the Kandy District []. Then, a retrospective study carried out for a 2-year period (2000 and 2001) by Dilrukshi et al. (2004) [] recorded 870 patients from the Rathnapura District. They reported nymphal stage of Amblyomma integrum was the most common species []. Later, an island-wide study reported five species of ticks infesting the human ear canal, nymphal stage of D. auratus being the dominant species in all the districts []. All these studies have observed a higher prevalence of infestation among children and women.

Tick activities are usually seasonal. Information on the season when the tick activity starts is important in determining the best practice for countermeasures against tick infestations. Studies have shown that tick infestations mostly ascend in the rainy season and are fewer in the dry season in the tropics, whereas lowest in winter in the temperate region [, ]. This is because, during the rainy season, the tick populations thrive in the environment, though the high temperature is also a vital factor. Studies have shown a relationship between surging tick infestations in different arrays of environmental conditions in different geographical regions; for example, epidemiological factors like temperature, humidity, and rainfall are associated with seasonality and risk factors of human tick infestations, especially otoacariasis [–]. The study conducted in Ratnapura district in Sri Lanka reveals a seasonality of human otoacariasis from November to March during the onset of northern monsoon []. The seasonality or the tick species' activity pattern is of great importance in controlling tick infestations and tick-borne infections.

Risk factors of otoacariasis have not been studied before. However, risk factors of acariasis (tick infestations) have been studied in five districts of Sri Lanka (Kandy, Anuradhapura, Kurunegala, Nuwara Eliya, and Rathnapura), and reported gender and age as risk groups where women and children below the age of 10 years are more vulnerable []. The same study says that the association with wildlife in the neighbourhood, engagement in outdoor activities, and occupation are risk factors. The authors especially draw attention to the “Kandyan ***forest*** gardens” associated with a majority of houses in Kandy district to host many wild animals, resulting in a high prevalence of otoacariasis in people who are associated with the garden in their daily chores. Studies suggest certain risk groups and risk factors/indicators for otoacariasis around the world include: women [, –], people who are associated with livestock as their occupation, and people who are living in rural areas [, , ] are more prone to otoacariasis. The objective of the present study was to assess the seasonality and socio-ecological risk factors, and report some case notes of human otoacariasis in two selected districts in Sri Lanka.

Materials and Methods

Study Sites

Two climatically diverse districts: Anuradhapura (Dry Zone) and Kandy (Wet/Intermediate Zone; Fig. ), with a high prevalence of otoacariasis cases [], were selected as study sites.

Map showing the two study sites in Sri Lanka: Kandy District in the Wet/Intermediate Zone and Anuradhapura District in the Dry Zone

Anuradhapura District

Anuradhapura District is a peneplain of 7179 Km2 with a human population of 856,232 with a density of 119 people per Km2 []. Anuradhapura has a mean annual rainfall of 1255 mm with a distinct rainy season from late September to early January and a shorter season from late March to mid-May, followed by a distinct dry season from May to September []. The average temperature is above 30 °C, and the relative humidity of 60% in September and 85% in December []. The ***forest*** cover is less than 200,000 ha, where the natural vegetation mainly consists of tropical dry mixed evergreen ***forest***. The fauna in the district consists of many large-to-small mammals. According to the Performance Report and Annual Accounts of 2012 [] in the Anuradhapura Divisional Secretariat, farmers make up for a large fraction of the population. Major farming crops include paddy and vegetables, and in addition, coconut, cashew, and mango comprise a small fraction of the ***agricultural*** ***lands*** []. Animal husbandry is confined to cattle, buffalo, and poultry.

Kandy District

Kandy District is 1940 km2 in its size and has a population of 1,375,382 []. Kandy District has a mean annual rainfall of 1840 mm with a distinct dry season from May to September, and the mean annual temperature is 23 °C []. The district is mostly covered by lowland monsoon ***forests*** to moist montane ***forests***. According to the Divisional Secretariat performance report 2013 [], people have a wide range of occupations. The cultivated ***land*** area consists of paddy and crops such as tea, rubber, coconut, cinnamon, pepper, coffee, and spices. Animal husbandry includes cattle, poultry, buffaloes, goats, and many others.

Tick Collection from Ear, Nose, and Throat (ENT) Clinic

Ticks were collected from otoacariasis patients attending the ear, nose, and throat (ENT) clinic of the General Hospitals at Anuradhapura (AGH) and Kandy (KGH) districts. Clinics were visited regularly once a week and the samples were collected with the help of the ENT staff. Ticks removed from the patients' ear canal were placed in 1.5 ml centrifuge vials containing 95% ethanol, brought to the laboratory, and were identified using available keys and literature [–]. Identifications were confirmed by Dmitry Apanaskevich at the Department of Biology, Georgia Southern University, USA, and the Assistant Curator of the U.S. National Tick Collection. Tick specimens were categorised as partially or fully engorged using the shape of the abdomen and its colour. Informed consent was obtained from the patient before the collection of ticks. Contact numbers and addresses of the patient were noted down after informed consent with the help of the hospital staff. The collection was carried out for a 2-year period.

Seasonality and Distribution of Otoacariasis

Monthly data were plotted to determine the seasonality of otoacariasis in the two districts. The association of disease prevalence with temperature, precipitation pattern, and relative humidity was assessed using the data obtained from the Meteorological Department, Sri Lanka. The distribution of the otoacariasis cases within the district was mapped using ArcGIS version 10.2.

Risk Factors of Otoacariasis: Questionnaire Data Collection

A case/control patient follow-up study was carried out by visiting the patients at home using the contact details recorded at the two hospital clinics. Only the patients living within the district boundary were considered. Information was collected using a semi-structured, pre-tested questionnaire after obtaining verbal consent from the patient. Background information (age, gender, occupation, education, etc.) and behavioral and disease-related information to assess the risk factors (involvement in outdoor activities, sleeping habits, household animals, wild animals in the neighbourhood, proximity to a wooded area, etc.) were gathered through interviewing the patient in vernacular.

Three types of controls (non-patients) were used as follows: Type “A” control: An individual in the same household where the patient lived but with no outdoor activities. Type “B” control: An individual residing in the same neighbourhood with no pets or livestock in their household but with exposure to wild animals. Type “C” control: An individual living in the same village with no exposure to wild animals while having pets or livestock. Information was collected from both patients and non-patients in the two districts.

During the visit to villages, ticks from the pets and livestock in the respective household and nearby houses were collected. Questing ticks were collected by flagging for 15 min using a 75 × 150 cm muslin cloth attached to a pole. All the ticks collected were preserved in 95% ethanol, brought to the laboratory, and identified.

Data Analysis and Ethical Clearance

Categorical variables are presented as numbers and percentages. A matched Chi-square test was used to analyse differences in socio-demographic characteristics between the cases of the two districts. The association between risk factors and the case management practices in the two districts were compared using a Chi-square test. Binary multivariate conditional logistic regression analysis was conducted among the cases and the three control groups to assess the risk associated with otoacariasis (R2 = 35.70%). The data were analysed using MINITAB version 18 (Minitab, Inc. State College, Pa.).

All the study protocols and objectives were approved by the Institutional Ethical Clearance Committee of Faculty of Medicine, University of Peradeniya, Sri Lanka.

Results

Hospital-based Data Collection

Sixty-nine ticks were collected from otoacariasis patients visiting the ENT clinic in the Anuradhapura General Hospital (AGH) for a 2-year period (February, 2013–February, 2015). Of which, eight patients were from other districts: Kurunegala (n = 4), Kandy (n = 1), Mullaithiv (n = 1), Matale (n = 1), and Kilinochchi (n = 1), and therefore not included in the analysis. Thus, only 61 patients were included in the study where all were single tick infestations. A total of 66 ticks were collected from otoacariasis patients visiting the Kandy General Hospital (KGH) hospital during 1-year period (December 2013–November 2014). A patient from Polonnaruwa district treated in the Kandy ENT clinic was omitted from the study. Therefore, 65 patients were considered as the number of cases recorded for the period. Four multiple tick infestations were recorded, of which three were multiple bilateral ticks, and the other had two ticks in one ear canal. One patient who had two separate infestations visited the ENT clinic at the KGH twice, first in February and again in May 2014. Although the objective of the study was to collect samples for a 2-year period, the second year collection from KGH was given to another research group carrying out a toxicology study, and therefore, the results are presented only for one year.

Tick Species Associated with Otoacariasis

Four tick species were identified: Dermacentor auratus, Amblyomma integrum, Hyalomma isaaci, and Rhipicephalus haemaphysaloides. In the KGH, D. auratus, A. integrum, and H. isaaci were encountered. The majority of the cases were infested with D. auratus (90.8%) followed by A. integrum (4.6%) and H. isaaci (3.1%; Table ). One specimen could not be identified due to the damaged body parts. All the infested stages were nymphs. In AGH, D. auratus, A. integrum, and R. haemaphysaloides were found. The majority of the cases were infested with D. auratus (93.4%) followed by A. integrum (3.3%) and R. haemaphysaloides (3.3%; Table ). All the ticks were nymphs except for two cases infested with R. haemaphysaloides in which they were female ticks.

Information on the otoacariasis cases recorded during the study period with respect to tick species

| **Study area** | **Tick species infested (*n*)** | **Life stage** | **Body condition\*** | | **Blood meal** | |
| --- | --- | --- | --- | --- | --- | --- |
| **IB (%)** | **D (%)** | **FE (%)** | **PE (%)** |
| Kandy(*n* = 65) | *Dermacentor auratus* (59) | N | 88.1 | 11.9 | 61.0 | 39.0 |
| *Amblyomma integrum* (3) | N | 100.0 | ? | 100.0 | ? |  |
| *Hyalomma isaaci* (2) | N | 50.0 | 50.0 | 100.0 | ? |  |
| Unidentified (1) | N | ? | 100.0 | 100.0 | ? |  |
| Total |  | 86.2 | 13.8 | 64.6 | 35.4 |  |
| Anuradhapura (*n* = 61) | *Dermacentor auratus* (57) | N | 71.9 | 28.1 | 52.6 | 47.4 |
| *Amblyomma integrum* (2) | N | 0.0 | 100.0 | 100.0 | ? |  |
| *Rhipicephalus haemaphysaloides* (2) | F | 50.0 | 50.0 | 50.0 | 50.0 |  |
| Total |  |  | 68.9 | 31.1 | 54.1 | 45.9 |

N Nymphal stage, F female, D ticks with damaged body parts FE Fully engorged, PE Partially engorged

\* Body condition of the tick was considered as soon as the tick was removed from the ear

Ticks were either fully or partially engorged when they were removed from the ear. The number of fully engorged ticks in the ear canal of patients at the KGH (61.5%) and AGH (54.1%) was not different between the two hospitals (Chi-square test; χ2 = 1.445, p = 0.229). During the ***removal*** of the ticks, some could be mechanically damaged due to the pressure of the device and the method of ***removal*** being used. A significantly fewer number of ticks removed at the KGH (13.8%) were damaged than those from AGH (31.1%; Chi-square test; χ2 = 5.450, p = 0.02).

Tick ***Removal*** Method at the Two Hospitals

The ***removal*** method of the tick from the ear canal in the ENT clinics at the two hospitals was different. The method used at the KGH was first to apply glycerine to kill the tick, send the patient home, and, on a later day, wash the ear canal with lukewarm water by a metal ear syringe. This method could take several days to 4 weeks from the first presentation of the patient to the clinic and ***remove*** the tick. Some patients may suffer severe ear pain, inflammatory responses in the ear canal due to the tick bite, or secondary infections; in such instances, micro-suction was performed using a suction device supported with a microscope. This method takes several days to 2 weeks. In certain patients, if the tick was attached to the outermost part of the ear canal, it is removed using crocodile forceps after applying some glycerine drops. At AGH, when the patient was presented to the clinic, usually, he/she was admitted to the ENT ward, and lidocaine was administered to anesthetize the tick, and then, the tick was removed by a pair of crocodile forceps or by applying micro-suction and, in certain instances, by syringing. This procedure could take up several hours to a week. Glycerine application followed by syringing or applying suction has rarely been practiced at the AGH.

Seasonality of Otoacariasis and the Influence of the Climatic Factors

Otoacariasis patients were recorded throughout the year in the Kandy District, with random peaks in October, December, and February (Fig. a). Since the data collection was done only for 1 year, we cannot, however, predict a season for human otoacariasis for Kandy District and make a generalised statement here. The 2-year data from the Anuradhapura District show that otoacariasis was not year-round but more seasonal, where patients were recorded from January to March (Fig. b). There was no significant relationship between the prevalence of otoacariasis with the precipitation, humidity, and temperature in both districts (Pearson correlation for precipitation: Kandy R = 0.081, p = 0.802; Anuradhapura R = − 0.145, p = 0.625).

Periodicity of human otoacariasis incidence in the two districts: a Kandy District for a 1-year period (December, 2013–November, 2014), and b Anuradhapura District for 2-year period (March, 2013–February, 2015), with special reference to the climatic factors of the district; average temperature (°C), relative humidity (RH), and precipitation (PPT in mm)

Geographic Distribution of Otoacariasis Cases in the District

The distribution of otoacariasis cases in the Kandy District was patchy with 32 locations restricted to the central part of the district (Fig. a). The highest number of patients (six) was recorded from Thalathuoya. Of the 32 locations, two patients in Ambatenna, Halloluwa, Hatharaliyadda, Jambugahapitiya, and Udadumbara, three patients in Gurudeniya, Kandy, Katugastota, Muruthalawa, Watagoda, and Waththegama, four patients in Ampitiya and Manikhinna, and five in Poojapitiya were recorded. There were no patient records from the Gampala-Nawalapitiya area (southwest), Rikillagaskada area (southeast), and Gomara area (northeast; Fig. a).

Otoacariasis case locations in the two districts: a Kandy District and b Anuradhapura District. Circle represents the locations with a single patient record, triangle represents the locations with two patient records, square represents the locations with three patient records, and star represents locations with four or more patient records

The distribution of otoacariasis cases in Anuradhapura District was 30 locations scattered throughout the District (Fig. b). Of these, two patients from Anuradhapura, Giribawa, Horrowpathana, Mahawilachchiya, Mihinthale, Nelumkulama, Padawiya, Parakramapura; three patients from Galenbindunuweva, Kekirawa, Medawachchiya, Nochchiyagama, Parasangasweva; three patients from Galkulama; five patients were from Kahatagasdigiliya; and six patients from Galkadawala were recorded (Fig. b).

Gender and Age Distribution of Otoacariasis Patients

A significantly higher number of female patients were recorded from the KGH (80.0%; one-sample Chi-square test: χ2 = 23.4, p < 0.001), but there was no difference in the gender distribution of patients reported to the AGH (females = 52.5%, χ2 = 0.147, p = 0.701). The patients’ age ranged from 8 months to 74 years in the Kandy District and 1 year to 93 years in the Anuradhapura District (Fig. ). Age dependency of otoacariasis was found in both Kandy (Chi-square test; χ2 = 38.3, p < 0.001) and Anuradhapura (χ2 = 33.4, p < 0.001) districts, showing that the children were more prone to infestation. Between the two districts, although more adult patients were reported in AGH (42.6%) than KGH (23.1%), the difference was not statistically significant (χ2 = 3.05, p = 0.08).

Age distribution of the otoacariasis patients of Kandy and Anuradhapura Districts (n = 126)

Patient Follow-up Study

Socio-Ecological Background of the Patients

Forty-seven patients in Kandy District and 35 patients in Anuradhapura District were visited during the patient follow-up study (Supplementary data). All the patients, except one from each district, were involved in one or many outdoor activities. Since most of the patients were children, they were primarily engaged in playing in the garden or nearby field or ***forest*** (Kandy = 68.1% and Anuradhapura = 68.6%). Other outdoor activities were firewood collection, farming, gardening, and bathing. None of the patients in the Kandy District claimed bathing as an outdoor activity as the bathing facilities were available inside the house or an outdoor facility within the premises. Next to children, the percentage of homemakers getting the infestation was high in both districts (14.9% in Kandy District and 11.4% in Anuradhapura District). Moreover, the percentage of skilled ***agricultural*** farmers was high in the Anuradhapura District (11.4%). All the patients in Anuradhapura slept in beds, whereas 93.6% of the patients used beds in the Kandy District and others slept on the floor (6.4%).

Most households had domesticated animals, dogs being the most common (Kandy = 70.2% and Anuradhapura = 85.7%). Other animals include cats, goats, cattle, poultry, and buffalo. None of the patients in the Anuradhapura District had goats or buffaloes as domesticated animals, whereas in the Kandy District, few reared goats, buffaloes, and poultry. Home gardens were common and more than 80% of the houses in the Kandy District and 60.0% of the houses in the Anuradhapura District were surrounded by home gardens. In the Kandy District, the home garden is a unique system called “Kandyan ***Forest*** Garden system” almost the same as a tropical rain ***forest*** and comprises spices like black pepper, nutmeg, clove, vegetables, coconut, and fruits like banana, mango, citrus, avocado, etc. In the Anuradhapura District, the home gardens were mostly comprised of dry zone vegetable patches or small-to-large-scale grasslands and shrub ***forests***, especially with elephant grass (Panicum maximum). The majority of the houses in both districts were located adjoining a plantation or a ***forested*** area. In the Kandy District, these plantations included tea, paddy, or vegetables, whereas in Anuradhapura, it was paddy or vegetables.

The association of wildlife with the households in both the districts was very high, especially in Kandy (91.5% and Anuradhapura = 74.3%). In both districts, the most commonly encountered animals in the vicinity were the common palm squirrel (Funambulus palmarum) and wild boar (Sus scrofa cristatus). Other animals were toque monkey (Macaca sinica), peacock (Pavo cristatus), barking deer (Muntiacus muntjak), hog deer (Axis porcinus), porcupine (Hystrix indica), water monitor (Varanus salvator), giant squirrel (Ratufa macoroura), jackal (Canis aureus lanka), and elephant (Elephas maximus maximus).

Analysis of Risk Factors of Otoacarisis

The main risk factors of otoacariasis were identified as engagement in outdoor activities in both districts (Table ). In addition, the presence of domesticated animals was identified as a risk factor in Anuradhapura (logistic regression; OR = 18.06, 95% CI 2.3684–137.7506; p > 0.001), whereas association wildlife in and around the household was a risk factor in the Kandy District (Logistic regression; OR = 5.30, 95% CI 2.2353–12.5800; p > 0.001; Table ). The occupation was not a risk factor when controlled for confounding effects of outdoor activities.

Statistical analysis of risk factors of human otoacariasis in Kandy and Anuradhapura Districts

| **District** | **Risk factors** | ***?2* value** | ***p* value** | **Odds ratio (OR)** | **95% Confidence interval (CI)** |
| --- | --- | --- | --- | --- | --- |
| Kandy | Engagement in outdoor activities | 7.74 | 0.005\* | 2.73 | (1.2969, 5.7643) |
| Presence of domestic animals | 3.13 | 0.077 | 1.87 | (0.9176, 3.8499) |  |
| Association with wildlife | 18.31 | > 0.001\* | 5.30 | (2.2353, 12.5800) |  |
| Anuradhapura | Engagement in outdoor activities | 17.23 | > 0.001\* | 17.51 | (2.2977, 133.5165) |
| Presence of domestic animals | 17.70 | > 0.001\* | 18.06 | (2.3684, 137.7506) |  |
| Association with wildlife | 3.04 | 0.081 | 2.09 | (0.8890, 4.9226) |  |

\*Statistical significance at 95% confidence interval (p = < 0.05)

Otoacariasis Case Notes

Patients of both unilateral and bilateral ear infestations were recorded in Kandy, whereas only unilateral infestations were presented in Anuradhapura (Table ). All the patients except one from Kandy claimed that they had experienced ear fullness when the tick was inside the ear canal. Other common symptoms were tinnitus, otalgia, myalgia, and liberation of powdery discharge from the ear canal and a lesser extent: fever, otitis externa, hearing impairment, eschar, and suppurative otitis media. Overall, 17% of the patients were misdiagnosed as suffering from upper respiratory tract infections during their first presentation to the Out-Patients Department (OPD) of the general hospital or to the private clinic, and there was no difference in the number of misdiagnosed cases at the two hospitals (Table ). Although the ***removal*** method was different in the two hospitals, there was no difference in the number of patients facing complications following the tick ***removal*** (Kandy = 48.9% and Anuradhapura = 54.3%; Chi-square test; χ2 = 0.504, p = 0.478).

Disease-related information of otoacariasis patients in the Kandy and the Anuradhapura District

| **Response variable** | **Percentage of patients % (*n*)** | |
| --- | --- | --- |
| **Kandy** | **Anuradhapura** |
| Symptoms |  |  |
| ?Fever | 8.5 (4) | 25.7 (9) |
| ?Otitis externa (ear oedema) | 6.3 (3) | 14.3 (5) |
| ?Hearing impairment | 0.0 (0) | 5.7 (2) |
| ?Ear fullness (irritation) | 97.9 (46) | 100.0 (35) |
| ?Tinnitus (ringing ear) | 80.8 (38) | 60.0 (21) |
| ?Otalgia (ear pain) | 29.8 (14) | 45.7 (16) |
| ?Myalgia (muscles other than the ear) | 17.0 (8) | 17.1 (6) |
| ?Eschar | 2.1 (1) | 2.9 (1) |
| ?Blackish powdery discharge from the ear canal | 38.3 (18) | 28.6 (10) |
| ?Suppurative otitis media (inflammation, redness, mucous) | 10.6 (5) | 5.7 (2) |
| Misdiagnosis of otoacariasis as upper respiratory tract infection |  |  |
| ?Yes | 17.0 (8) | 17.1 (6) |
| ?No | 83.0 (39) | 82.9 (29) |
| Information related to the ***removal*** of the tick |  |  |
| ?Method of ***removal*** |  |  |
| ??Glycerine applied and syringed | 83.0 (39) | 2.8 (1) |
| ??Glycerine applied and suctioned | 14.9 (7) | 8.6 (3) |
| ??Lidiocane applied and surgically removed | 2.1 (1) | 28.6 (10) |
| ??Lidiocane applied and syringed | 0.0 (0) | 5.7 (2) |
| ??Lidiocane applied and suctioned | 0.0 (0) | 54.3 (19) |
| ?Time period for recovery |  |  |
| ??Less than 1 week | 44.7 (21) | 82.9 (29) |
| ??More than 1 week | 55.3 (26) | 17.1 (6) |
| ?After medication |  |  |
| ??None | 65.9 (31) | 28.6 (10) |
| ??Painkillers orally | 2.1 (1) | 20.0 (7) |
| ??Antibiotics orally | 8.5 (4) | 20.0 (7) |
| ??Painkillers and antibiotics orally | 8.5 (4) | 20.0 (7) |
| ??Antibiotics/anti-inflammatory drugs orally | 8.5 (4) | 2.8 (1) |
| ??Anti-inflammatory ear drops | 8.5 (4) | 45.7 (16) |
| ??Ear wick | 6.4 (3) | 5.7 (2) |
| ?Complications after the ***removal*** of the tick |  |  |
| ??None | 48.9 (23) | 54.3 (19) |
| ??Ear fullness for several weeks | 17.0 (8) | 17.1 (6) |
| ??Ear fullness for several months | 21.3 (10) | 11.4 (4) |
| ??Local redness | 4.3 (2) | 5.7 (2) |
| ??Itchiness | 29.8 (14) | 37.1 (13) |
| ??Otalgia | 4.3 (2) | 17.1 (6) |
| ??Hearing impairment | 2.1 (1) | 5.7 (2) |
| ??Suppurative otitis media | 4.3 (2) | 2.9 (1) |
| ??Enlargement of lymph glands | 2.1 (1) | 0.0 (0) |
| ??Blood discharge | 0.0 (0) | 2.9 (1) |
| ??Otitis externa | 0.0 (0) | 2.9 (1) |
| ?Secondary treatments |  |  |
| ??Yes | 4.3 (2) | 14.3 (5) |
| ??No | 95.7 (45) | 85.7 (30) |
| Information on previous tick infestations |  |  |
| ?Previous tick infestations |  |  |
| ??No | 61.7 (29) | 68.6 (24) |
| ??Yes | 38.3 (18) | 31.4 (11) |
| ?\*Site of infestation |  |  |
| ??Head region | 50.0 (9) | 9.1 (1) |
| ??Trunk region | 33.3 (6) | 27.3 (3) |
| ??Arms and legs | 66.7 (12) | 90.9 (10) |
| ??Ear canal (otoacariasis) | 22.2 (4) | 0.0 (0) |
| ?\*Method of ***removal*** |  |  |
| ??Handpicked without any application | 61.1 (11) | 72.7 (8) |
| ??Handpicked after application of oil | 16.7 (3) | 9.1 (1) |
| ??Removed at the hospital/private clinic | 27.8 (5) | 18.2 (2) |
| ?\*Medication given |  |  |
| ??No | 77.8 (14) | 81.8 (9) |
| ??Yes | 22.2 (4) | 18.1 (2) |
| ?\*Complications aroused after the ***removal*** |  |  |
| ??Persisting wounds | 44.4 (8) | 18.1 (2) |
| ??Local redness and inflammatory responses | 27.8 (5) | 9.1 (1) |
| ??Itchiness | 88.9 (16) | 72.7 (8) |

\*Percentages were calculated considering only the patients who had previous tick infestations

The recovery period of the patients varied between the two districts. A higher percentage of patients in the Kandy District (55.3%) spent more than a week for recovery than patients in the Anuradhapura District (17.1%; Chi-square test; χ2 = 12.287, p < 0.001; Table ). In certain instances, subsequent medications were prescribed after ***removing*** the intra-aural ticks or when they dropped off from the ear canal. A significantly higher number of patients from the Anuradhapura District (81.4%) received treatment after tick ***removal*** compared to those of the Kandy Districts (34.1%; χ2 = 4.787, p = 0.029). Subsequent medication consisted of oral drugs such as painkillers, antibiotics, and anti-inflammatory drugs or/and anti-inflammatory ear drops. Special treatment of anti-inflammatory medications, ear wick, was given to few patients (Kandy = 6.4% and Anuradhapura = 5.7%) with severe inflammation in the ear canal with a high degree of obstruction due to otalgia. Ear wick is a shred of thread inserted into the external ear canal to apply ear drops outside the ear to pass it along and enter into the ***targeted*** site. Those who complained of having complications, experienced ear fullness and itchiness and minor distresses such as local redness, otalgia, hearing impairment, and suppurative otitis media. One patient had enlargement of lymph glands, blood discharge from the ear canal, and otitis externa (Table ). Secondary treatment to complications following tick ***removal*** was less common in both districts (Kandy = 4.3% and Anuradhapura = 14.3%).

Although a third of the patients claimed that they had previously been subjected to general tick bites, only four patients from Kandy had intra-aural ticks and none from the Anuradhapura District (Table ). A similar number of patients complained of previous tick infestations other than otoacariasis in both districts (Kandy District—38.3% and Anuradhapura District—31.4% (chi-square test; χ2 = 2.57, p = 0.109). Among the general tick infestations, the most vulnerable attachment sites were arms and legs and eyes and the ear pinna on the head. Most patients claimed that they did not use any particular ***removal*** method or apply medication while ***removing*** ticks. Still, they just pinched the ticks off using their fingertips and rarely sought medical advice unless the attached site was a sensitive area, for example, the eye, ear canal, or genital area. Patients who were previously subjected to tick bites had one or more complications following tick ***removal***. Most claimed that they had itchy papules where the ticks fed earlier, persisting wounds, and inflammatory responses like swellings and local redness in and around the feeding site of the tick.

Ticks Collected from Households of Patients

Seven species of ticks were found questing on vegetation in the Kandy District and five species in the Anuradhapura District. Among the four species associated with human otoacariasis, three species: D. auratus, R. haemaphysaloides, and A. integrum were recorded on vegetation. Cats were infested with D. auratus, and dogs and cattle were infested with R. haemaphysaloides.

Discussion

Prevalence of Otoacariasis in the Two Districts

A higher number of cases were reported from the Kandy District (65 cases for 1 year) than from the Anuradhapura District (61 for 2 years). This is consistent with the earlier findings of a recent study done in five districts in different agro-ecological zones reporting Kandy District having more cases than the Anuradhapura District []. Higher elevation of 100–1600 m with a mean annual rainfall of 1840 mm and a mean annual temperature of 23 °C in Kandy provide ideal environmental conditions for the high prevalence of the ticks and this together with the associated risk factors may have elevated the prevalence of tick infestations in the Kandy District.

All the cases from the Anuradhapura District were single tick infestations. In the Kandy District, 94% of the cases were single infestations, while the rest (6%) was multiple infestations. Of the multiple tick infestations, three cases were multiple bilateral ticks and a single event of multiple ticks in the same ear canal. These multiple infestations were all girls aged 3 (1), 4 (2), and 5 (1) years from different localities. This is the first record of bilateral otoacariasis in Sri Lanka although multiple intra-aural tick infestations have been reported elsewhere. Koosha and Mohamed (2014) [] described case management of bilateral intra-aural ticks in a 6-year-old female who recovered without any clinical complications after ***removing*** the tick. Moreover, Kangsanarak et al. from Thailand (1992) [] reported an unusual case of brown dog tick, R. sanguineus mature and immature ticks (n=127) in an ear canal (one engorged female, larvae, and various engorgement sizes adults) of a 7-month-old female who had recovered without any major complications after the tick ***removal***. Furthermore, in the present study, a patient with a subsequent tick attack within 4 months was also recorded.

Tick Species Associated with Otoacariasis

The present study reported four tick species in the human ear canal: D. auratus, A. integrum, H. isaaci, and R. haemaphysaloides of which D. auratus was the most common (> 90%) tick species. This finding is consistent with the previous records of Edussuriya and Weilgama (2003) [] and Ariyarathne et al. (2016) [] reporting nymphal D. auratus as the major tick species causing otoacariasis in Sri Lanka. However, Dilrukshi et al. in 2004 [] reported nymphal A. integrum as the major tick species in the Rathnapura District. We assume that it may be a misidentification of species. Dermacentor auratus is a three-host, hard tick. Adults parasitize wild boar, domestic pig, bear, and deer, while the immature stages parasitize small mammals like Rattus spp., squirrels, hare, porcupines, and civet cats, deer, monkeys, leopards, etc. [, , ]. The present study reported cats carrying immature stages of this tick species, and it was earlier reported from dogs []. This tick is known to dwell in closed virgin and secondary ***forests*** at an altitude below 400 m, where it is known to complete the life cycle at 23 ± 6 °C and an RH of 95% under laboratory conditions [, ]. Most of the households of otoacariasis patients in the present study were frequently visited by wild boars, the primary host of D. auratus. Therefore, the household members can acquire the infestations through domesticated animals or directly from the wild animals. Moreover, D. auratus prefer humid and moist body sites like the external auditory canal and eyelids [, ].

Of the other three species, A. integrum followed by H. isaaci and R. haemaphysaloides tend to feed on a variety of hosts, and human is an accidental host [, , ].

Seasonality of Otoacariasis

Otoacariasis is seasonal in the Anuradhapura District from January to March, but was year-round in the Kandy District. A previous study has shown that in the Ratnapura District, the otoacariasis season from December to January []. In the Kandy District, since the collection was done only for 1 year, seasonality cannot be confirmed uncritically. The number of cases increased, following a heavy rainy period. Studies have shown that immature stages of ixodids are abundant after a rainy season [].

Geographic Distribution of Otoacariasis Cases

The distribution of otoacariasis cases in the two districts was different: in the Kandy District, it was localized to the middle part of the district, whereas for the Anuradhapura District, it was scattered throughout the district. This can be attributed to the availability of accessible healthcare facilities in the two districts. In the Anuradhapura District, ENT clinic is available in the General hospital, while in the Kandy District, four other hospitals have ENT clinics: Base Hospital Gampola, Base Hospital Nawalapitiya, Base Hospital Teldeniya, and Teaching Hospital Peradeniya. Moreover, all three base hospitals are located out of the city of Kandy; thus, if there were any otoacariasis patients from the far corners of the district, they were more likely to seek treatment from the nearest ENT clinic rather than visiting the ENT clinic at the KGH. Since the collection only contained samples from KGH, the number of otoacariasis cases was seriously underreported in the Kandy District in this case.

Risk Factors and Risk Groups

Children less than 10 years were a risk group in both districts, while females have been identified as a risk group in the Kandy District. Other studies also show a higher occurrence in females and children below 10 years of age [, , ]. Co-sleeping at night and close association of infants with their mothers might be the cause for children, and women were at a higher risk of otoacariasis []. A study by Somayaji and Rajeshwari (2007) [] reported 126 tick otoacariasis cases where there were more female patients, but the majority of the patients belonged to the age group 31–40 years. There was no gender difference in the patients in the Anuradhapura District. The gender differences in otoacariasis are not fully understood, even though many research reports more female otoacariasis patients [].

Engagement in outdoor activities was a risk factor in both districts. In addition, the presence of domesticated animals in the household was a risk in the Anuradhapura District factor, while the presence of wildlife around the house had been identified as a risk factor in the Kandy District. A recent study done in the same two districts reported risk factors of general tick infestations as outdoor activities, presence of wildlife around the house, location of the house, and occupation []. Outdoor activities and association with wildlife have been listed as risk factors for tick infestations and tick-borne diseases by other authors [, , ]. However, in the present study, occupation and the presence of a home garden were not identified as risk factors when controlled for the confounding effect of outdoor activities. In the Kandy District, the majority of the houses had a ***forest*** garden which is used by the household members for collecting firewood, raring animals, cutting grass for livestock, etc. Women and children are primarily involved in these activities. This “Kandyan Home Garden system”, a globally recognized oldest agro-forestry system in Asia, is used as an alternative household income source. While engaged in outdoor activities, immature questing ticks on vegetation are encountered and humans become accidental hosts. For instance, in forestry workers, the prevalence of Lyme borreliosis was higher in a study done in Italy where they are infested by ticks that they encounter during their fieldwork []. Ley et al. in 1995 [] pointed out walking through a ***forested*** trail for more than 5 h a week poses a risk of tick infestation. ***Forested*** gardens attract wildlife. In a given area, the tick abundance can be high if wildlife like small mammals is associated []. While ticks use passive and active tactics, many species quest to find a host remaining in different heights of the vegetation which defines the height of their host, attachment sites, etc. []. In the current study, wildlife such as rodents, wild boar, monkeys, peacocks, barking deer, and porcupine were frequent visitors in home gardens and the ***forested*** patches in both districts. Other studies done on tick-borne diseases reveal that the individuals who are living in ***forested*** fringes are more prone to tick-borne diseases [, ]. In Kandy District wild boar, the primary host of the dominant tick species of otoacariasis, D. auratus was a frequent visitor and has now been listed as a pest. The prevailing law in the country bans the killing of wild boars within ***forest*** reserves, and selling wild boar meat is illegal, but no restriction is imposed on killing the animals that enter plantations and home gardens. However, the communities have experienced an increase in the numbers of wild boars in recent years (personal communication with villagers). Among the questing ticks collected from the houses visited, immature stages of D. auratus were recorded. Earlier, Liyanaarachchi et al. (2014) [] also collected a large number of immature stages of D. auratus from farm paddock.

In the Anuradhapura District, domesticated animals posed a risk of otoacariasis. Ley et al. in 1995 [] suggest that there is no significant association, but some studies show that pet owners are frequently attacked by ticks []. In Anuradhapura District, domesticated animals were mostly dogs, cats, and cattle. Most of these domestic animals are not tethered, but are free-roaming and/or free grazing. Thus, they can pick questing ticks and bring them inside the house. During the visit, the ticks collected from domesticated animals in the Anuradhapura District had the immature stages of D. auratus. In Kandy and Anuradhapura Districts, the controlling of the cases should be addressed differently, since the risk factors were different. For the Kandy District, the focus should be more towards reducing the encounter of wild animals like wild boars; for the Anuradhapura District, the focus should be more on grooming of livestock and pets and using acaricides.

Otoacariasis Case Notes

All the patients showed symptoms; the majority suffered from ear fullness or irritation. Ear fullness is the clogging sensation patients experience due to the logging of the tick in the ear canal []. Ear fullness and otalgia/ear pain are common symptoms of otoacarisis [, , , , , , –] followed by symptoms like tinnitus, myalgia, powdery discharge from the ear canal, suppurative otitis media, otitis externa, and fever [, ]. Rarely hearing impairment, bleeding, and facial palsy have been reported [].

When the ticks were attached to the bony, cartilaginous, or muscular part of the ear canal, they pierced their mouthparts into the skin to imbibe blood. While feeding, ticks inject their saliva with various chemicals, which can exert toxic effects on the human host []. Attached tick’s faeces, oozed blood, and ear wax produce a blackish powdery discharge which is a common symptom of otoacariasis [, ]. Due to the toxicity, ear pain develops, which ultimately can result in facial palsy given the tick species, especially if the tick is H. marginatum and the site of the tick attachment [–]. The paralysis is mostly caused by the neurotoxin secreted by the female tick []. Mostly, the symptoms like hearing impairment, secondary infections like otitis media, and suppurative otitis externa are a result of attempts of tick ***removal***, especially by inexperienced clinicians or due to the ***removal*** attempts by the patient []. However, contrary to the above toxin theory, a recent report by Kularatne et al. (2018) [] showed a strong association of otoacariasis with lower motor facial palsy when the tick is infected with rickettsia. In the present study, one patient developed an eschar as a result of tick infestation, and this was suspected to be a rickettsial infection. Later, the tick was tested positive for rickettsial DNA. In the medical record of the patient, symptoms of the spotted disease (high fever and skin rash over arms) and tinnitus were entered. However, as the child was not tested for rickettsia, it was not a confirmed case, but was given antibiotics.

Tick ***Removal*** Methods and their Consequences

Different tick ***removal*** methods are practiced at the KGH and the AGH. In the KGH, glycerine is used to kill the tick, whereas in Anuradhapura, lignocane is used to anesthetize the tick. Then, the ticks were later removed by syringing, suctioning, or using forceps. Administration of local anesthesia (LA) is a common practice where lidocaine (4 or 10%) and xylocaine (10%) anesthetize the tick until the suction or forceps ***removal*** is performed []. Local anesthesia also has mild anaesthetic activity over the tick bitten area, so it will reduce the pain during the procedure. In most of the otoacariasis cases, LA was administered and the tick was removed using crocodile forceps, and sometimes, suction was applied to ***remove*** the tick [, –, , , , –]. Although faeces of the tick is syringed out, it is rarely performed in hospitals to ***remove*** ticks, since it can exert tympanic perforation and secondary infections due to the moisture in the ruptured eardrum []. General anesthesia (GA) has also been used to ***remove*** ticks, especially where the patients were children and/or were under severe pain [, ]. Negative pressure application or suctioning is also recommended, since it can access even the innermost attached foreign bodies [].

Time taken for the tick ***removal*** process in the KGH may last from several days to 2 weeks, whereas in the AGH, it takes several hours to a maximum of one week. Duration of tick attachment or the tick’s feeding time significantly increases the burden of infection risk of tick-borne diseases in the host []. Therefore, the tick ***removal*** method should be focused more on eliminating the risk of tick-borne diseases. Since the KGH uses syringing after killing the tick, most ticks were intact during the ***removal*** process. However, a significant number of ticks were damaged in the AHG, since the clinic used the forceps ***removal*** method after anesthetizing the tick. Therefore, even though the ***removal*** time was shorter, the rate of damage was higher.

Consequently, the damaged mouthparts might cause secondary infections following the tick ***removal***. Davies and Benger in 2000 [] stated that all the foreign body extraction methods have pros and cons depending on the type of the foreign body, where it is attached, the condition of the patient, etc. Forceps ***removal*** is associated with bleeding, tympanic perforation, and abrasions, whereas the irrigation method (syringing) is associated with tympanic perforation and inner ear stimulations []. Since the AGH uses forceps ***removal***, the mechanical damage to the ear canal and the tick is higher, so, generally, as a precaution, a majority of the patients were administered oral and topical antibiotics to avoid any subsequent secondary infections (Personal communications). Whereas in the KGH, antibiotics were prescribed only for patients who were showing signs of secondary infection or damaged ear canal.

Despite the ***removal*** method, complications following the tick ***removal*** were common. Most patients suffered from ear irritation and itchiness, and some were suffering from local redness, otalgia, hearing impairment, and suppurative otitis media. However, treatment for secondary complications after tick ***removal*** was rare in both districts, since most of the patients did not seek medical advice, because the complications disappeared after several days and the patients claimed that “because it was bearable didn’t go to the ENT clinic again”.

The present study shows that otoacariasis was seasonal in the Anuradhapura District, whereas it was year-round in the Kandy District. The most dominant tick species D. auratus was common to both districts. Children and outdoor activities were identified as risk factors in both districts. However, other risk factors and the treatment protocols were different in the two districts.

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**Notes**

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[***£150 million government investment to save the world's rainforests***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:626F-NM11-F0YC-N2JM-00000-00&context=1516831)

Impact News Service

March 12, 2021 Friday

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**Body**

London: UK Government has issued the following news release:

* New government funding to protect tropical rainforests, regions and communities across Africa, Asia and Latin America

1. funding will help protect 2.1 million hectares of rainforests, an area the size of Wales, from deforestation
2. programme will have the potential to create thousands of green jobs throughout rainforest regions and generate almost £1 billion of green private sector investment to tackle climate change around the world

A new multi-million pound fund launched today will help protect rainforests equivalent to an area the size of Wales, cut millions of tonnes of carbon ***emissions*** and improve the lives of over 600,000 people in tropical ***forest*** communities across Africa, Asia and Latin America.

Through the newly launched Mobilising Finance for ***Forests*** Programme, the government will invest £150 million for businesses and investors who support and deliver sustainable ***land***-use projects and protect rainforest regions like the Amazon and Indonesian basins in communities vulnerable to climate change.

This is also expected to attract as much as £850 million private investment, support thousands of green jobs across multiple sectors, such as ***agriculture***, food, and technology in these regions, and is predicted to provide 23% of the reduction in carbon ***emissions*** and climate impacts needed over the next decade to meet the goals set in the Paris Agreement.

The projects that could benefit include those that promote transparent supply chains and implement deforestation-free standards, supporting an estimated 600,000 small-scale farmers and food producers to incorporate ***forest*** protection into ***agricultural*** production.

This funding will help to ***remove*** 28 million tonnes of CO2 from the atmosphere, equivalent to the offsetting London’s entire CO2 ***emissions*** annually over the next 15 years, through investing in eco-friendly projects like harvesting nuts, seeds, and coffee sustainably, restoring lost ***forests***, diversifying crops to prevent soil erosion, and launching conservation activities – restoring tropical ***forests*** as our most effective and natural carbon capture and storage sinks.

Today’s funding forms part of the UK’s existing commitment of £11.6 billion for international climate finance, which includes the Prime Minister’s recent pledge to spend at least £3 billion to protect nature and precious biodiversity over the next 5 years, of which projects to maintain ***forests*** will be a major part.

Energy Minister Anne-Marie Trevelyan said:

The impact of deforestation is devastating – on those vulnerable rainforest communities, and on global efforts to combat climate change. And the health of the earth’s tropical ***forests*** is critical to the health of our planet – we need to do all we can to protect and preserve this vital ecosystem.

Today’s new fund will ramp up investment in projects on the frontline of this effort, while also giving financial institutions the confidence they need to invest, which could attract and secure as much as £850 million from the private sector.

International Environment Minister Lord Goldsmith said:

Deforestation is not only a major contributor to climate change, it is responsible for catastrophic biodiversity loss and it undermines the livelihoods of many hundreds of millions of people who depend on ***forests***. So the UK is absolutely committed to tackling global deforestation.

In addition to expanding our own woodlands, we are working internationally to tackle the main drivers of deforestation and protect our vital ***forests***. This funding is a demonstration of our leadership in the run-up to the crucial G7 and COP26 summits. We are clear that there is no pathway to tackling climate change that does not involve the recovery of nature.

More than a quarter of the world’s population rely on ***forest*** resources for their livelihoods, including providing more than 13 million green jobs. Rainforests are also habitats for a vast array of plants and animals and safeguard the planet’s resilience to climate change, including storing carbon dioxide in tree trunks, roots and soil. Through unsustainable approaches like deforestation, the world has lost one-third of its ***forests*** since the last ice age – an area twice the size of the United States, releasing a predicted one fifth of the world’s greenhouse gas ***emissions***.

By 2030, the global transition to sustainable food and ***land*** use will be worth £1.8 trillion annually. This will help 1.5 billion people come out of poverty and feed an additional 2.2 billion by 2050, while protecting valuable natural resources being cleared to make way for grazing animals and to grow crops.

COP26 President Alok Sharma said:

The world’s ***forests*** provide over 1.5 billion people with food and livelihoods and are a vital resource that is disappearing at an alarming rate, and we must do more to protect them.

Nature and biodiversity is a key campaign of COP26 and action to tackle its loss will be crucial in the fight to address the impact of climate change whilst also supporting sustainable livelihoods. I am pleased the funding announced today will help secure the future for millions of hectares of ***forest*** across the globe.

The programme is being delivered in partnership with the Netherlands’ Development Finance Institution, which will aim to co-invest up to £36 million of its own capital in project.

Executive Director of Tropical ***Forest*** Alliance Justin Adam said:

I welcome the United Kingdom’s announcement of a new £150 million facility to Mobilise Finance for ***Forests***. Our ***forests*** are critical in the fight to slow climate change and address biodiversity collapse. Yet deforestation, predominantly from the expansion of ***agriculture***, is causing the loss of 3.8 million hectares per year of pristine rainforest.

This is an area of tropical rainforest the size of Switzerland that the world is losing. Meeting food security and environmental goals is going to require innovative finance approaches that blend public and private monies. I am excited to see how this new facility can accelerate efforts to stop deforestation.

Chief Executive Green Finance Institute Dr Rhian-Mari Thomas OBE said:

Nature and climate are increasingly being recognised as 2 sides of the same coin – we can’t solve for one without solving for the other. We welcome the MFF programme, which can play an important catalytic role, helping to crowd-in private capital towards sustainable ***forest*** use.

This kind of program, particularly the inclusion of credit guarantee structures, can be a highly efficient way to de-risk sustainable ***land*** use investments, making them attractive to investors whose return appetite would otherwise not be met. This is an important step in scaling up green investment in nature-based solutions to help tackle climate change and deforestation.

The government’s International Climate Finance (ICF) programme plays a key role in supporting the growth of innovative sustainable farming and forestry businesses globally. In 2019, UK ICF programme helped reduce deforestation levels in Colombia by 19% - a great step towards reducing ***emissions*** and protecting the people in ***forests*** in one of the most bio-diverse countries in the world.

In February 2021, the UK COP26 Presidency also launched the ***Forest***, ***Agriculture*** and Commodity Trade (FACT) Dialogue, which will bring together key countries exporting ***agricultural*** products and the countries consuming these products to discuss how to make this process greener and more sustainable. The dialogue will run up to COP26 and beyond.

Through the government’s ICF programme and COP26 presidency, the UK will continue to play a crucial role in addressing the global challenge of climate change internationally in the run up to the COP26 UN Climate Summit in November. Britain is among the largest contributors of public climate finance and the government is committed to providing support which is transparent, transformative and in line with the needs and priorities of developing countries.

**Load-Date:** March 13, 2021

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[***Minister watching livestock herd 'very carefully'***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6262-VRG1-JC8V-40B0-00000-00&context=1516831)

Irish Examiner

February 25, 2021 Thursday

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**Section:** FARMING; Pg. 1

**Length:** 594 words

**Byline:** Stephen Cadogan

**Body**

Methane from the livestock herd cannot increase over the next decade, as this would clearly increase global warming, said ***Agriculture*** Minister Charlie McConalogue this week.

"I will be watching livestock number trends very carefully and, as I indicated very recently at the IFA AGM, we are approaching the point where a mature discussion is needed to ensure environmental compliance costs are not transferred from expanding farmers to all farmers."

His comments come after December 2020 Livestock Survey results released last weeks howed the total number of cattle fell from 6,593,500 to 6,529,400 in 2020. Dairy cows increased from 1,425,800 to 1,456,000, but "other" cows decreased from 956,900 to 922,700. There was a 1.4% increase in sheep. The overall situation is reduction in the suckler herd offsetting expansion in dairy herds, with the result that methane ***emissions*** for 2020 are unlikely to increase.

Although the government will encourage diversif ication away from livestock, Mr McConalogue said Ireland's agrifood sector will remain principally based around livestock, for production of high-quality meat and milk proteins. "While consumption of these products may fall in the EU over the coming decades, global demand is expected to remain high. Ireland must occupy this space, because we can produce these products in a more carbon-efficient way than most countries throughout the world."

On the methane produced in the rumen of grazing livestock such as cattle and sheep, he said: "We must have a serious debate about all aspects of methane.

"Methane is a potent greenhouse gas but the programme for Government recognises that it has distinct characteristics that need to be taken into account in Government policy.

"In time, I believe that a technological solution will be found that will contribute to methane reduction, mainly in the form of methane reducing feed additives and livestock breeding improvements.

"I also believe that livestock has come in for some unfair criticism in recent times. There are those within the general population who believe eating a hamburger is more detrimental to our planet that getting on an aeroplane. We need to counter this narrative."

The minister said it will be possible for farmerst reduce ***emissions*** substantially in the coming decades, and he is keen to find ways to reward these farmers.

"We only have to look at the success of the woodland environmental fund within my department, whereby private sector companies are paying farmers to establish native woodlands. As afforestation rates increase, there will be room to expand on this scheme, creating opportunities for more farmers. However, it will not be limited to forestry. I see opportunities for the re-wetting of peat-based soils and reduction of methane from the livestock herd through use of feed additives."

Management intensity on thousands of hectares of peat-based grassland must be altered, to allow them naturally lock up carbon. These soils are cur rently a net emitter of carbon.

The minister said the agrifood sector must reduce greenhouse gases, increase the carbon ***removal*** or sequestration potential of ***land*** and ***forests***, meet ammonia ***targets***, reduce negative impacts on water quality, and build resilient food production and ***land*** use for climate and air obligations, while meeting market expectations.

Farmers must reduce chemical nitrogen use 20% in the next decade; move to protected urea fertiliser and low-***emission*** slurry spreading; maintain or increase tillage production; and significantly increase afforestation and organic production.

**Graphic**

Picture, **Environmental compliance costs cannot be transferred from expanding farmers to all farmers, warns McConalogue**.

**Load-Date:** March 11, 2021

**End of Document**



[***Unilever procurement chief talks climate crisis: The world's food system needs to change***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60CF-KYR1-JC6M-X2YF-00000-00&context=1516831)

FoodNavigator.com

July 16, 2020 Thursday 1:41 PM GMT+1

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**Section:** BUSINESS

**Length:** 2106 words

**Byline:** Katy Askew, , [*Katy*](mailto:Katy)

**Body**

Unilever recently set out a range of commitments to tackle climate change as well as halt and even reverse the degradation of the natural world. This includes a ***target*** to reach net zero ***emissions*** from all products by 2039. FoodNavigator speaks to Chief Procurement Officer Dave Ingram to learn more.

Last month, CPG giant Unilever upped the anti on its already market-leading sustainability agenda when it detailed new actions to fight climate change , protect and regenerate nature and preserve resources for future generations .

The scope of Unilever s ambition should not be understated but then nor should the scale of the challenged faced.

The Paris Climate Change Agreement, a landmark international deal inked in 2016, set the ambition to limit global heating to 1.5°C above pre-industrial levels. This already looks in jeopardy.

The latest forecast from the World Meteorological Organization (WMO) suggests that over the next five years there is a 24% chance the global average temperature rise will exceed 1.5°C for 'at least' one year.

While this doesn t mean the Paris Agreement s long-term goal will be breached, it comes as a stark reminder of the very real nature of rising temperatures and the need for urgent action.

The food system is an important piece of the puzzle.

According to a meta-analysis by Joseph Poore and Thomas Nemecek published in Science , food is responsible for 26% of global greenhouse gas (GHG) ***emissions***. Much of this takes place at an ***agricultural*** level livestock is linked to 31% of food ***emissions***, crop production accounts for 27%, and ***land*** use change adds 24%. Supply chain (from processing to retail) contributes 18%.

When counting the carbon cost of our current food system, there is a strong argument that food waste should be added to the ledger. One-third of the food produced is currently wasted. If food waste were a country, it would be the world s third largest carbon emitter, behind only the USA and China.

Today, around two billion people globally are overweight, nearly a billion people go to bed hungry, while a third of all food produced is lost or wasted. Producing and consuming food is exhausting the earth s resources and fuelling the climate crisis. At the same time, the COVID-19 pandemic is reminding us all of the importance of a resilient food supply chain, Unilever Chief Procurement Officer Dave Ingram explained.

Everyone everywhere deserves access to good food. But for people to get their fair share, the world's food system needs to change.

Climate ***targets***, food production and the supply chain

Unilever s existing carbon ***targets*** were to achieve zero ***emissions*** from its own operations, and to halve the GHG footprint of its products across the value chain, by 2030. But the company recognises this is not enough.

Responding to the scale and urgency of the climate crisis the London-headquarterd consumer goods giant said it will also achieve net zero ***emissions*** from all its products by 2039 from the sourcing of materials to the point of sale.

We set a net zero ***emissions*** by 2039 ***target***, a full 11 years ahead of the Paris Agreement. We believe that all ***emissions*** across the value chain matter and we should therefore take all ***emissions*** into consideration. At Unilever, our first responsibility is for our own operations and for the raw materials and ingredients that we purchase as this is where we have the most control, Ingram told FoodNavigator.

Given the scale and complexity of Unilever s global supply chain, this is a daunting task. But Ingram stressed that the company isn t coming from a standing start.

We ve already been working for several years to reduce our environmental impact, with some good progress made: We use 100% renewable grid electricity across our sites around the world, 25 Unilever sites are carbon neutral with several more expected to achieve this by the end of this year and 62% of our ***agricultural*** raw materials are sourced sustainably.

To advance, Unilever will prioritise building partnerships with suppliers who have set and committed to their own science-based ***targets***. The company also intends to strengthen its existing commitments to working with farmers and smallholders in its direct supply chain.

We all want our food to be made in ways that are fair to others, and the planet. So, at the same time as supporting people to choose healthy, balanced diets, we strive to source our ingredients sustainably and support farmers, smallholders and others who make their livelihood from working with us, Ingram said. We have a world-class supply chain team who work hard every day to make this a reality.

The Knorr-to-Magnum manufacturer's brands will collectively invest 1bn in a new Climate & Nature Fund. The cash will be used over the next ten years to take meaningful and decisive action , the company revealed.

Biodiversity, climate and deforestation

***Land***-use change and the expansion of current ***agricultural*** practices, with a focus on intensive farming of monocultures, are threatening what is left of the world s biodiversity.

It s estimated that over one-third of the planet s ice-free ***land*** surface is dedicated to food production. The last 300 years have seen approximately 50% of natural grasslands and one-third of natural ***forests*** converted for food production. And this figure is expected to grow.

According to Dr Carlos Nobre, a senior climate scientist at the University of São Paolo, bio-diverse hotspots like the Amazon are in peril due to ***agricultural*** expansion.

Deforestation rates increased dangerously in the last three years. Especially in the last 12 months, during which the deforestation rate in the Amazon has increased by over 40%. Deforestation rates in Colombia are also increasing. That is very worrying, [*he said during a press briefing from the Intergovernmental Panel on Climate Change*](https://www.foodnavigator.com/Article/2019/08/06/Forests-are-essential-for-food-security-Changing-what-we-eat-can-help-save-them)  (IPCC).

As well as contributing to biodiversity, ***forests*** play an important role in keeping the climate in check. ***Forests*** ***remove*** a third of carbon ***emissions*** in the air each year. Protecting and expanding ***forests*** could provide an additional 25% of the mitigation needed by 2030 to keep global warming at 1.5 degrees, IPCC analysis suggests.

Already, 89% of Unilever s ***forest***-related commodities are certified as sustainably sourced to globally recognised standards. However, to end deforestation, we must challenge ourselves to even higher standards, the company said.

To raise the bar, Unilever wants to move away from the mass balance system, which it said does not allow for accurate verification of deforestation-free when sourcing derivatives of commodities. Instead, the company wants visibility on exact sourcing locations .

Unilever said it will achieve a deforestation-free supply chain by 2023 by increasing traceability and transparency through emerging digital technologies.

We ve enhanced our efforts to increase traceability through emerging technologies such as satellites, geolocation, blockchain and artificial intelligence, and are working with major technology firms and start-ups to develop new approaches from which the whole industry can benefit. Only by companies coming together and using cutting-edge technology to carefully monitor our ***forests*** will we create a sustainable future, Ingram elaborated.

Transparency: Holding companies and brands to account

Increased transparency, Ingram continued, is also a powerful tool to empower consumers to take action on the environmental issues they care about.

To make informed, sustainable choices, as well as to hold companies and brands to account, consumers deserve full visibility. People have a right to know where the products they buy come from, and how they were made.

We have been long committed to driving transparency and the best way to demonstrate this is by opening up our own supply chain. If we take palm oil as an example we were the first consumer goods company to publicly disclose the palm oil suppliers, refineries and mills in our supply chain and are the only consumer goods company to publish a public grievance report so issues, such as cases of deforestation, can be identified and appropriate action taken.

Transparency, Unilever believes, can also be used to accelerate the global race to zero ***emissions***. To this end, the company intends to communicate the carbon footprint of every product we sell .

To do this, we will set up a system for our suppliers to declare, on each invoice, the carbon footprint of the goods and services provided; and we will create partnerships with other businesses and organisations to standardise data collection, sharing and communication."

From preservation to restoration

Unilever also set out a plan to help regenerate nature by increasing local biodiversity, restoring soil health, and preserving water conservation and access.

This, Unilever said, will be achieved by empowering farmers and smallholders who are committed to protecting and regenerating their farm environment. The approach echoes work already being undertaken by Unilever brand Knorr in South Africa. [*Alongside WWF, Unilever has partnered with smallholder farmers in the country to introduce lesser-known, drought-resistant crops into Knorr s supply chain.*](https://www.foodnavigator.com/Article/2020/02/28/Unilever-builds-agrobiodiversity-in-South-Africa-for-Knorr-products)

New initiatives include securing legal ***land*** rights, access to finance and financial inclusion, and development of restorative practices. These will run in parallel with Unilever s new Regenerative ***Agriculture*** Code, which will apply to all its suppliers. The new code will include details on farming practices that help rebuild 'critical resources'.

Elsewhere, Unilever identified water security as an issue that requires urgent attention. Citing data from the World Bank, Unilever noted that already 40% of the world s population is affected by water insecurity.

To tackle this, Unilever will implement water stewardship programmes for local communities in 100 locations by 2030. Again, the approach builds on learnings from previous initiatives in this case Unilever s Prabhat programme in India, which takes a community approach to water management.

The company will also leverage its innovation might to make its products, which include home and personal care brands, biodegradable by 2030 to minimise impact on the aquatic ecosystem.

The need for collaboration

Furthering its efforts on water security, Unilever is joining the 2030 Water Resources Group, a multi-stakeholder platform hosted by the World Bank. The Group aims to contribute towards transformative change and resilience in water management in key water-stressed markets, such as India, Brazil, South Africa, Vietnam and Indonesia.

This is indicative of Unilever s belief that system-wide change at the speed needed to avert climate catastrophe cannot be driven by business alone. It requires collaboration from all stakeholders, including industry, regulators and civil society.

When we look at the industry more broadly, we believe that implementing the commitments outlined in the We Mean Business Coalition s Take Action Framework should be the priority, Ingram told us.

This includes setting a Science-Based ***Target*** for ***emissions*** reductions in line with the 1.5-degree ambition of Paris Agreement, switching to renewable energy, reporting climate-related financial risks and opportunities, and supporting the development of nature-based climate solutions (such as climate-smart ***agricultural*** practices and reforestation) and eliminating deforestation from commodity supply chains.

Beyond voluntary industry codes and commitments, Unilever wants governments to act.

Ingram elaborated: This is what we are calling for: Greater political momentum ahead of COP26, including long-term strategies from all countries for decarbonisation in line with the Paris Agreement; Better carbon pricing, and the ***removal*** of fossil fuel subsidies that drive negative carbon prices; The repurposing of existing ***agricultural*** subsidies to grow a variety of crops for a balanced diet, and support for farmers transitioning to regenerative ***agriculture***; A more favourable policy environment for plastic waste reduction, including approval of food-grade recycled plastics, financial incentives for the right behaviours, and support for advanced recycling technologies; Better recycling infrastructure, and industry-wide action to reduce plastic use and improve waste management, including collection, in line with SDG 12 and the principles of a circular economy for plastics.

Nothing less than a transformation is needed.

Additional sources

'Reducing food s environmental impacts through producers and consumers' Science DOI: 10.1126/science.aaq0216 Authors: J Poore & T Nemecek

**Load-Date:** July 16, 2020

**End of Document**



[***Climate transition depends on shifting finance***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:625N-9F71-DYXB-V2DX-00000-00&context=1516831)

EurActiv.com

March 9, 2021 Tuesday

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**Length:** 547 words

**Byline:** Bas Eickhout, Krista Mikkonen

**Highlight:** The criteria for the EU sustainable finance taxonomy can show investors and businesses the way to climate neutrality globally and getting the taxonomy right would make the EU a global trailblazer, argue Krista Mikkonen and Bas Eickhout.

**Body**

*Krista Mikkonen is the Minister of the Environment and Climate, Finland; Bas Eickhout is a Green MEP and the European Parliament's co-rapporteur on the Taxonomy Regulation*

Climate emergency is still with us. Global greenhouse gas ***emissions*** that plummeted due to the COVID-19 pandemic-related economic shutdowns have now already exceeded levels preceding the pandemic according to International Energy Agency.

To achieve the Paris Agreement goals we need to accelerate our transition to climate neutral circular economy. The EU can and should take the lead. It is fundamental to shift financial flows to 1,5C compatible investments if we are to meet - and go beyond - the EU's enhanced 2030 climate ***target***.

The EU sustainable finance taxonomy is a classification system establishing a list of environmentally sustainable economic activities. The framework was agreed between the European Parliament and the Council under the Finnish Presidency of the EU in 2019 and once fully implemented, it will have a crucial role in facilitating the climate transition of the economy.

In order to create the necessary security for investors seeking to finance climate solutions, it is important that the evaluation criteria have integrity and that the reduction of ***emissions*** and the strengthening of ***removals*** are based on sound science.

The criteria must provide a reliable framework for shifting international financial flows into environmentally sustainable economic activities. We cannot afford to risk derailing the exercise by setting the bar too low.

Investment decisions made today will determine the sustainability of our economy for the decades to come. The taxonomy should therefore set standards that may go beyond what is provided for in binding EU legislation, in particular in areas where sustainability criteria are not fully developed or harmonised.

Setting criteria for activities in the energy sector are most urgently needed. It is also important to establish criteria for new solutions, such as synthetic or power-2-x fuels to speed up the development of solutions for reducing ***emissions*** from aviation and shipping.

The sustainability of iron and steel products should take into account the potential for, inter alia, hydrogen recovery and carbon capture and use in manufacturing processes.

It is important that the technical assessment criteria do not fall behind existing EU energy legislation and do not increase incentives for unsustainable use of bioenergy or reduce incentives to increase carbon sinks.

As regards forestry, the criteria must ensure that the carbon sink of ***forests*** increases and as a minimum, that biodiversity does not deteriorate. Biodiversity loss and climate change are inseparable and interrelated processes, which should be taken into account in the preparation of technical assessment criteria.

For ***agriculture***, the criteria should take into account the different natural conditions and potential for soil carbon sequestration in the member states. ***Agricultural*** activities on peatland should make use of practices that maximise soil carbon such as paludiculture.

The taxonomy criteria can show investors and businesses the way to climate neutrality globally and should therefore be up and running sooner rather than later. The EU cannot afford failure on this.

**Load-Date:** March 9, 2021

**End of Document**



[***Trump stripping protections from Alaska's Tongass forest, one of the world's largest temperate rainforests***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:615H-40J1-DY4H-K0HS-00000-00&context=1516831)

The Independent (United Kingdom)

October 28, 2020 Wednesday 4:04 PM GMT

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**Section:** ENVIRONMENT; Version:7

**Length:** 773 words

**Byline:** Louise Boyle

**Highlight:** The Tongass spans more than 25,000 square miles (64,750 sq km) in southeast Alaska and is one of the largest intact temperate rain ***forests*** in the world

**Body**

President Trump has removed protections from Alaskaâ€™s Tongass National ***Forest***, one of the worldâ€™s largest temperate rainforests, to allow for logging and development.Â

A notice, posted by the ***Forest*** Service on Wednesday, stated that all 16.7 million acres will be opened up in Tongass, dubbed â€œAmericaâ€™s climate forestâ€ by environmentalists. The Trump administration is ***removing*** safeguards that have been in place for almost 20 years.Â

The Tongass spans more than 25,000 square miles (64,750 sq km) in southeast Alaska and is Americaâ€™s largest national ***forest***.

With only days to go until the presidential election, the Trump administration announced that the Tongass will be exempt from the 2001 Roadless Rule, â€œwhich prohibits timber harvest and road construction/reconstruction with limited exceptions within designated inventoried roadless areasâ€.

The 2001 federal rule restricted logging and road-building in designated wild areas. This means, as of Thursday, it is now legal for logging companies to carve roads through the ***forest*** and cut timber across 9.3 million acres.

The Tongass is an old-growth ***forest*** with Sitka spruce, western hemlock, western red cedar, and Alaska (yellow) cedar.

In a statement to the The Independent, the Department of ***Agriculture*** (USDA), which oversees the Forestry Service, said that its decision to exempt Tongass from the 2001 Roadless Rule was made with â€œsignificant support from the State of Alaska and the Alaska Congressional Delegation and robust consideration of multiple alternatives and stakeholder viewsâ€.

A spokesperson added: â€œThe Department believes that increasing flexibility for timber harvest and road construction and reconstruction on the Tongass can meaningfully addresses local economic and development concerns while balancing conservation needs of the ***forest***.â€

The Alaska Roadless Rule decision does not authorize any specific projects, according to USDA, and any subsequent projects must comply with the 2016 Tongass ***Land*** Management Plan and undergo separate environmental review under the National Environmental Policy Act (NEPA).

Â In July, the Trump administration also announced an overhaul of NEPA, weakening its ability to assess the damage that potential projects might cause to the environment.

The USâ€™s largest environmental organisation, the Sierra Club, has called Tongass â€œAmericaâ€™s climate forestâ€, and said the Trump administration is jeopardising the subsistence culture of Indigenous communities, the forestâ€™s role in fighting the climate crisis, and already imperilled wildlife.

â€œPreserving the Tongass is a matter of survival. A standing healthy ***forest*** is absolutely essential to the subsistence survival of Indigenous peoples. Itâ€™s also essential for mitigating the climate crisis that threatens us all. We will continue to fight for the Tongass and those who depend on it. We will challenge the lifting of restrictions against logging in the ***forest***'s roadless areas at every turn," Sierra Club Alaska Chapter director Andrea Feniger said on Wednesday.

The Tongass National ***Forest*** is a vast carbon sink, absorbing more carbon dioxide ***emissions*** from the atmosphere than it releases, playing a critical role in mitigating global warming. Temperate rainforests have the densest accumulation of above-ground carbon in the world, according to physicsworld.

Scientists estimate that the Tongass holds between 10 and 12 per cent of Americaâ€™s stored carbon in national ***forests***, according to a report by Juneau Empire.

Supporters of the exemption say it will increase access to federal ***lands*** for timber harvests and the development of minerals, creating economic growth.

Senator Lisa Murkowski, a Republican representing Alaska, wrote in The Washington Post last year why she supported Trumpâ€™s proposal for the Tongass.

â€œThe one-size-fits-all roadless rule is an unnecessary layer of paralyzing regulation that should never have been applied to Alaska," she wrote.

â€œA full exemption from it has always been my preference, as well as the united preference of our stateâ€™s congressional delegation and that of Alaskaâ€™s governors, regardless of party. It will allow Alaskans to create needed opportunities for a sustainable year-round economy, while still being good stewards of our ***lands*** and waters.â€

Read more

Judges to decide fate of Paddington family's ***forest*** paradise

Chief of indigenous Amazon tribe dies with coronavirus

Third of rainforests in New South Wales damaged by Australian bushfire

**Load-Date:** October 28, 2020

**End of Document**



[***EU approves 2021 forestry programme but licence logjam still hinders progress***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6238-44Y1-DYRW-V34M-00000-00&context=1516831)

Irish Examiner

January 28, 2021 Thursday

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**Section:** FARMING; Pg. 8

**Length:** 970 words

**Byline:** Stephen Cadogan

**Body**

The number of forestry licence applications being processed in the Department of ***Agriculture***, Food and the Marine reduced from 4,832 on October 1, 2020, to 4,453 last week.

But IFA President Tim Cullinan said the Department's plan to address a felling licence backlog is not working, with only 30% of ***targeted*** monthly felling licence issues achieved in December.

Mr Cullinan said: "The recent changes around appeals, publishing output figures, and setting up committees, is all bluster."

He said farmers with forestry cannot thin or harvest their timber, and new entrants cannot get a licence to plant.

"Those who went into forestry with the full encouragement of the Government are being blocked from harvesting their crop.

"Yet the Government keeps issuing press releases telling us how important it is to increase the amount of forestry in the country," said the IFA chief.

Meanwhile, the EU Commission's extension of state aid approval for Ireland's National Forestry Programme for 2021 has been welcomed by Senator Pippa Hackett, the Minister of State in the Department of ***Agriculture***, Food and the Marine with responsibility for forestry.

The existing approval by the EU of Ireland's forestry state aid expired on December 31 last, and the new EU approval allows the Government to go ahead with its 2021 forestry programme, for which (EURO)103m was allocated in the budget last October.

The Government says it is fully committed to expansion of the national ***forest*** estate, due to its multi-functional benefits including increased ***removal*** of carbon from the atmosphere, creation of habitats rich in biodiversity, and better water quality.

Generous grants and premiums since 2014 have made available over (EURO)100m each year for forestry development, including afforestation.

Currently, up to (EURO)6,220 per hectare is available to cover the cost of ***forest*** establishment, followed by premiums of up to (EURO)680 each year for 15 years.

The Climate Action Plan ***target*** is to increase Irish ***forest*** cover by 8,000 hectares per year. But without the EU extension, the Government would have had to cease all its national forestry schemes, which are a key part of its national climate mitigation measures.

However, the separate licencing logjam has already slowed Irish forestry industry development to a crawl, regardless of the EU state aid extension.

The Department of ***Agriculture***, Food and the Marine (DAFM) is the planning and consenting authority for forestry licensing in Ireland, and ***Agriculture*** Minister Charlie McConalogue has acknowledged the impact which licensing delays are having on the sector, contributing to a reduction in afforestation levels.

Licences are required for afforestation, ***forest*** road construction, and tree felling, to go ahead. Licences must be issued in compliance with EU and national environmental legislation.

Third parties may make submissions on licence applications, and can appeal approvals of forestry licences.

Recent case law from the Court of Justice of the EU, and its subsequent interpretation by the Irish High Court, the most significant part of which came in mid- 2019, required the DAFM to introduce new assessment procedures for forestry licencing, resulting in delays in licence processing.

Minister McConalogue said new procedures have been challenging to implement, such as the more detailed screening where protected nature sites are within 15 km of a proposed forestry project.

Delays in issuing licences are partly due to most applications now requiring a second stage assessment.

There have also been a large number of appeals, after licences were granted, which has resulted in an appeals backlog.

Mark McAuley, Director of ***Forest*** Industries Ireland, said recently that there are long delays for every licence application.

His members need 500 felling licences per month, but the industry "is on its knees, and thousands of jobs are at stake", due to licence delays.

"If we can't get our raw material, then the industry is dead on its feet. We have to see far greater output of licences right now if we are to stave off disaster."

The Co Cork-based ***Forest*** Owners Co-operative Society warned that its members could face average losses as high as (EURO)100,000, if unfelled trees lose condition, or suffer windblow damage, while they wait for licences to allow them harvest.

The DAFM has 2,760 felling licence applications on hand at present, down from 3,230 applications on hand at October 1 last.

Since October 1, there have been 29 appeals against licences for felling of 474 hectares of ***forest*** (124,803 cubic metres of timber).

The DAFM says the felling volume licenced in 2020 was just over five million cubic metres, down from 6.5m cubic metres licensed in 2019.

Licence applications being processed for new afforestation have increased from 960 on October 1, 2020, to 1,009 afforestation licences at present.

Since October 1, 172 sites, for planting of 1,639 hectares of ***forest***, have been licensed. But there were appeals against 23 of these afforestation licences, totalling 306ha.

In 2020, 2,433 new hectares were planted. Just over one third was broadleaf trees; the Forestry Programme ***target*** is 30% broadleaf.

Afforestation licences have a three-year validity, and a total of 4,900ha is currently available for planting, with a valid afforestation licence, and not subject to appeal.

Minister Pippa Hackett has encouraged any landowner with a valid afforestation licence to strongly consider using it, given the strong economic and environmental benefits of using some of their ***land*** for treeplanting.

Licence applications being processed by the DAFM for ***forest*** roads have increased from 642 at October 1, 2020, to 684 at present.

In 2020, 129km of ***forest*** roads were licensed, compared to 195km in 2019. But there were appeals against 10 road licences, for a total of 5.2km, since October 1.

**Graphic**

Picture, **Minister of State with responsibility for forestry Senator Pippa Hackett, with Peter McCarthy, left, Vice President of Legal and Corporate Affairs at Virgin Media, and Joe Codd, Director, VEON, as they announced details of Virgin Media's tree planting partnership with VEON Forestry, in which over 50,000 native broadleaf trees will be planted, as part of the media company's Low Carbon Pledge**.

**Load-Date:** February 26, 2021

**End of Document**



[***Poots: Planting for our Future***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62J8-P4D1-JDG9-Y205-00000-00&context=1516831)

Impact News Service

April 27, 2021 Tuesday

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**Length:** 438 words

**Body**

London: Northern Ireland Executive Government has issued the following news release:

***Agriculture***, Environment and Rural Affairs Minister, Edwin Poots MLA, recently visited a new large woodland creation project near Stranocum in North Antrim, which is funded by almost £450,000 from his Department.

The 50 hectare site is the largest scheme to benefit from the ***Forest*** Expansion Scheme to date and will receive approximately £445,000 over 10 years to create a woodland comprising 75% commercial conifers and 25% broadleaves.

As well as delivering significant carbon capture benefits the woodland will provide potential for tourism development, income from timber production, conserve and enhance local biodiversity and the landscape.

Minister Poots said: “It was a pleasure to meet with Mr and Mrs McConaghy to see how they moved their business from a long established dairy farm towards a significant woodland holding and the contribution this makes at this early stage in taking forward the ***Forests*** for Our Future programme. The 50 hectare site is the largest scheme to benefit from the ***Forest*** Expansion Scheme to date and I am delighted that my Department was able to contribute £445,000 over 10 years.

“Woodland creation is a simple low cost option to ***remove*** carbon from the atmosphere to help meet the UK’s Net Zero Carbon ***target*** by 2050. My Department is leading in the development of the Executive’s ‘Green Growth’ strategy, and ‘***Forests*** for our Future’ will be one of its foundation programmes – so far, we’ve planted around 670,000 trees.

“This woodland will provide economic benefits to the farm, enhance the biodiversity of the local area and provide society with benefits derived through carbon capture, estimated to be around 30,000 tonnes of carbon dioxide equivalent captured over the next 40 years. ”

Welcoming the woodland creation, Mayor of Causeway Coast and Glens Borough Council, Alderman Mark Fielding, said: “Climate change and our environment have been identified as one of Council’s key priorities in our updated Corporate Strategy and this project is an excellent example of the role our communities can play as well.

“The McConaghy family have embraced the opportunities offered by diversification and over the coming years this new woodland area will deliver a wide range of environmental and economic benefits for the area. ”

Brian Malcomson, Senior Forestry Officer, Scottish Woodlands said: “Scottish Woodlands Ltd have worked closely with David and Hazel McConaghy from the initial design concept through to planting to ensure that the woodland meets their objectives. Woodland can be a great ***land***-use option. ”

**Load-Date:** April 28, 2021

**End of Document**



[***"Harvest does not equal deforestation"***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60SK-K5S1-F0YS-W000-00000-00&context=1516831)

Bioenergy Insight

September 7, 2020 Monday 08:15 AM EST

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**Length:** 2167 words

**Body**

With a Nobel Peace Prize under her belt, and a crucial role as Enviva's vice-president and chief sustainability officer, Dr Jennifer Jenkins is well-versed on the benefits of biomass. *Bioenergy Insight*caught up with Dr Jenkins to discuss the impact of COVID-19, anti-biomass campaigns and the role of bioenergy in a low-carbon future.

**Could you tell our readers a bit about yourself and what led to your interest in biomass/ bioenergy specifically?**

I would characterise my trajectory into the biomass and bioenergy space as more of an evolution versus a single moment decision. The common thread throughout my professional career has been "taking action on climate, while also being practical".

I spent a lot of time hiking and camping as a child, and really developed an affinity for being outside, as well as a deep respect for the natural world. In graduate school, I became intrigued with how carbon flows - between soils, roots, tree biomass, and the atmosphere - and was interested in how society might use ***forests*** to help mitigate the climate crisis. For example, what really determined the flow of carbon between ***forest*** and atmosphere, and how might that system be managed for good?

As climate change is one of the greatest challenges facing humanity today, I find great satisfaction in finding solutions to get carbon ***emissions*** to 'net zero' by 2050. Hopefully we'll be able to mitigate climate change far into the future.

**In 2007, you received the Nobel Peace Prize for your work on climate change. Can you tell us more about this?**

In 2003, I was working as a Research ***Forester*** with the US Department of ***Agriculture*** (USDA) ***Forest*** Service's Northeastern Research Station, based in Burlington, Vermont. I worked with colleagues to develop something called the 'Jenkins Equations', which basically allow you to estimate a tree's total biomass from its diameter. We used allometric equations to work through the data relating tree dimensions to weight. We collected 2,734 such equations and put them into one meta-analysis, where basically each equation was a different line of code in a database. Once the equations were integrated into the database, my team was able to start comparing biomass in trees and species all across the country. This was time-consuming and gruelling - and I'd be lying if I said I loved every second of it - but I knew we were advancing the state of knowledge, so it was worth doing. The equations were ultimately used as part of the USDA ***Forest*** Service's consistent national-scale methods for estimating ***forest*** biomass, which go into the US's official national greenhouse gas (GHG) inventory each year.

Because of that work, the US Government invited me to participate in the Intergovernmental Panel on Climate Change (IPCC) methodological development for ***forest*** inventory. Fast forward a few years to 2007, and Al Gore (along with me and hundreds of other scientists from around the world working on the IPCC) were awarded the Nobel Peace Prize for our collaborative efforts on climate change.

**Some environmental campaigners argue that *forest* biomass is an unsustainable energy source on par with coal. What would you say to them?**

That viewpoint is inaccurate and unsupported. They should read our new White Paper1, in which we lay out the scientific rationale for the GHG benefits of bioenergy. The international science community and the IPCC support biomass as renewable energy and recognise the value of sustainable forestry in addressing climate change. Sustainably sourced, 'good biomass' is unequivocally represented and categorised as carbon neutral. In fact, when utilising sustainably sourced wood pellets, heat generators and power producers across the UK, EU and Japan have reduced carbon ***emissions*** by more than 85% on a lifecycle basis2.

**What is the biggest misconception surrounding the use of *forest* biomass?**

The biggest misconception that I hear regarding ***forest*** biomass is that it leads to deforestation. To provide some context around the discussion, let me start off by saying, not all biomass is 'good biomass'. At Enviva, we define 'good biomass' as being sustainably sourced from a region where ***forest*** carbon stocks are stable or increasing, it is not sourced from material that could have another high-value use, it requires that ***forests*** are regrown after harvest, and it demands that harvests occur with respect for biodiversity and high conservation value.

Looking at sourcing regions for biomass, the US has a strong, established ***forest*** industry. In fact, ***forests*** in the US Southeast (where Enviva sources its wood) provide onefifth of the timber that is used globally each year to make long-lived wood products such as telephone poles, houses, furniture, books and more. From these planned harvests, the biomass industry purchases low-value wood (i.e. treetops, sawmill residue, thinnings, warped trees, and branches) and turns that into wood pellets that generate a dependable and renewable source of power and heat. Of the 2% of ***forests*** that are harvested annually in the US Southeast, only 3% of that harvest is used for the biomass industry.

The biomass market is an integrated part of the overall ***forest*** products industry and it does not drive harvests, nor does Enviva's biomass lead to deforestation, as we source only from working ***forests*** that will be returned to ***forest*** after harvest. Harvest does not equal deforestation. In fact, over the last 25 years, the ***forest*** in the US Southeast has grown by 40%, making it one of the most vigorous areas of ***forest*** growth in the world.

**Plans outlined in the European Commission's Biodiversity Strategy for 2030 mention minimising the use of 'whole trees' for bioenergy production. What are your thoughts on this, and how could this decision impact the bioenergy sector?**

This is one of the most common misperceptions about our industry. What I want people to understand is that all of our wood, no matter what form it takes when it crosses the scales at the mill, is low-value wood. To a ***forester***, the value of a piece of wood is determined by its quality, not its size.

Good biomass must have climate benefits, and we believe that good biomass is produced from low-value wood that is created as a by-product of a traditional timber harvest. These are thinnings, tops and limbs, and low-value trees that are not suitable for higher-value uses.

We're talking about material that is a relatively small source of revenue for a landowner, so it's not driving their decision to harvest in the first place. And we're also talking about wood that isn't well-suited for permanent carbon storage in high-value wood products like building materials. So yes, some whole trees absolutely fall into this category, and they do provide climate and environmental benefits.

I think where some people get tripped up on this issue, is that they automatically view a whole tree as inherently being high value, and to be fair, ***forest*** economics is not something we naturally spend a lot of time thinking about. But once you learn a bit about how markets operate in this sector, then you start to understand what drives harvest decisions, and from there, how trees are sorted, purchased and used according to their quality and value. As long as we source fibre from the bottom of that value scale, regardless of whether it's a whole tree or parts of a tree, then we know we're operating sustainably and delivering tangible benefits for the climate.

**In your opinion, how much of role will bioenergy play in the transition to a low-carbon future?**

There is no way to meet net zero and effectively address climate change without a radical rethink on how we make energy, and how we use and protect the world's ***forests***.

The good news is that you can have it both ways: ***forests*** can simultaneously be a carbon sink while also providing feedstock for a renewable fuel that can be used to displace fossil fuels. Wood-based biomass is a renewable, reliable, dispatchable, cost-effective energy source that can be used in energy systems that exist today. Biomass is a complement to wind and solar and - in my view - will accelerate the transition from coal to renewable energy globally. For utilities and power generators that choose to switch over, the benefits include maintaining dependable, renewable, base load power that, in turn, supports the building of other renewables.

Looking ahead, we expect the role of wood pellets in the energy system to substantially evolve as we look to exponentially reduce carbon ***emissions*** globally. Sustainably sourced wood-based biomass offers a carbon neutral replacement to coal and gas-fired furnaces in heavy industries such as steel, aluminium, and cement.

More exciting yet is the possibility of teaming bioenergy with carbon capture and storage (BECCS) to create negative-***emissions*** technology. If we cannot totally decarbonise sectors of our economy by 2050, then it is critical we develop carbon negative solutions to offset the ***emissions*** that remain.

That said, it's important to have strong safeguards in place to guarantee the climate benefits of biomass, and to ensure that biomass is sustainably sourced. We understand that many stakeholders are concerned about over exploitation of the world's ***forests*** in the face of strong demand for renewable energy, and we share that concern. We are working to engage policymakers and the public to push for those safeguards and regulations.

**How has Enviva coped with the disruption caused by the COVID-19 pandemic?**

Enviva has been classified as essential critical infrastructure and continues to operate safely (in compliance with the Center for Disease Control's public health and safety guidelines) to supply essential fuel for power utility companies across the globe, including the UK and EU.

Since early March, Enviva has instituted a comprehensive business continuity programmes across its offices and facilities to minimise the risk of COVID-19 exposure. As a result, all Enviva facilities have been fortunate to remain fully operational without any significant impact to production, operations or shipping to date.

**What, if any, will be the lasting impacts of the COVID-19 crisis on the bioenergy industry?**

While Enviva has been privileged to be able to continue operating without interruption, the COVID-19 crisis has presented humanity with a stress that is globally distributed, difficult to navigate with its uncertainty, and also invisible. What I have been struck by is how similar the coronavirus crisis is to the climate crisis. These are both looming tragedies that aren't tangible until an individual is confronted directly with its impacts, yet - in order to avoid the worst impacts of both - we must take decisive action now that will pay off much later.

It is my hope that as we rebuild post-COVID, we will take advantage of the opportunity to think differently about threats to our well-being, and take a different, more courageous approach to rebuilding our economies in ways that support our natural environment. I participated in a webinar in May, run by the United Nations' Food and ***Agriculture*** Organisation's Advisory Committee on Sustainable ***Forest***-Based Industries, in which we agreed the ***forest*** products industry must #BuildBackBetterTogether, and #BuildBackBetterInformed.

**What will be Enviva's main focus for the remainder of 2020?**

For the remainder of 2020, Enviva will continue to work diligently toward our 2020 sustainability goals3. More specifically, in 2020, we plan to publish our first Corporate Sustainability Report describing how the company works to deliver on its mission to displace coal, grow more trees and fight climate change. The report will include an evaluation of our current environmental impact and sustainability practices as well as our goals for continuous improvement.

In addition, we plan to add 30,000 acres to the American Tree Farm System (ATFS) and/ or ***Forest*** Stewardship Council (FSC) certified ***land*** base, thereby assisting private ***forest*** landowners in its sourcing region with writing sustainable ***land*** management plans to keep family ***forests*** healthy and productive for ecosystem services like wildlife, clean water, and wood supply. Enviva will also strengthen its existing partnership with The Longleaf Alliance to actively seek longleaf restoration through its wood sourcing on private and public ***lands*** in Alabama, Mississippi, Georgia, Florida, Virginia, and the Carolinas. Longleaf ***forests*** are one of the most important and biologically diverse ecosystems in the US Southeast, and because many such ***forests*** need thinning, appropriate biomass ***removals*** are a critical step in the longleaf restoration process and for wildlife habitat improvement.

Finally, this year we will assist in the conservation of 3,500+ acres of bottomland hardwood (BLHW) ***forests*** to meet our 10-year goal of conserving 35,000 acres of BLHW ***forests*** by 2030. BLHWs are critical to supporting biodiversity, community resiliency, outdoor recreation, and clean water and they also act as a buffer to infrastructure during storms.

**Load-Date:** September 7, 2020

**End of Document**



[***Ardern says climate crisis is 'life or death' as New Zealand landmark report calls for sweeping changes***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62W6-RK71-DY4H-K4X6-00000-00&context=1516831)

The Guardian (London)

June 9, 2021 Wednesday 3:09 AM GMT

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**Section:** WORLD NEWS; Version:1

**Length:** 1033 words

**Byline:** Tess McClure in Christchurch

**Highlight:** Climate Commission recommends shift to electric cars, large-scale ***agricultural*** reform and an end to reliance on gas in homes

**Body**

New Zealand has been handed a new vision for dramatic reduction of its greenhouse gas ***emissions*** - including reduced animal numbers on farms, no new household gas connections by 2025, and a dramatic shift to electric cars in the next decade.

The prime minister, Jacinda Ardern, said the climate crisis was a matter of "life or death" as she spoke at the release of a new roadmap for the government's response to global heating.

The Climate Commission, an independent body set up to advise the government, released its final advice on Wednesday - a sweeping document outlining what New Zealand must do if it wants to meet its ***target*** of achieving net zero carbon ***emissions*** by 2050, and reducing biogenic methane ***emissions*** by 24%-47%.

Ardern and climate minister James Shaw endorsed the report's findings, calling them an "achievable blueprint" for change. But they stressed that they would need more time to digest the 400-page document before outlining a formal policy response.

[*Multi-partisan legislation passed by Ardern in 2019*](https://www.theguardian.com/world/2019/nov/07/ardern-says-new-zealand-on-right-side-of-history-as-mps-pass-zero-carbon-bill) means the government is legally obliged to consider and create a policy plan based on the commission's advice, which it will release before the end of year.

The report laid out pathways for New Zealand to meet its greenhouse gas reduction obligations by 2050. They include wide-scale ***agricultural*** reform to reduce methane ***emissions***, dropping herd sizes by 10%-15%, ending imports of combustion-engine cars, eliminating new household gas connections, and less travel by car overall. Some of those changes would need to be dramatic transformations: to meet its goal for transport ***emissions***, New Zealand would need to increase electric vehicle share of the market to 50% in the next 10 years. It is now around 1-2%.

At the release of the commission's advice, Ardern said the report was "one of the most significant documents I'll receive in my time as prime minister".

She also noted that the path ahead would be challenging for New Zealand. "Having a roadmap doesn't change the fact the road will be steep and tough at times," she said.

Ardern emphasised in her speech that "meeting our climate ***targets*** is achievable and affordable with existing technology", and outlined progress the government had already made. But hitting its climate goals will require a total reversal of New Zealand's current trajectory. New Zealand [*is one of the world's worst*](https://www.newsroom.co.nz/climate-commissions-advice-likely-to-shock) performers on ***emission*** increases. Its ***emissions*** rose by 57% between 1990 and 2018 - the second greatest increase of all industrialised countries. [*Earlier this year, data showed that New Zealand's* ***emissions*** *had increased*](https://www.theguardian.com/world/2021/apr/13/new-zealand-emissions-rise-as-government-vows-urgent-action#:~:text=The%20latest%20Greenhouse%20Gas%20Inventory,to%20the%20end%20of%202019.&text=New%20Zealand's%20net%20emissions%20rose,poorest%20performers%20in%20the%20OECD.) by 2% in 2018-19.

That increase means the commission's advice had changed from its earlier drafts - it is now calling for steeper, earlier cuts to ***emissions*** than it had in January.

The plan will require changes across every part of New Zealand life. In ***agriculture***, some of the work to reduce methane ***emissions*** could be done through improved farm practices and breeding animals that produced less gas - but the commission found it would also require a drop in the number of total herd numbers by 10%-15%.

The country would need to end imports of fossil-fuel-powered cars by 2030-35, and transition to electric vehicles. Ardern said the government was taking action to make them more affordable - including switching the government fleet to electric cars to create a secondhand market, and creating a new incentives regime. The 2021 budget released in May put aside about $300m for incentives to try to boost electric vehicle uptake, but did not provide details on how the program would look.

The commission's draft advice had prompted fears that New Zealanders may lose access to the beloved sausage sizzles on gas barbecues, which some consider a fixture of Kiwi culture. The commission took a moment to specifically refute that claim.

"Many submitters were concerned the advice would mean a 'ban on gas barbecues' and strongly opposed that. No recommendations were made about banning fossil gas barbecues."

The commission's advice was also clear about failings of policy in the past, which had not put New Zealand on a lower-***emissions*** trajectory - and warned that relying on ***forest***-planting offsets to reduce net ***emissions*** would not be enough. "Instead of putting policies in place to decarbonise the economy ... Aotearoa used ***forests*** planted in the 1990s to offset its ***emissions*** and meet its ***targets***," it said. "The carbon ***removal*** benefits of these ***forests*** are now coming to an end."

Shaw said the government was taking action, and had done more on climate in the past three-and-a-half years than the past three-and-a-half decades of governments combined. "Is it enough? No." he said.

"We are yet to see a sustained decline in the pollution we put into the atmosphere. And even when we do, we need to ensure that decline continues and, in fact, picks up pace every year."

The commission modelled both the cost of its recommended changes, and the cost of doing nothing. The cost of the recommended changes would amount to about 1.2% of GPD by 2050. But delaying action on the climate crisis would end up costing the economy more, with GDP in 2050 falling by about 2.3%. In both cases, that cost described a reduction of economic growth.

Ardern said the modelling showed that "acting now makes more economic sense than waiting, and that we can reduce ***emissions*** while continuing to grow the economy".

The commission sets out goals for net reductions in ***emissions***, including an 18% drop in net carbon dioxide from 2019 levels by 2025, 47% below 2019 by 2030 and 78% by 2035. Biogenic methane, the gas broadly produced by ***agricultural*** animals, must drop 8% by 2025, 12% by 2030, 17% by 2035.

The report comes as the world's major democracies are increasing commitments, and pressuring others to do the same, to cut ***emissions*** this decade, as the science says is necessary. The topic will be a major focus at the G7 summit in Cornwall later this week. All G7 countries have increased their 2030 commitments in recent months, and are promising new policies.

The next step in response to the commission's report is for the government to prepare an ***emissions*** reduction plan based on them, which it will release by the end of 2021.

**Load-Date:** June 9, 2021

**End of Document**



[***3 reasons companies are investing in forest conservation and restoration, and how they do it***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62WG-YCT1-JDG9-Y2YR-00000-00&context=1516831)

Impact News Service

June 9, 2021 Wednesday

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**Length:** 1857 words

**Body**

Cologny: World Economic Forum has issued the following press release:

Over half of global GDP is potentially threatened by nature loss, making restoration an economic priority in the decade ahead. The UN is launching the Decade on Ecosystem Restoration to prevent, halt and reverse environmental degradation worldwide. The sustainable management of ***forests*** could create $230 billion in business opportunities and 16 million jobs worldwide by 2030. Companies across industries are investing in ***forests*** to foster resilience, profitability and growth, and values-based leadership.

The world is facing two interdependent environmental crises: the accelerating destruction of nature and climate change. Corporate citizenship is an integral part of the problem and solution to these twin threats. Over half of global GDP, or $44 trillion, is potentially threatened by nature loss, making restoration an economic priority in the decade ahead. Halting environmental degradation and deforestation, conserving remaining natural sites and restoring those at risk, paired with rapid Paris Agreement-aligned ***emissions*** reductions are increasingly recognized hallmarks of a robust corporate response.

In light of the urgency to act, the United Nations is launching the UN Decade on Ecosystem Restoration to prevent, halt and reverse environmental degradation worldwide. The UN didn’t just dedicate a day, a month, or even a year to this issue. Over the next 10 years, the UN aims to reduce poverty, combat climate change and prevent mass extinction across the globe – restoring our threatened natural heritage.

Creating business opportunities and jobs

Investing in ***forests*** provides a significant opportunity for companies seeking to address climate change, protect nature and create jobs, in a single intervention. ***Forests*** have a net carbon absorption of around 7.6 billion tonnes of CO2e per year, 1.5 times more CO2e than the US emits annually. Responsible ***forest*** conservation and restoration can be a cost-effective solution to help ***remove*** atmospheric carbon and build climate resilience. As ***forests*** are also home to 80% of the world’s terrestrial biodiversity, they are an essential landscape in our efforts to preserve habitats and protect natural heritage. In addition, the sustainable management of ***forests*** could create $230 billion in business opportunities and 16 million jobs worldwide by 2030.

Companies from across industries are investing in ***forests***, given their multifaceted potential for risk mitigation alongside the ability to create short-, medium- and long-term value. These are generated in three principal ways:

1. Business resilience: Investing in ***forest*** conservation and restoration today protects businesses against the loss of natural capital and physical effects of climate change later on, while preparing for shifting consumer and investor preferences. With many governments set to introduce new regulations to address nature loss and climate change, investing in ***forests*** offers an opportunity for businesses to stay ahead of these policy shifts.

2. Business profitability and growth: The economic value of ***forests*** is vast – one estimate suggests that the total value of intact ***forests*** and their ecosystem services is up to $150 trillion, around double the value of global stock markets. ***Forest*** conservation and restoration can indirectly increase core business profits, through lower costs of capital and equity, and increased customer loyalty associated with sustainability attributes. Investing in ***forests*** also directly generates environmental and commercial returns, e.g through the sale and use of sustainable ***forest*** products.

3. Values-based leadership: Strong business positioning and values-based leadership are instrumental for businesses to build long-term value. ***Forest*** conservation and restoration support businesses to become leaders in sustainability, strengthening business reputation among customers, employees and ecosystem partners, including the communities in which they operate.Sample of corporate pledges on ***forest*** conservation and restoration.Worldwide sample of corporate pledges on ***forest*** conservation and restoration.

Recognizing these economic benefits, businesses are already investing

Businesses that are highly dependent on ***forests***, such as certain consumer goods and ***forest*** products-reliant companies, are investing in ***forest*** restoration and sustainable ***forest*** management. Such practices build resilience to key risks and enable companies to seize new opportunities for business growth and profitability by integrating ecologically sound and socially responsible approaches.Example of the mosaic system concept: Suzano’s integrated management of natural areas for biodiversity, water and eucalyptus plantations.Example of the mosaic system concept: Suzano’s integrated management of natural areas for biodiversity, water and eucalyptus plantations.Image: Suzano

For example, L’Oréal identified that a lack of strong management on ***forest***-related issues could damage its brand value, putting more than $180 million, around 1% of its operating expenses in 2018, at risk. In addition to its avoided deforestation commitments, L’Oréal created a Fund for Nature Regeneration, a €50 million impact investing initiative that aims to restore more than 1 million hectares of damaged marine and terrestrial ecosystems.

Nestlé has announced they will distribute 2.8 million shade trees by 2022 in Côte d’Ivoire and Ghana, and will train its farmers in how to implement agroforestry practices. These trees will provide vital ecosystem services beneficial to its cocoa plantations, including shade and improved soil health.Planting ***forest*** saplings along the Kinabatangan River in Sabah, Malaysia, as part of Nestlé Malaysia’s RiLeaf reforestation programme.Planting ***forest*** saplings along the Kinabatangan River in Sabah, Malaysia, as part of Nestlé Malaysia’s RiLeaf reforestation programme.Image: Nestlé Malaysia

Companies with low direct dependencies on ***forests***, such as those in the technology and financial services industries, have identified opportunities to develop new products that benefit ***forest*** conservation and restoration, and increase business profitability and growth, while simultaneously enhancing their relationships with employees, customers and partners.

Recognizing customer demand from food and ***agricultural*** businesses to transition to more sustainable ***agricultural*** practices, Rabobank created a $150 million guarantee fund, the Agri3 Fund, in partnership with the UN Environment Programme. This fund aims to de-risk loans and investments that financial banking partners plan to make in ***agriculture*** supply chains to a total of $1 billion.

Meanwhile, Mastercard has launched the Priceless Planet Coalition and committed with its 30-plus partners to restore 100 million trees over the next five years. Through “round-up’’ campaigns, this initiative allows Mastercard to directly engage with consumers on sustainability by giving them the possibility to donate to plant trees at the point-of-sale.A Nepalese woman holds Kher (Sengalia catchu) seedlings to be planted at a community ***forest*** project near Ruchang, supported by Eden Reforestation and tentree.A Nepalese woman holds Kher (Sengalia catchu) seedlings to be planted at a community ***forest*** project near Ruchang, supported by Eden Reforestation and tentree.Image: tentree

Businesses with large greenhouse gas ***emissions*** acknowledge the need to avoid and reduce their ***emissions*** as a priority, and are simultaneously investing in ***forest*** conservation and restoration to mitigate and capture their residual ***emissions*** on the journey towards net zero.

Shell plans to invest around $100 million a year in nature-based solutions, adopting the policy of “avoid, reduce and then mitigate”. As part of this portfolio approach, Shell is co-developing and investing direct equity in ***forest*** conservation and restoration projects worldwide. It is also purchasing high-quality carbon credits from projects that support ***forest*** conservation and restoration, ensuring that projects are certified under high quality and independent standards.What’s the World Economic Forum doing about deforestation?

Halting deforestation is essential to avoiding the worst effects of global climate change.

The destruction of ***forests*** creates almost as much greenhouse gas ***emissions*** as global road travel, and yet it continues at an alarming rate.

In 2012, we brought together more than 150 partners working in Latin America, West Africa, Central Africa and South-East Asia – to establish the Tropical ***Forest*** Alliance 2020: a global public-private partnership to facilitate investment in systemic change.

The Alliance, made up of businesses, governments, civil society, indigenous people, communities and international organizations, helps producers, traders and buyers of commodities often blamed for causing deforestation to achieve deforestation-free supply chains.

The Commodities and ***Forests*** Agenda 2020, summarizes the areas in which the most urgent action is needed to eliminate deforestation from global ***agricultural*** supply chains.

The Tropical ***Forest*** Alliance 2020 is gaining ground on tackling deforestation linked to the production of four commodities: palm oil, beef, soy, and pulp and paper.

Get in touch to join our mission to halt to deforestation.

By adopting the following principles, companies can ensure that their investments in ***forests*** successfully generate business value while supporting nature, climate and local communities.

– PROTECTING existing ***forests***: protect existing primary and intact ***forests*** as a priority to avoid and reduce deforestation and ***forest*** degradation, since they are biodiversity hotspots, long‐term carbon sinks and a repository for bio-innovation in the search for new drugs or novel materials.

– PARTNERING with local communities, Indigenous peoples, governments, NGOs and other businesses: co-develop and implement projects with local partners, communities and municipalities to ensure that activities are effective, build on local knowledge of ***forests***, and protect local ***land***-use rights, with a long-term approach in mind.

– PREVENTING greenhouse gas ***emissions*** and nature loss as a priority: invest in ***forest*** conservation and restoration as a complementary measure to broader strategies focused on avoiding and reducing ***emissions*** as part of net-zero ***targets***, and to reverse negative impacts on nature and biodiversity.

– PRIORITIZING projects that deliver both environmental and social benefits: set clear goals on the mix of environmental and social indicators that a project prioritises and develop milestones throughout implementation to track progress.

– PLANNING for growing the right trees in the right way and in the right regions: pick the most appropriate regions and trees to ensure climate resilience and permanence of new ***forests*** in the long term, while avoiding unintended negative consequences.

Businesses embracing this movement have a unique opportunity to pledge their contribution to the UN Decade on Ecosystem Restoration to conserve, restore and grow a trillion trees by 2030 while accelerating resilience, profitability and value creation.

**Load-Date:** June 10, 2021

**End of Document**



[***Mosaic puts the pieces in place to imagine a new system of land use***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6286-2VD1-F0JC-M078-00000-00&context=1516831)

The National (Scotland)

March 21, 2021 Sunday

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**Length:** 591 words

**Byline:** [*Greg Russell*](http://Greg Russell)

**Body**

SCOTLAND'S uplands dominate much of the country's landscape but they are not, as widely believed, "natural". Centuries of extractive ***land*** use has left us with a largely deforested landscape - overgrazed, burned and depopulated.

Little thought has been given to putting something back to replace the fibre and protein which has been extracted in a historical narrative of greed, exploitation and disputes.

Human management of the ***land*** saw extensive tree-felling, overgrazing, culling of selected species and depopulation. The results? Degraded soil, low biodiversity and productivity, higher carbon ***emissions*** and simplified and segregated ***land*** use.

A report today says there is little hope of change any time soon under current management and subsidy regimes, but it does offer some hope.

A Mosaic of Life is the third in a series from Common Weal that we have featured this week, and it examines how rewilding and reforesting can transform ***land*** into a more productive space with commercial and non-commercial woodland that enables biodiversity recovery and improved carbon capture. This will be combined with more contained livestock rearing, restored peatland, revitalised communities and more.

The authors, Donald McPhillimy, founder director of Reforesting Scotland, and Callum Blackburn, a consultant on the circular economy, say changes will be needed to achieve all of this - hill sheep flocks will need to be reduced, deer numbers cut to enable ***forest*** regeneration and driven grouse shooting stopped.

Putting this mosaic into practice will not be done with tiles, stone or glass, but by using what we already have.

In the upland rewilded mosaic, the sheep will come off, which has already happened across parts of the Highlands, and the numbers of deer and grouse will come down.

The authors say: "Back will come the native woodland as can be quite clearly seen at Glen Feshie, Mar Lodge, Abernethy and several other sites.

"Where the seed source doesn't exist, it will have to be planted as at Carrifran in the Southern Uplands.

"Existing semi-natural habitats like peatlands and mountain tops will be protected and restored."

That is just one aspect of the ambitious project, which is accompanied by a nine-point plan to get there, starting with the establishment of a "national discussion" on a ***land*** use strategy linked to the National Planning Framework (NPF) outlined by the Scottish Government in November.

A ***Land*** Use Agency would be established with divisions for the upland rewilded mosaic, forestry, ***agriculture***, water and renewable energy.

Models for each of the divisions would be created, based on carbon sequestration, ecological health and biodiversity, human wellbeing, integration with other sectors and outputs, such as softwood timber, energy and food.

Individual landowners would be guided by Regional ***Land*** Use Strategies, which have already been piloted in the Borders and Aberdeenshire.

A pilot study of Regional ***Land*** Use Partnerships for five parts of Scotland has already been announced.

All driven grouse moors would be licensed and a start made to actively rewild them, as in the uplands, using a new ***agricultural*** payments system and ecosystem services payments and grants. ***Agricultural*** payments would be reformed

to ***remove*** sheep from open hillside.

New "half wild" ***forests*** would be created and existing ***forests*** converted over time through changes in forestry policy.

The report said most landowners should managed to convert to the new model and a turnover of some ***land*** units would allow for "fresh ideas and younger people to come in".

**Load-Date:** March 21, 2021

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[***£150 million government investment to save the world's rainforests***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:628M-13K1-JD3Y-Y4KH-00000-00&context=1516831)

M2 PressWIRE

March 12, 2021 Friday

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**Body**

March 12, 2021

[*https://www.gov.uk*](https://www.gov.uk)

- New government funding to protect tropical rainforests, regions and communities across Africa, Asia and Latin America

- funding will help protect 2.1 million hectares of rainforests, an area the size of Wales, from deforestation

- programme will have the potential to create thousands of green jobs throughout rainforest regions and generate almost £1 billion of green private sector investment to tackle climate change around the world

A new multi-million pound fund launched today will help protect rainforests equivalent to an area the size of Wales, cut millions of tonnes of carbon ***emissions*** and improve the lives of over 600,000 people in tropical ***forest*** communities across Africa, Asia and Latin America.

Through the newly launched Mobilising Finance for ***Forests*** Programme, the government will invest £150 million for businesses and investors who support and deliver sustainable ***land***-use projects and protect rainforest regions like the Amazon and Indonesian basins in communities vulnerable to climate change.

This is also expected to attract as much as £850 million private investment, support thousands of green jobs across multiple sectors, such as ***agriculture***, food, and technology in these regions, and is predicted to provide 23% of the reduction in carbon ***emissions*** and climate impacts needed over the next decade to meet the goals set in the Paris Agreement.

The projects that could benefit include those that promote transparent supply chains and implement deforestation-free standards, supporting an estimated 600,000 small-scale farmers and food producers to incorporate ***forest*** protection into ***agricultural*** production.

This funding will help to ***remove*** 28 million tonnes of CO2 from the atmosphere, equivalent to the offsetting London's entire CO2 ***emissions*** annually over the next 15 years, through investing in eco-friendly projects like harvesting nuts, seeds, and coffee sustainably, restoring lost ***forests***, diversifying crops to prevent soil erosion, and launching conservation activities - restoring tropical ***forests*** as our most effective and natural carbon capture and storage sinks.

Today's funding forms part of the UK's existing commitment of £11.6 billion for international climate finance, which includes the Prime Minister's recent pledge to spend at least £3 billion to protect nature and precious biodiversity over the next 5 years, of which projects to maintain ***forests*** will be a major part.

Energy Minister Anne-Marie Trevelyan said:

The impact of deforestation is devastating - on those vulnerable rainforest communities, and on global efforts to combat climate change. And the health of the earth's tropical ***forests*** is critical to the health of our planet - we need to do all we can to protect and preserve this vital ecosystem.

Today's new fund will ramp up investment in projects on the frontline of this effort, while also giving financial institutions the confidence they need to invest, which could attract and secure as much as £850 million from the private sector.

International Environment Minister Lord Goldsmith said:

Deforestation is not only a major contributor to climate change, it is responsible for catastrophic biodiversity loss and it undermines the livelihoods of many hundreds of millions of people who depend on ***forests***. So the UK is absolutely committed to tackling global deforestation.

In addition to expanding our own woodlands, we are working internationally to tackle the main drivers of deforestation and protect our vital ***forests***. This funding is a demonstration of our leadership in the run-up to the crucial G7 and COP26 summits. We are clear that there is no pathway to tackling climate change that does not involve the recovery of nature.

More than a quarter of the world's population rely on ***forest*** resources for their livelihoods, including providing more than 13 million green jobs. Rainforests are also habitats for a vast array of plants and animals and safeguard the planet's resilience to climate change, including storing carbon dioxide in tree trunks, roots and soil. Through unsustainable approaches like deforestation, the world has lost one-third of its ***forests*** since the last ice age - an area twice the size of the United States, releasing a predicted one fifth of the world's greenhouse gas ***emissions***.

By 2030, the global transition to sustainable food and ***land*** use will be worth £1.8 trillion annually. This will help 1.5 billion people come out of poverty and feed an additional 2.2 billion by 2050, while protecting valuable natural resources being cleared to make way for grazing animals and to grow crops.

COP26 President Alok Sharma said:

The world's ***forests*** provide over 1.5 billion people with food and livelihoods and are a vital resource that is disappearing at an alarming rate, and we must do more to protect them.

Nature and biodiversity is a key campaign of COP26 and action to tackle its loss will be crucial in the fight to address the impact of climate change whilst also supporting sustainable livelihoods. I am pleased the funding announced today will help secure the future for millions of hectares of ***forest*** across the globe.

The programme is being delivered in partnership with the Netherlands' Development Finance Institution, which will aim to co-invest up to £36 million of its own capital in project.

Executive Director of Tropical ***Forest*** Alliance Justin Adam said:

I welcome the United Kingdom's announcement of a new £150 million facility to Mobilise Finance for ***Forests***. Our ***forests*** are critical in the fight to slow climate change and address biodiversity collapse. Yet deforestation, predominantly from the expansion of ***agriculture***, is causing the loss of 3.8 million hectares per year of pristine rainforest.

This is an area of tropical rainforest the size of Switzerland that the world is losing. Meeting food security and environmental goals is going to require innovative finance approaches that blend public and private monies. I am excited to see how this new facility can accelerate efforts to stop deforestation.

Chief Executive Green Finance Institute Dr Rhian-Mari Thomas OBE said:

Nature and climate are increasingly being recognised as 2 sides of the same coin - we can't solve for one without solving for the other. We welcome the MFF programme, which can play an important catalytic role, helping to crowd-in private capital towards sustainable ***forest*** use.

This kind of program, particularly the inclusion of credit guarantee structures, can be a highly efficient way to de-risk sustainable ***land*** use investments, making them attractive to investors whose return appetite would otherwise not be met. This is an important step in scaling up green investment in nature-based solutions to help tackle climate change and deforestation.

The government's International Climate Finance (ICF) programme plays a key role in supporting the growth of innovative sustainable farming and forestry businesses globally. In 2019, UK ICF programme helped reduce deforestation levels in Colombia by 19% - a great step towards reducing ***emissions*** and protecting the people in ***forests*** in one of the most bio-diverse countries in the world.

In February 2021, the UK COP26 Presidency also launched the ***Forest***, ***Agriculture*** and Commodity Trade (FACT) Dialogue, which will bring together key countries exporting ***agricultural*** products and the countries consuming these products to discuss how to make this process greener and more sustainable. The dialogue will run up to COP26 and beyond.

Through the government's ICF programme and COP26 presidency, the UK will continue to play a crucial role in addressing the global challenge of climate change internationally in the run up to the COP26 UN Climate Summit in November. Britain is among the largest contributors of public climate finance and the government is committed to providing support which is transparent, transformative and in line with the needs and priorities of developing countries. Notes to editors

Read more details about the International Climate Finance.

The Mobilising Finance for ***Forests*** programme will use a blended finance investment approach to combat deforestation and other environmentally unsustainable ***land*** use practices that are contributing to global climate change. The UK will initially allocate up to £150 million across 5 to 6 investment funds operating in selected tropical ***forest*** regions in Africa, Asia and Latin America. The programme's investments will, over time, contribute to a reduction in deforestation rates by stimulating the growth of private sector investment in markets that create value from standing ***forests*** or incorporate ***forest*** protection into ***agricultural*** production.

MFF will be delivered by the Netherlands' Development Finance Institution (FMO). FMO has a strong track record of investing in a range of forestry and sustainable ***land*** use (SLU) sectors in MFF's ***targeted*** geographies. FMO will endeavour to invest £36 million of its own capital alongside the UK, increasing MFF's mobilisation impact and demonstrating progress for the UK's COP26 objective to increase International Finance Institutions' support for nature-based solutions.

FMO will also work closely with the Commonwealth Development Corporation (CDC), the UK's own Development Finance Institution, to increase the flow of much needed private capital into forestry and sustainable ***land*** use projects that combat climate change. CDC has invested over £800 million into climate related investments under its current mandate in Africa and South Asia since 2017, primarily in clean energy, but with ambitions to grow the size of its investment portfolio in forestry.

All UK investments are closely scrutinised and adhere to a high standard of Official Development Assistance (ODA) rules to ensure they deliver value for money.

The UK government's International Climate Finance (ICF) has committed over £1.1 billion since 2011 to help developing countries slow and eventually stop deforestation and protect precious biodiversity. This includes:

- £141.5 million for ***Forest*** Carbon Partnership Facility Fund (FCPF) which supports the development and implementation of low deforestation rural development plans in developing countries to protect ***forest*** and biodiversity

- £73 million for the REDD+ Early Movers programme (REM), which supports governments and local indigenous communities in Brazilian and Colombian Amazon to grow sustainable rural economies and halt ***forest*** loss

- the £64 million Territorios Forestales Sostenibles (TEFOS) programme, which will create local jobs in areas of Colombia, improving livelihoods of communities who rely on ***forests***

- the £35 million Partnership For ***Forests*** (P4F) programme which supports building innovative business solutions to tackle deforestation and protecting precious biodiversity in Latin America whilst recovering in a greener and resilient way

Climate change will hit the hardest communities and groups who are already the most disadvantaged. ICF programmes such as Partnership for ***Forests*** provided training and support to women in Brazil to take on a bigger role in male-dominated activities such as cocoa agroforestry activities.

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[***Persistent organic pollutant cycling in forests***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:693W-H851-F129-P0DC-00000-00&context=1516831)

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**Body**

Introduction

Persistent organic pollutants (POPs) are a class of pollutants that  and are toxic to humans and wildlife. POPs can be transported across international boundaries, through air,, water, and migratory species (birds or fishes), and deposited far from their source,. Most POPs are pesticides and industrial products (Box ), but some POPs are produced through unintentional combustion,, as are polycyclic aromatic hydrocarbons (PAHs), another class of POP-like chemicals (Box ). Because of their global transport and toxicity, the Stockholm Convention (SC) on POPs was adopted in 2001 and went into effect in 2004, with the aim to reduce and/or eliminate the ***emissions*** and releases of POPs. Although POPs usage had been prohibited in most contracting parties, global transportation and the unintentional ***emission*** of POPs has challenged the effectiveness of the SC.

The grasshopper effect, (also referred to as global distillation) describes the repeated warm volatilization and cold deposition of POPs, (Fig. ). This process is controlled by air–surface exchange,, — higher temperatures usually promote the volatilization of POPs from the ***land*** surface, whereas lower temperatures facilitate the condensation of POPs from the air to the ***land*** surface. The global result is the atmospheric transport of POPs from warmer regions (generally, lower latitudes and altitudes) to colder regions (generally, higher latitudes and altitudes). POPs are, thus, present in areas far from where they were manufactured or used, such as the Arctic, or mountain tops–.

Persistent organic pollutant cycling across scales.

The grasshopper effect, which describes the global transport of persistent organic pollutants (POPs), is shown in the left panel. Local ***emission*** in urban areas and long-range transport supply POPs to ***forests*** (middle panel). ***Forests*** enhance the deposition of atmospheric POPs to the ground (right panel). ***Forest*** disturbance such as deforestation, afforestation and fire impact the cycling of POPs at the local and regional scales.

***Forests*** play a crucial role in the global and regional cycling of POPs–, and have the potential to hinder and delay the global atmospheric transport of POPs through the ***forest*** filter effect (FFE),. The FFE describes the enhanced POP deposition under the ***forest*** canopy and decreased concentrations of atmospheric POPs in ***forest*** regions. This effect is caused by atmospheric POP uptake from the air and deposition to the  through absorption, foliage uptake, dry particle deposition, wet particle deposition and rain dissolution. These POPs are released into the soil by , wax erosion, wash off and particle erosion, and can adsorb to surface litter absorption,,,. After POP deposition to the ***forest*** floor, processes such as degradation and can take place,–. The overall effect is that ***forests*** act as POPs reservoirs. For example, 2–21% of the global emitted polychlorinated biphenyls (PCBs) are stored on the boreal ***forest*** floor, making boreal ***forests*** a barrier that prevents POPs from reaching the Arctic, during atmospheric transport. ***Forests*** on high mountains can also reduce regional transport of POPs, as they have high organic matter contents in their soils, which help to trap POPs–.

Owing to climate change and rapidly expanding human activities, ***forests*** around the world have been disturbed–. Urban expansion, deforestation for ***agricultural*** purposes, ***forest*** fires, and insect and disease outbreaks radically reduce ***forest*** cover–. From 2010 to 2015, for example, approximately 16.5 million hectares of global ***forest*** cover were lost, and approximately 67 million hectares of forestland were burned annually from 2003 to 2012 (ref.). These losses have been partially compensated for by ***forest*** plantations — China’s ***forest*** plantations, for example, now equal a quarter of the Amazon rainforest. However, large-scale change in ***forest*** cover (deforestation and afforestation) impacts the partitioning and storage of POPs,. Moreover, combustion can produce various POPs and PAHs, suggesting that ***forest*** fires can be sources of pollutant ***emissions***. Ultimately, these processes impact the terrestrial cycling and storage of POPs,.

In this Review, we summarize the research and the developing consensus on POP cycling mechanisms in ***forests***, including atmospheric uptake and transport to and from soil. We synthesize the global distribution of POPs and PAHs in ***forest*** soils, examine the dominant controls on POP distribution, estimate global ***forest*** POP stocks and discuss its responses to deforestation and/or afforestation and ***forest*** fires. We also present the current models that predict the fate of POPs in the ***forests***, identify knowledge gaps in terrestrial POP science and suggest directions for future research.

Box 1 Sources of persistent organic pollutants and polyaromatic hydrocarbons

The Stockholm Convention (SC) was established in 2004 and a total of 12 persistent organic pollutants (POPS) or POP categories were listed in the first version of the Convention, and were collectively known as the ‘dirty dozen’. Most of these POPs are organochlorine pesticides (such as DDT) and industrial synthetic compounds (such as PCBs and PCDD/Fs). Since then, an additional 16 new classes of chemicals were added in SC Annexes after 2009 (ref.). Chemicals listed under Annex A must be eliminated; Annex B chemicals are restricted (either production or use). Chemicals listed in Annex C should have the unintentional release minimized. Unintentional release can occur through natural ***emissions*** (volcanic eruptions and ***forest*** fires) and anthropogenic processes (industrial, ***agricultural*** and waste incineration), producing chemicals such as HCB, PCB, PCN and PCDD/F,. Combustion (both natural and anthropogenic) can also produce carcinogenic polyaromatic hydrocarbons (PAHs), which are POP-like. Although PAHs are not under the Annex of the SC, they are restricted chemicals by the Convention on Long-range Transboundary Air Pollution, owing to their potential for atmospheric transport.

Persistent organic pollutant cycling

In ***forests***, POP cycling broadly includes atmospheric uptake by foliage (which refers to leaves and pine needles here), transport to the ***forest*** floor, and accumulation or further cycling within the soil (Fig. ). We collated data on the concentration of POPs and PAHs in foliage, soil, air and deposition in ***forests*** from remote regions across Asia, Europe, America and Africa (Fig. ; see also the and Supplementary Tables –). Data from the ***forests*** near polluted areas (factories, farmlands and city centres) were excluded because of the potential impacts of local sources,, as opposed to long-range atmospheric transport. Atmospheric POP and PAH concentrations from global background regions were also compiled (Supplementary Table , Supplementary Figure ) to provide a broad fundamental basis for understanding the distribution of POPs and PAHs in ***forest*** foliage and soil. These data are used as a quantitative basis to review the cycling and storage of POPs in ***forest*** ecosystems.

Persistent organic pollutant and polyaromatic hydrocarbon observations in ***forests*** globally.

***Forested*** regions are shown in grey, with most sampling locations in Europe and Asia. Detailed information on sampling sites and references are listed in Supplementary Tables –.

Foliar uptake of atmospheric persistent organic pollutants

Foliar uptake of POPs and PAHs results in lower atmospheric concentrations of POPs under the ***forest*** canopy than in other environmental conditions, (Supplementary Table ). Both model simulations and field observations– demonstrate that foliage uptake during the growing season could result in a twofold to fivefold decrease in the concentrations of atmospheric POPs. For example, the simulated air concentration of POPs decreased from ~450 pg m−3 to 80 pg m−3 when ***forests*** were included in the model. In the Lys Valley, Italy, the atmospheric concentration of PCB-138 was observed to be 3.4 pg m−3 in a clearing but only 1.4 pg m−3 in the ***forest***, a twofold decrease that was attributed to foliar uptake.

The primary absorption of atmospheric POPs, especially for , occurs through the  and/or lipids on the leaf surface– (the cuticle; Fig. ). Leaf POP concentrations increase in the daytime because of stomatal uptake, and POP uptake is greater in illuminated plants (as stomata are open) than in unilluminated plants (as stomata are closed). Notably, stomata are also the pathway through which POPs are lost from leaves, (Fig. ). Foliar PAH uptake can be tracked by two-photon excitation microscopy, revealing mechanisms by which PAHs are transported from the leaf surface into deeper layers of leaf tissue,,. PAHs are able to penetrate and diffuse via a channel-like pathway into the middle layer of the leaf cuticle matrix (Fig. ), where they are accumulated by polymeric lipids and other aqueous and lipophilic phases of plant tissues,.

Foliar uptake of atmospheric persistent organic pollutants.

a | Atmospheric persistent organic pollutant (POP) uptake by foliage, where arrows point in the direction of the movement of the pollutants and the blue lines represent the potential diffusion pathway of pollutants into the foliage. b | Locations of pollutants (blue areas) on the adaxial and abaxial surfaces of leaves. c | Uptake of POPs with varying physicochemical properties. POPs with logKOA < 8.5 will be rapidly taken up by foliage through stomatal exchange, with chemical partitioning between the leaf and the air approaching equilibrium. POPs with higher logKOA are likely taken up primarily through the cuticle, which is a relatively slow process. For POPs with logKOA between 8.5 and 11, gaseous uptake will be kinetically limited and will not approach equilibrium. For POPs with a high logKOA, particle-bound deposition could be the primary foliar uptake pathway. Some have suggested that this pathway dominates at logKOA > 9 (ref.), while others have suggested a logKOA of >11 (ref.). Part a adapted from ref., Springer Nature Limited. Part b adapted with permission from ref., American Chemical Society.

Foliar uptake of POPs can be divided into two different categories, which relate to the of each POP (Fig. ). POPs with a logKOA < 8.5 (such as PCB-28 and PCB-52) experience relatively rapid uptake and clearance kinetics through the stomata, with only a short period to leaf–air equilibrium (often, a couple of days),,. In contrast, POPs with logKOA > 9 (such as PCB-153) experience slow chemical migration, owing to kinetic limitation during gaseous uptake through the cuticle and/or particle-bound deposition,, and concentrations will not approach leaf–air equilibrium, (Fig. ). For the pollutants with logKOA > 9, the uptake dynamic curve can be fitted by an exponential curve relating foliar concentrations (Cf) and uptake time (t):where A and y0 are constant parameters and k is the uptake rate (per day), which is related to the concentrations of POPs, where a high k value is associated with rapid uptake. For example, the uptake rate parameter k decreased from 0.19 per day to 0.003 per day by the end of the growing season in one location for PCB-153 (logKOA ~10). Simultaneously, the uptake fluxes of PCB-153 from air to foliage in spring (1.5–2.9 ng m−2 per day) were 1.5–4 times higher than those at the end of the growing period (0.7–1.0 ng m−2 per day).

Different plant species can have up to 20-fold variations in POP uptake because of differences in the lipid content and quality of plant foliage–, as lipophilic POP and PAH will tend to partition to leaf lipids–. Indeed, a study in the Italian Alps showed that the concentrations of hexachlorocyclohexanes (HCHs) and hexachlorobenzene (HCB) in spruce needles (200–480 pg g−1) were higher than those in the leaves of chestnut (23–69 pg g−1) and maple (109–205 pg g−1) trees. The  of pollutants with logKOA > 9 in coniferous canopies are much slower than in deciduous canopies (0.78 cm s−1 versus 3.6 cm s−1 for polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans, or PCDD/Fs). Although the slow uptake velocities decrease the accumulation rate of POPs in coniferous leaves, the long lifetime of coniferous leaves prolongs the exposure time. For example, an increase in the concentrations of POPs (including dichlorodiphenyltrichloroethane (DDT), HCHs and HCB) in coniferous leaves was observed over a 5-year period–. Thus, the long uptake period can partly offset the influences of low uptake velocities.

Deposition to the ***forest*** floor

Litterfall, and are the major POP deposition pathways under the ***forest*** canopy (Fig. ), with litterfall occurring mainly at the end of the growing season,. In the Lys Valley, for example, the deposition of PCBs during the late growing season related broadly to the amount of litter. However, in a coniferous ***forest*** near Bayreuth, Germany, litterfall accounted for only 16–48% of the total deposition flux of PCDD/Fs, which might be contributed to by the washout of rainfall through foliage (throughfall). Indeed, the fluxes of throughfall for PAHs, PCBs and PCDD/Fs were 2–12-fold higher than those of litterfall in coniferous ***forests*** in Sweden (Supplementary Table ). Higher throughfall fluxes are often ascribed to pollutant deposition during leaf wax erosion, which is thought to occur frequently, owing to the renewal of the cuticular waxes. However, measurements of throughfall fluxes, especially related to wax erosion, are relatively sparse because of the difficulty of rainfall sampling and analysis (Supplementary Table ).

Air–litter POP and PAH exchange occurs on the surface ground of the ***forest*** floor, and, owing to the high carbon content in the litter, usually results in pollutant deposition as dry gaseous deposition. As with measuring throughfall, quantifying air–litter POP exchange fluxes is difficult–, so direct observations are rare, but some estimated values are available. In Himalayan ***forests***, for example, the dry gaseous deposition fluxes of HCHs and DDT (both in the range of 3–10 pg m−2 h−1) were estimated to account for 10–50% of total deposition to the ***forest*** floor. A similar pattern was found for benzo[a]pyrene in North China ***forests***, where 40% of total deposition was attributed to dry gaseous deposition. In the UK, the large differences in fluxes between observed litterfall deposition and total deposition (10–170 times) were attributed to the direct uptake of atmospheric POPs by litter on the ***forest*** floor.

Together, these depositional processes can lead to fluxes up to a few or tens of μg m−2 per month for DDT, PCBs, PAHs and PCDD/Fs (Supplementary Table ). Deposition fluxes of PAHs (12–170 μg m−2 per month, Supplementary Table ) are higher than those of other POPs (Supplementary Table ), which could relate to the relatively higher atmospheric PAH concentrations in the global atmosphere (Supplementary Fig. ). However, these flux estimates are biased, as most studies observe boreal and/or temperate ***forests***. In the only tropical rainforest where POP measurements have been undertaken (in Hainan, China), the total PCB deposition flux under the ***forest*** canopy (38 ng m−2 per month) was approximately one order of magnitude higher than that in the Tibetan ***forest*** (Supplementary Table ). This large flux was attributed to high precipitation and the deciduous trees in Hainan rainforests, which can introduce more throughfall and litterfall. POP deposition in tropical rainforests should, therefore, be of great concern.

Soil processes

In ***forest*** soils, POPs and PAHs are generally most concentrated in the top uppermost layer (the leaf litter) because of their high affinity with organic matter,,,–, which is abundant in the litter layer (for example, >20% organic matter content) and decreases with depth (~1% organic matter content). As organic matter in the litter layer is degraded, POPs can be freely dissolved and leach to deeper soil layers or be washed out. Dissolved organic matter and particulate organic carbon, partly from the litter decomposition, could enhance POPs mobility in ***forest*** soil. Despite long litter decomposition times in European boreal and montane ***forests***, however, it was observed that less than 1% of DDT and PCB-180 leached from the soil surface every year,. Moreover, the more hydrophobic compounds, with log higher than 6.5 (DDT, high-molecular-weight PCBs, 5–7-ring PAHs), tended to remain in the layer where they were originally deposited,,.

Leaching and infiltration were more prevalent in temperate ***forests*** than in boreal ***forests***. Observations in China and Europe suggest that the occurrences of PCBs and HCB in the mineral layers of ***forest*** soil were related to precipitation–, indicating the leaching with dissolved organic matter from the surface O-layer to deeper layers. Similarly, high PAH retention was observed in the mineral layers of ***forest*** soils in the USA. Higher proportions of broad-leaved trees in mixed ***forests***,, less acidic soil and the activities of earthworms, have been suggested to promote POP leaching and infiltration into deeper soils in temperate ***forests***.

Although POP studies are limited in tropical ***forest*** soils, one study found that 0.3–0.5% 13C-labelled PCBs leached into deeper soil over 120 days, whereas similar percentages of PCBs leached into boreal and montane ***forests*** over one year. High temperature and precipitation, and rapid litter decomposition, likely enhance the mobility and degradation of POPs, resulting in the relatively rapid loss of POPs in tropical rainforest soils. This loss could offset the higher deposition fluxes of POPs in tropical ***forests*** (Supplementary Table ).

Degradation is another pathway by which POPs and PAHs are lost from ***forest*** soil. For example, microorganisms in ***forest*** soils can mineralize PAHs — bacteria related to Sphingomonas, Rhodanobacter and Acidobacteria that can degrade phenanthrene, anthracene and fluoranthene, respectively, have been found in ***forest*** soils. Owing to microbial degradation, the half-lives of phenanthrene in the UK and Norwegian ***forest*** soils were only 6–70 days. The warm and wet environment of tropical ***forests*** should intuitively support a higher rate of microbial degradation of POPs. However, the half-lives of PCBs in the rainforest of Hainan Island are consistent with those measured in the boreal ***forest***, indicating that degradation of organochlorine chemicals could be minor in that location. Although current technologies have been widely used to identify the potential microorganisms that can degrade POPs and PAHs in soil–, the mechanisms and effects of POP biodegradation in ***forest*** soil are unknown.

Despite losses from leaching and infiltration, weathering and biodegradation, high accumulation rates related to foliage uptake and under-canopy deposition lead to the role of ***forests*** as POP reservoirs. These observations are further supported by comparisons of the concentrations of POPs in ***forest*** soils versus in clearings, expressed as the ***forest***/clearing (F/C) ratio ( and Supplementary Fig. ). Furthermore, POP concentrations in ***forest*** soils were higher than those in background non-***forest*** soils (Supplementary Fig. ), highlighting the influence of the FFE on POP storage and cycling.

Global distribution and stocks

The geographic variations in POP and PAH distribution are driven by local, regional and global factors. Whereas the numbers of sites where foliar concentrations of POPs and PAHs were measured are relatively low (10 and 12 sites, respectively, Supplementary Table ), POP concentrations in soil have been sampled extensively (Supplementary Fig. ). In this section, we describe the distribution of POPs in ***forest*** soils globally and the geographic factors that drive this distribution, and estimate total ***forest*** soil stocks of POPs and PAHs.

Drivers and distributions

In ***forest*** soils globally, the O-layer of soil (the organic, uppermost layer) contained higher concentrations of all classes of POPs than the A + B layers (Fig. ). Amongst the POPs, the concentrations of HCHs, DDT and PCBs were relatively high, reaching tens of ng g−1, whereas HCB concentrations tended to be lower (<1 ng g−1), perhaps due to its relatively high volatility and low affinity for organic matter. Polychlorinated naphthalene (PCN) and PCDD/F values also tended to be in the nanogram or sub-nanogram range, with 4.5–190 pg g−1 reported for PCN in ***forest*** soils in China and 0.06–4.4 ng g−1 for PCDD/Fs in German ***forest*** soils. PAHs were more concentrated than POPs, reaching hundreds of ng g−1 (Fig. ).

Persistent organic pollutants and polyaromatic hydrocarbons in ***forest*** soils.

a | Concentrations of persistent organic pollutants and polyaromatic hydrocarbons (PAHs) in ***forest*** soils. b | Relationship between soil total organic carbon (TOC) and normalized concentrations (Cnor) of persistent organic pollutants and PAHs (r = 0.61 and p < 0.05). c | Cnor versus latitude (r = 0.92, p < 0.01). d | Cnor versus longitude (r = −0.68, p < 0.01). e | Cnor versus altitude (r = −0.79, p < 0.01). The concentrations in ***forest*** soil are based on the data in Supplementary Table , and, to reduce the deviations from the uneven data, the normalized concentrations were averaged over some intervals. Further details are included in the . DDT, dichlorodiphenyltrichloroethane; d.w., dry weight; HCB, hexachlorobenzene; HCHs, hexachlorocyclohexanes; PCBs, polychlorinated biphenyls; PCDD/Fs, polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans; PCN, polychlorinated naphthalene.

Overall, POP and PAH concentrations tend to be higher in European soils than on other continents (Fig. ). The relatively high concentrations are most notable for PCBs (up to 90 ng g−1 in Europe), which are two orders of magnitude higher than in other regions (~0.8 ng g−1 on average), which corresponds with high PCB ***emissions*** in Europe (Fig. , Supplementary Fig. 4). Soil HCB concentrations are substantial in Northern Europe; at 5.2 ng g−1 dry weight (d.w.), a soil in Norway had the highest HCB concentration discussed here. POP concentrations were also relatively high in Asia. HCB concentrations are notably high in North China and DDT is frequently measured in substantial amounts in Asian soils (Fig. ). Extremely high DDT levels occur in China (Mount Tai: 749.6 ng g−1 d.w.) and relatively high levels also occur in Europe (Leipzig, Germany: 252.9 ng g−1 d.w. for p,p′-DDT, Supplementary Fig. ).

The distributions of POPs in ***forest*** soils do not follow global patterns of atmospheric POP concentrations (Supplementary Fig. ), suggesting that the current or short-term atmospheric concentrations of POPs are likely not the dominant influence on their soil distributions. Some studies on POPs ***emissions*** highlight the high cumulative usage and ***emission*** of PCBs in Europe as leading to their accumulation in soils regionally,. Similarly, Asia has been suggested as a hotspot region of HCH and DDT production and ***emissions***–, hence, these chemicals are dominant in Asian ***forest*** soil. As ***forest*** soil accumulates POPs over the timescale of years, the long-term ***emissions*** of chemicals usually lead to the great burden of POPs in ***forest*** soil.

In addition to regional ***emissions*** and use patterns, the grasshopper effect suggests that the global transport of POPs is driven by temperature and, thus, shows a latitudinal gradient,, which could be reflected in soil POP concentrations. Using observational data compiled here, we investigated the relationships between the normalized concentrations of POPs and PAHs in ***forest*** soil (Cnor) and the geographic parameters, including soil total organic carbon (TOC), latitude, longitude and altitude (Fig. –). More information on calculating the Cnor and the statistical analysis for linear regression can be found in the .

Organic carbon-rich soils consistently contained the highest burdens of POPs, and there was a significant positive correlation between Cnor and TOC (r = 0.61, p < 0.05, Fig. ). This correlation suggests that ***forest*** soil organic carbon controls the accumulation of POPs,–. Latitude was also strongly positively correlated with Cnor in the Northern Hemisphere (r = 0.92, p < 0.01, Fig. ) and, as latitude is related to temperature, reflects the cold condensation of these relatively volatile chemicals. The latitudinal increase of POPs was previously suggested as evidence of the grasshopper effect. The data compiled here support this attribution and show that POP distributions in ***forest*** soils can provide insights into the global migration of POPs.

In contrast with the positive correlations with TOC and latitude, Cnor was negatively correlated with longitude (r = −0.68, p < 0.01, Fig. ) and elevation (r = −0.79, p < 0.01; Fig. ). High concentrations of POPs occurred at longitudes of 100°W–30°E (Fig. ), with high upper concentrations at 20–40°E (Europe) and ~40°W (America), and at low elevation (<500 m, Fig. ). Although cold condensation along the mountain slope enhances POP concentration at high-elevation locations,,, the negative correlation between Cnor and elevation suggests a heavy burden of POPs in low-altitude regions globally,,,–. Most of the population lives in low-elevation regions, and Europe and America had extensively used most of the above-mentioned POPs; thus, these high concentration variations likely resulted from regional contamination. However, it should be noted that only a few datasets have been obtained from high elevations (many datasets are from low elevations, where local contamination occurs, Supplementary Table ), thus, limiting these conclusions.

Investigating the relationship between soil TOC and temperature can reveal the balance between the FFE and the grasshopper effect in driving ***forest*** POP concentrations. One study investigated the distribution of POPs in ***forest*** soils of the eastern slope of Mount Gongga, China, and found that the contribution of the FFE to POPs accumulation in ***forest*** soil was up to five times larger than that of the mountain cold trapping effect (which is related to temperature). It was suggested that, instead of focusing solely on the temperature-driven grasshopper effect to explain ***forest*** soil POP concentrations, we should take both effects into account. Here, multiple regression analysis was conducted with Cnor as the dependent variable, and latitude and TOC as the independent variables. The correlation relationship (, r2 = 0.86, p < 0.01) suggests a strong correlation between these variables. The combined contribution of cold condensation and the FFE can explain more than 80% of the POPs concentration variation in the global ***forest*** soil, and the contribution of the FFE is larger than that of temperature, as the coefficient for TOC is positive and higher than that for latitude.

Persistent organic pollutant stocks in ***forest*** soil

The canopy and the soil are the two main compartments that contain POPs in ***forests***, and the global burden of POPs in these compartments can be estimated for the first time using the datasets compiled here (Supplementary Tables –; see the for more information about the estimation methods used). In terms of overall abundance in soils and in foliage, PAHs were the most abundant, followed by PCBs > DDT > HCHs > HCB > PCN > PCDD/Fs (Fig. ), which broadly matches the total ***emissions*** of those compounds globally,,,,. Generally, tropical ***forest*** foliage has the highest storage capacity (1.7 ± 1.0 Gg for the total ***target*** POPs and PAHs; Fig. ), owing to its large biomass, followed by temperate ***forest*** foliage (0.1 ± 0.05 Gg, Fig. ), with the lowest POP storage in boreal ***forest*** foliage (0.03 ± 0.02 , Fig. ). The total amount of estimated POPs and PAHs in ***forest*** soils is substantially higher, at 139 ± 111 Gg in the O-layer globally. As with the foliage, the amount stored in the tropics was the highest (64 ± 51 Gg), but boreal ***forests*** stored 1.5 times more POPs and PAHs than temperate ***forests*** (Fig. ).

Estimation of stocks and soil storage fluxes of persistent organic pollutants and polyaromatic hydrocarbons.

a | Tropical ***forest*** stocks and fluxes. b | Temperate ***forests***. c | Boreal ***forests***. From top to bottom: maps of the distribution of these ***forests***, stocks in foliage (light orange) and soil (dark orange), soil storage fluxes (purple), changes in stocks in foliage (light blue) and soil (dark blue) related to deforestation and afforestation, and ***emissions*** from fires (red). Data in this figure were calculated based on the global concentrations of persistent organic pollutants (POPs) in the ***forest*** soil and foliage as described in the . PAHs, polycyclic aromatic hydrocarbons; PCBs, polychlorinated biphenyls; HCB, hexachlorobenzene; HCHs, hexachlorocyclohexanes; DDT, dichlorodiphenyltrichloroethane; PCN, polychlorinated naphthalene; PCDD/Fs, polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans.

The higher storage of POPs and PAHs in tropical and ***forest*** soils might be explained by the TOC, as it is one of the most important factors controlling the FFE, and the carbon pools in the boreal and tropic ***forest*** soils are estimated to be 2–4 times higher than those in temperate ***forests***. The high carbon pools for vegetation in tropical ***forests*** (~200 tC ha−1 versus <75 tC ha−1 in temperate and boreal ***forests***), could explain why the highest foliar POPs storage occurred in tropical ***forests***. The exposure time of soil (>20 years) is higher than that of foliage (3 months to 5 years); therefore, the stock of POPs in ***forest*** soil is 20–1,600 times greater than that of foliage (depending on the specific compound). These ratios are in good agreement with the previous estimation of Nizzetto et al.. Errors in the concentrations of POPs and PAHs and the ratios of leaf biomass to total above-ground biomass introduce some uncertainty in these estimates though (see the and Tables ,–), warranting further constraint of these estimates in future research.

The soil storage flux (in Mg per year) for each POP class and for PAHs was calculated based on the soil age as in ref. (Fig. ). The flux with unit Mg per year means how many POPs per year are stored in soil. For example, the storage flux of PCBs in boreal ***forest*** soil was estimated as 23 ± 11 Mg per year (Fig. ), which is the same order of magnitude as that reported by Moeckel et al. (11.2 Mg per year). These flux estimations can vary substantially (by 20-fold) with the soil age used ( and Table ). Despite these uncertainties, the estimated storage fluxes of this review are broadly on the same order of magnitude as the data reported by other observations and/or estimations (Supplementary Fig. ), indicating that the flux values estimated in Fig.  are reasonable.

Impact of disturbances on POPs

Human activities and climate change disturb ***forests***, resulting in soil erosion and organic carbon release with the decreasing ***forest*** areas,.Tropical ***forests***, which are the largest ***forest*** reservoir of POPs and PAHs, saw a 5.5 × 104 km2 per year decrease from 2010 to 2015 (ref.). In contrast, plantations continue have led to an increase in ***forest*** areas in some places, including a temperate-region ***forest*** area increase of 2.2 × 104 km2 per year. ***Forest*** fires can also lead to rapid destruction of the ***forest***, with an accompanying release of a large amount of pollutants and carbon from above-ground vegetation and litter,. This flux is especially important, as fire frequencies and burned area are increasing with climate change,,,. Deforestation and ***forest*** fire will influence the accumulation and release of POPs in the ***forest*** regions, as reviewed in this section.

Impacts of ***forest*** ***land***-use change

As ***forests*** disappear, air–foliage exchange decreases and the deposition of POPs in canopy foliage and soil declines. A reduction of the canopy biomass by 10% coupled with a 2 °C increase in air temperature is estimated to reduce the canopy SC POP storage capacity by up to 15–25% (ref.). Deforestation also enhances the release of POPs from the soil. The destruction of rainforests in tropical regions is mainly for the development of cattle ranches and/or for economically beneficial tree and crop plantations. A study of contiguous plant regions in Hainan Island showed that, after deforestation for planting eucalyptus and rubber ***forests***, the TOC content in the surface soil decreased at a factor of ~2, leading to the possible leaching of PCBs with organic carbons from soil. In contrast, afforestation can enhance POP storage in both the canopy and the soil. The Three Northern Regions Shelter ***Forest*** (TNRSF), China (also known as the Great Green Wall), is the largest afforestation project globally — from 1978 to 2010, the TNRSF expanded ***forest*** cover in northern China by 8% (ref.). Simulations showed that, from 1990 to 2010, the uptake of atmospheric phenanthrene and benzo[a]pyrene by the TNRSF increased from 36.4 to 76.82 Mg and from 2.2 to 4.52 Mg, respectively.

Based on the annual change in ***forest*** area and biomass (the net result of deforestation and afforestation) according to the Food and ***Agriculture*** Organization of the United Nations (FAO), we estimated the changes in POP budgets caused by ***forest*** change between 2010 and 2015 (Fig. ). Large POP and PAH loss rates occurred in tropical ***forests*** (Fig. ), including in both foliage (light blue row) and soil losses (dark blue row), which could be a result of the decrease in ***forest*** biomass and area in the tropics,,,. However, the POP burden in temperate ***forests*** clearly increased (Fig. ), which is likely associated with plantation projects and other afforestation in mid-latitude regions,. The POP loading in boreal ***forests*** was relatively constant compared with the other two zones, with a slight loss found only for soil, whereas the foliage loading of POPs increased (Fig. ).

Impacts of ***forest*** fires

In addition to disrupting ***forests*** and potentially reducing the POP burden in ***forest*** foliage and soils, ***forest*** fires produce POPs (HCB, PCBs, PCN and PCDD/Fs) and PAHs through the combustion of organic matter,–. Other POPs (for example, DDT, HCHs and PCBs) accumulated in foliage, litter and surface soil also revolatilize during the high temperatures experienced during fires,–. For example, because of the high biomass in ***forests***, the POP ***emissions*** from ***forest*** fires could be up to 60 times higher than those from savannah fires in Australia. In Africa, ***forest*** fires are considered to contribute 10% of the atmospheric PCDDs and PAHs in ***forested*** regions.

***Emission*** factors (EFs) are indicators that evaluate the ***emission*** efficiency of pollutants from burning,,. We find that ***forest*** type is the main factor influencing the EFs,, (Supplementary Table ). For example, EFs of PAHs in eucalyptus ***forests*** are ~3 times lower than those in pine ***forests*** (Supplementary Table ), which might relate with the difference in carbon density and burning efficiency in different ***forests***,. In addition, the EFs of DDT from leaf litter burning are one order of magnitude higher than those from woody debris burning (Supplementary Table ).

Total POP and PAH ***emission*** fluxes owing to ***forest*** fires were estimated in each ***forest*** type here (Fig. , red rows), based on the annual burned area and the EFs described in Supplementary Table  (see the for more details about the calculations). Globally, PAHs account for the most ***emissions*** (up to 115,000 Mg per year), followed by PCBs (~30 Mg per year), which could be related to the high EFs of PAHs from ***forest*** fires, albeit these EFs have large uncertainties ( and Supplementary Table ). For comparison, it was estimated that the global PAH ***emission*** caused by ***forest*** fires is ~60,000 Mg in 2007 (ref.), which is about half of the estimation in this Review (Supplementary Fig. ). Despite this difference, considering the carcinogenicity of PAHs, their massive ***emission*** by ***forest*** fires will certainly worsen air quality and imperil human health.

For quantifying the importance of ***forest*** fire ***emission*** on POP cycling, we calculated the ratios of fire ***emission*** fluxes to the total storage fluxes. The ratios for HCB, PCBs and PCN are in the range of 0.1–0.8 (Supplementary Fig. ), but the ratios of fire ***emission*** fluxes to storage fluxes are >10 for PAHs in all the ***forest*** ecosystems (Supplementary Fig. ), indicating that the ***emissions*** by ***forest*** fires generally outpace PAH storage. These ratios show that fire ***emissions*** are an important source of atmospheric POPs. Moreover, pollutants released from ***forest*** fires can reach upward to thousands of metres (even into the stratosphere) and disperse at long distances with fire plumes–. For instance, trans-Pacific air masses from Siberian fires were related to approximately twofold atmospheric concentrations of HCHs and HCB in the western USA. In the Arctic, the boreal ***forest*** fire ***emission*** contributed 7–90% of atmospheric benzo[a]pyrene–. ***Forest*** fires in Alpine regions are also sources of POPs in mountain glaciers. Together, these findings suggest that ***forest*** fires can redistribute POPs regionally and even globally.

Compared with atmospheric transport, the runoff of residual POPs and PAHs in burned soil after fires– is easily and often ignored. Importantly, though, this runoff can lead to a 3–4-fold increase in the PAH load in streams that drain burned catchments,, which can persist for six months or even one year after burning,,,,. These observed increases imply that the impacts of ***forest*** fires on POP cycling could last for over at least a year on regional scales.

Modelling POP cycling

To date, many models have been developed to simulate the behaviour of POPs in the ***forest***,,– and the global transport of POPs as mediated by ***forests***–,,. Based on their ***targets***, these models can be grouped into two general categories (Table ). One comprises models that aim to estimate the uptake of POPs by canopy foliage. Generally, simple mathematical equations and mass balance theory are used in these models to account for various processes, such as vegetation uptake and wet and dry precipitation-bound deposition,,,,. This type of model is precise, owing to the clear physical principles for the models, but they require more measured data to calibrate the parameters in models and more computing resources,–. Therefore, these models are usually used to discuss the mechanisms behind POP processes in the ***forest*** under ideal situations,.

Models of persistent organic pollutant and polyaromatic hydrocarbon processes in ***forests***

| **Model type** | **Model name/description** | **Principle** | **Resolution** | **Model *targets*** | **Regions applied** | **Refs** |
| --- | --- | --- | --- | --- | --- | --- |
| Foliage-uptake model | Simonich?Hites model | Mass balance model | ? | Estimate the average annual ***removal*** of PAHs from the atmosphere by vegetation | Northeastern United States |  |
| McLachlan?Horstmann model | Mathematical model | ? | Describe the FFE and examine the role of ***forest*** in soil POP deposition | Bayreuth, Germany |  |  |
| St-Amand model | Mathematical model | ? | Predict POP concentrations in air and vegetation | Ottawa, Canada | , |  |
| Improved McLachlan?Horstmann model | Mathematical model | ? | Describe the dry gaseous deposition of POPs to the ***forest*** canopy | Lys Valley, Italy |  |  |
| Leuning layered canopy model with chemical fate module | Dynamic model | ? | Simulate atmosphere?canopy exchange of gas-phase POPs | Harvard ***Forest***, United States |  |  |
| Moeckel model for ***forest*** POPs | Mathematical model | ? | Evaluate POP depositional fluxes from foliage | Uppsala, Sweden |  |  |
| SoilPlusVeg model | Fugacity model | Two vertical atmospheric layers + multilayered soil + vegetation | Model the dynamics of POP uptake and release in ***forest*** compartments | Como, Italy |  |  |
| Regional/global model with fugacity theory | MCMPOP model | 2D level III multi-compartment fugacity model | 1 × 1 km, two vertical atmospheric layers | Study the impacts of ***forests*** on POP transport over high mountains | Central Himalayas |  |
| Modified multimedia urban model (MUM) | Level III fugacity model | ? | Comparing the mobility of POPs in urban and ***forested*** areas | ***Forested*** region of Toronto, Canada |  |  |
| CoZMo-POP model | Non-steady-state mass balance model | ? | Assess the effects of ***forests*** on POP behaviour | ? |  |  |
| Improved ?BETR North America? model for Europe | Segmented model with steady-state solution | 5° × 5°, with 50 cells in Europe | Examine the fate of lindane in Europe | Europe |  |  |
| POPCYCLING-Baltic fugacity model | Three-resistance state-of-the-art fugacity model | 1 × 1 km | Assess the combined influence of increasing temperature and shifts in ***land*** use and management on the re-***emission*** of POPs from soils | Czech Republic |  |  |
| VegeZoMo model | Steady-state model without transport | Climate zones with five media | Investigate the effect of vegetation compartment on the environmental partitioning of DDT | Globally |  |  |
| CliMoChem model | Level IV fugacity model | Climate zones with five media | Investigate the effect of vegetation compartment on the environmental partitioning of DDT | Globally |  |  |
| Globo-POP model | Fugacity-based non-steady-state multimedia fate model | Ten climate zones, four vertical atmospheric layers | Investigate the effect of ***forests*** on POP potential to undergo long-range transport and accumulation in the Arctic | Globally |  |  |
| Canadian Model for Environmental Transport of Organochlorine Pesticides (CanMETOP) coupled fugacity-based canopy module | Fugacity-based level IV-based multimedia model | 0.25° × 0.25°, 14 vertical levels | Quantify the influence of large-scale ***land***-use change induced by artificial ***forests*** | Three Northern Regions Shelter ***Forest***, China |  |  |

DDT, dichlorodiphenyltrichloroethane; FFE, ***forest*** filter effect; PAHs, polycyclic aromatic hydrocarbons; POP, persistent organic pollutant.

The second class of models includes fugacity modelling deployed at different scales, from a mountain transect to a continent, and the globe. Fugacity theory simplifies calculations during simulations, which provides the possibility of realizing large-scale and multi-median POP cycling simulations. For instance, Globo-POP is a locally averaged global distribution model that determines how ***forests*** affect the potential of a chemical to undergo long-range atmospheric transport. This model indicates that boreal ***forests***, specifically, boreal deciduous ***forests***, can drastically reduce POP concentrations in air, ocean and freshwater, while increasing POP concentrations in ***forest*** soils and substantially increasing the global storage time of POPs in the terrestrial environment.

The impact of climate and ***land***-use change on the fate of POPs can also be estimated by fugacity models (Table ). The POPCYCLING-Baltic fugacity model was set up as a three-resistance classical model for the Czech Republic, for example, and suggested that conversion of 10% of the arable ***land*** to grassland or ***forest*** (which facilitates deposition of POPs) can counteract the volatilization of POPs caused by a 1 °C increase in air temperature. A fugacity-based level IV multimedia fate model coupling an atmospheric transport model (CanMETOP) revealed that the TNRSF can enhance the ***removal*** of atmospheric PAHs and will contribute to the long-term improvement of air quality in northern China. Compared with the mathematical and dynamic models in Table , the fugacity models are easier to couple climatic or atmospheric transport models, and are suitable to simulate POPs fate under climate and/or ***forest*** changes on regional or global scales.

Future perspectives

Although recent research has advanced our understanding of the role of ***forests*** in the cycling of POP, there are still many areas where additional efforts are required and many knowledge gaps need to be filled. Here, we recommend the following directions for future research.

Boreal ***forests***, rainforests and high-mountain ***forests*** are key areas for studying POP cycling in ***forests***, but most of the studied sites are currently located in boreal ***forests*** in Northern Europe and temperate ***forests*** in East Asia and Western Europe (Fig. ). Thus, intensive POP and PAH sampling of tropical and montane ***forests*** are needed to fully understand regional and global POP cycling, the FFE and the grasshopper effect. Particularly, some regions with extensive ***forest*** cover, such as Siberia, Central Africa, Southeast Asia, and Central and South America have a lack of available data and should serve as priority ***targets*** for POP research.

Similarly, the number of studies on POPs in the ***forest*** air, precipitation and foliage are relatively limited compared with ***forest*** soil studies (Fig. ). Although leaves–, tree barks–, and moss and/or lichen,– have been widely used as passive samplers of POPs, measurements of these ***forest*** components are also rare. As POPs can be stored in various organic compartments, these data gaps hinder the estimation of the total POPs burden in ***forests***.

Many current studies focus on foliar uptake, but the processes and mechanisms of POP migration into plant body, movement with litter degradation and the effect of snow falling, and melting on the migration of POPs in the ***forest*** are poorly explored. The effect of stomata on the absorption of POPs by leaves is also not clear. Given that the opening and closing of stomata can be controlled by light, using isotopically labelled chemicals as indicators coupled with light manipulation techniques can provide direct evidence for the stomatal absorption of POPs. Isotopically labelled chemicals can also be used as a tracer of the movement of POPs during air–litter exchange. Similarly, high-time-resolution and online equipment should be set up to investigate POPs movements as continuous processes in situ and in real time, which will improve our understanding of the POPs fate in the ***forest*** and inform further model development.

The ***forest*** is a complex system that includes plants, animals, fungi and microorganisms, and impacts global cycling of energy, water, carbon, and other materials. However, the connections between POP cycling, other biogeochemical cycles and microclimates have barely been explored. Furthermore, biota under the canopy influence POP cycling, but a number of questions about biota–POP interactions are elusive and remain to be addressed: How do other organisms (other than trees) mediate the cycling of POPs in the ***forest***? Which types of biota are efficient mediators of POPs degradation? What factors influence their efficiency? To date, we are aware of only one study that has investigated the accumulation of POPs in the ***forest*** food chain (soil–earthworm–hedgehog), which reported that the concentrations of PCBs increased from ***forest*** soil (2.3 ng g−1) to hedgehogs (up to 13.5 ng g−1). Considering the high accumulation along this ***forest*** food chain, animals could be one of the important sinks of POPs in ***forests***. Further collaboration between environmental chemists, ecotoxicologists and ecologists are needed to understand POPs transfer along the ***forest*** food web.

Climate change, which influences ***forest*** losses and drives the change of water, carbon and energy cycling, can increase the release of POPs from ***forests*** and weaken the regulatory efficiency of the SC to eliminate POPs. However, current dynamic models only focus on the fate of POPs and do not account for global change (Table ). Models of ***forest*** POPs should be linked or joined into global and regional climate models (such as the Community Earth System Model (CESM), GEOS-Chem, and WRF-Chem) as a module and different temperature gradients (1, 2 and 5 °C) should be considered in the models. Considering that the half-lives of most POPs are tens of years, the years of prediction could be up to 2050.

Taking global POP cycling models further, the influences of POP and PAH release from ***forest*** fires should be predicted. ***Emissions*** of POPs by ***forest*** fires should be coupled with the global transport and fate models to estimate the possible stocks and storage of POPs under future climate scenarios. Moreover, the EFs of different chemicals from different media (foliage, branches, tree bark, litter and soil) of different places should be systematically investigated.

Policymakers should also consider determining the safety threshold of ***forest*** soil by integrating the bioavailabilities and concentrations of POPs in ***forest*** soil. Given that any changes in the ***forest*** could result in large-scale ***emission*** or accumulation of POPs, and the emitted POPs from ***forest*** fires will greatly increase the inhalation risks to humans, the possible redistribution and health impacts of POPs should be assessed before setting up planting, cutting and burning strategies. Moreover, both climate change and anthropogenic activities have led to the aggravation of ***forest*** fires, promoting pollutant ***emissions***. Coordinated, transdisciplinary research is needed help decision makers reduce the impact of ***forest*** fire on environmental pollution.

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**Notes**

Supplementary informationSupplementary information is available for this paper at [*https://doi.org/10.1038/s43017-020-00137-5.Peer*](https://doi.org/10.1038/s43017-020-00137-5.Peer) review informationNature Reviews Earth & Environment thanks Kevin Jones and the other, anonymous, reviewer(s) for their contribution to the peer review of this work.Publisher’s noteSpringer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.Related linksConvention on Long-range Transboundary Air Pollution:[*https://unece.org/fileadmin/DAM//env/lrtap/lrtap\_h1.htmlStockholm*](https://unece.org/fileadmin/DAM//env/lrtap/lrtap_h1.htmlStockholm) Convention:[*http://www.pops.int*](http://www.pops.int)

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[***-Salesforce-Fighting Climate Change: Salesforce Surpasses 10 Million Tree Milestone in 12 Months***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6262-BVD1-JD3Y-Y0SR-00000-00&context=1516831)

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**Body**

Salesforce announced today it has met a major milestone in its decade-long commitment to conserve, restore, and grow 100 million trees by 2030 in support of the 1t.org mission.

Company's climate strategy embraces nature-based solutions, renewable energy, technology and innovation, and supply chain reduction ***targets***

***Forests*** are one of the Earth's largest carbon sinks, decreasing the amount of carbon dioxide in the atmosphere. Despite their importance, however, systematic destruction by fires, deforestation, and other human activity has led to the loss of nearly half the world's trees, most within the last 100 years.

According to ecosystem ecologist Thomas Crowther of Restor, addressing climate change requires both cutting ***emissions*** and drawing down the carbon in our atmosphere. It's an 'and, not or' approach on the global journey to net zero ***emissions***. So, when it comes to nature-based solutions for a carbon drawdown, ***forests*** are one of the best tools we've got.

That's why Salesforce has committed itself to conserving, restoring and growing ***forests*** as a major component of our integrated climate action strategy.

Partnership drives major goals that combat climate change

In January 2020, we partnered with the World Economic Forum to launch 1t.org, a global effort to bring together companies, NGOs, climate activists, and governments with the goal of conserving, restoring and growing one trillion trees around the world by 2030. In support of 1t.org's mission, Salesforce announced our own goal: to support and mobilize the conservation, restoration and growth of 100 million trees by the end of the decade.

Since that goal was announced, we have supported 19 projects throughout the world. Critically, as of today, we have now reached the first milestone: funding over 10 million trees.

Salesforce partnerships in different regions to support 100m trees planted

Projects supported by Salesforce engage locally and globally

Our strategy is focused on catalyzing the right trees, in the right places, by the right people, for the right reasons (i.e., climate change, biodiversity, livelihoods, etc). Some are assisted natural regeneration, some are managed planting; and they are located in developed and developing countries.

Trees planted today, if properly nurtured, will take about 10-15 years to mature. There's an old adage that says the best time to plant a tree was 20 years ago; and the second best time is now. Our actions today are front-loading investments for future climate and biodiversity impact.

Globally, projects span from Africa, Australia to Europe to Latin America, as well as the U.S. Some highlights below and you can see all 19 projects here:

Mangrove restoration in Madagascar: More than 90% of Madagascar's original ***forests*** have been destroyed, displacing entire animal species and limiting the Malagasy's ability to farm and live on the ***land***. With financial support from Salesforce, Eden Reforestation Projects is producing, planting, and protecting 2 million trees in Ankarafantsika National Park and 8 million mangrove trees in the Betsiboka River Estuary. The project will employ 150+ full-time and seasonal workers who receive a fair wage to produce and plant trees, patrol, and fight ***forest*** fires.

Reforesting the Camp Fire Burn Scar: Supporting American ***Forests*** to reforest ***land*** devastated by California's deadliest fire, the Camp Fire, which claimed at least 85 lives. The project uses the latest climate science to pioneer new tactics to grow healthy resilient seedlings. In November, on the fire's second anniversary, we planted 2,000 trees on private ***land*** burned by the fire. Salesforce is supporting planting 39,000+ more trees in the Camp Fire burn scar in the coming weeks and months.

Restoring degraded farmland in Australia in partnership with the Dja Dja Wurrung: With financial support from Salesforce, Greenfleet is restoring degraded farmland and planting 150,000+ native trees, linking two large patches of remnant woodland to increase biodiversity and ecosystems. Engaging on this initiative with the local indigenous group Dja Dja Wurrung has played a vital role in the planning and execution of this project.

Reforestation in Scotland to help a farm diversify its business while supporting the environment and biodiversity: Working with Natural Capital Partners to support the reforestation of a multi-purpose native woodland that will enable the local farm diversify its business while supporting the local environment and biodiversity. The 23,000 trees will capture approximately 4,000 tones of CO2e during their growing lifetime.

Watershed restoration in Latin America: In partnership with Salesforce and Global ***Forest*** Generation, Accion Andina is helping to restore one million hectares of high Andean ecosystems in six Latin American countries over the next 25 years. Salesforce funded 600,000 of the 1.2 million trees planted in 2020 and works with on-the-ground conservation leaders and indigenous communities to reforest priority watersheds for climate, biodiversity and people.

A ***forest*** of treesPhoto credit: Arnaud Mesureur

Enabling the ecopreneurs of tomorrow

Technology also plays a critical role in meeting these milestones through innovation.

Last year, the World Economic Forum launched UpLink, a new, open-source digital platform to foster mass participation from entrepreneurs, community groups and individuals around the world to meet the UN's Sustainable Development Goals.

Co-designed and developed with founding partners Salesforce and Deloitte, the platform helps to enable the next generation of mission-driven entrepreneurs and young innovators.

UpLink's Trillion Trees Challenge, co-designed with 1t.org, was a global call for solutions to help meet the goal of conserving, restoring and growing a trillion trees over the next decade. Five priority areas were identified: mass mobilization, reaching scale, greening cities, building a ***forest*** economy, and Fourth Industrial Revolution (i.e., automation, IoT) technologies for trees.

Through innovation and technology, tree innovators are driving impact at scale, including:

Pachama which is developing a modern market for ***forest*** carbon credits using remote sensing and machine learning.

Dendra Systems provides a cutting edge ecosystem restoration platform that combines ecology with drone and AI technologies, making optimising and delivering transparency to biodiversity restoration projects at a scale never before possible.

Reforestum Ecosphere+ deliver an end-to-end solution that brings transparency through technology to scale climate action, connecting companies and individuals to vital conservation and reforestation projects.

'All of the Above' solutions create new opportunities

Harnessing nature-based solutions like trees is a critical piece of our climate strategy as they help ***remove*** carbon from the atmosphere while supporting biodiversity, local economies and livelihoods.

But while trees and other nature-based solutions are absolutely vital, we must do more in order to meet our climate goals. We are at a critical juncture where an urgent 'all of the above' approach is needed when it comes to climate solutions.

Key to how Salesforce is tackling climate change:

Making climate an official part of the company public policy platform

Setting an approved 1.5-degreeC science-based ***emission*** reduction ***target*** and working with 60% of our suppliers to set their own ***emission*** reduction ***targets***.

Focusing on improving efficiency throughout our operations and sourcing renewable energy towards a 100% renewable energy goal.

Putting technology in the hands of companies to give them a 360-degree view of their environmental impact with Sustainability Cloud.

Partnering for a future we all want and can live in

***Forests***, which are critical to the health of our planet, covered about half the earth before the ***agricultural*** revolution began. In the 8,000 years since, while we've managed to feed and house billions of people, we've also lost or degraded half of those ***forests***, fueling a biodiversity collapse and the climate crisis. It's time we stop taking from our natural ecosystems, and start giving back.

Conserving, restoring, and growing 1 trillion trees is a movement that every company and every person can be part of. It won't be easy, but every person can make a difference. You can plant trees in backyards and neighborhoods, or donate to one of the many responsible programs that have long been restoring and protecting ***forests*** around the world. By getting involved, anyone can start regreening the Earth today.

Join us by visiting 1t.org and be part of the movement.

[Editorial queries for this story should be sent to [*newswire@enpublishing.co.uk*](mailto:newswire@enpublishing.co.uk) ]

**Load-Date:** March 11, 2021

**End of Document**



[***England's biggest landowners not growing enough trees - report; Church of England and Duchy of Cornwall come last in ranking of major landowners by forest cover***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60H9-XHK1-F021-63BK-00000-00&context=1516831)

The Guardian (London)

August 4, 2020 Tuesday 7:00 AM GMT

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**Section:** ENVIRONMENT; Version:2

**Length:** 1094 words

**Byline:** Fiona Harvey Environment correspondent

**Highlight:** Church of England and Duchy of Cornwall come last in ranking of major landowners by ***forest*** cover

**Body**

Many of England's biggest landowners are not doing enough to [*plant trees to tackle the climate crisis*](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place), according to new data.

Government departments, companies such as United Utilities and Network Rail, the royal family and organisations such as the Church of England and the National Trust are among the biggest owners of ***land*** in the country, but most have ***forest*** cover on their ***land*** that is only slightly above the national average, despite having pledged to reduce their carbon footprint.

Tree cover makes up about 10% of England's overall ***land*** area, but out of the top 10 landowners, only the Forestry Commission had a substantially greater ***forested*** area than this average, according to [*data compiled for the first time by Friends of the Earth*](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place).

That shows most of the biggest landowners could and should [*do more to plant trees*](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place), according to the campaigning charity, which is calling for a doubling of the UK's ***forest*** cover as part of the push to [*net*](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place) [*zero carbon* ***emissions***](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place).

"Much of England is owned by a very small number of landowners, who have a responsibility to better use their ***land*** in a way that helps address the climate and nature crises facing us all," said Guy Shrubsole, a trees campaigner at Friends of the Earth. "A big part of [tackling these crises] means [*growing more trees*](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place), which would ***remove*** planet-wrecking carbon from the air and provide homes for wildlife."

The Ministry of Defence and Highways England are both government bodies, with 15% and 12% tree cover on their ***land*** in England respectively. The government has pledged to ensure [*more* ***land*** *is devoted to woodland*](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place), as part of its [*England Tree Strategy*](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place). Shrubsole said the government should do more on its own estate, and more to enable other landowners to plant trees.

"[The government] didn't even set a tree ***target*** for the country," he said. "This lack of ambition shows a complete disregard for the climate crisis. Ministers must turn this around, by committing to a ***target*** to double UK tree cover, and providing better incentives for landowners to grow more trees and rewild their estates."

Some of the organisations named in the report are embarking on [*tree-planting programmes*](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place), which will substantially increase the amount of tree cover on their ***land***. For instance, the National Trust announced in January [*plans for 20m new trees*](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place) on its estate, which would cover an area one-and-a-half times the size of Manchester, or the equivalent of 42 Sherwood ***Forests***.

Patrick Begg, the outdoors and natural resources director at the National Trust, said: "We are absolutely supportive of planting more trees, across England, Wales and Northern Ireland. [Our 20m tree plan] will ensure we meet the [*Committee on Climate Change recommendations*](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place) of an increase in woodland cover from 10% to 17% in England and Wales by 2050."

The Duchy of Cornwall is also conducting a natural capital assessment of its ***land***, which is likely to result in more tree planting, and the water companies - including United Utilities, which currently has only 17,000 hectares of woodland among its 141,000 hectares - have [*pledged to plant 11m trees*](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place).

In some cases, landowners are also constrained by the nature of their ***land*** and the uses to which it can be put. For instance, the Duchy of Cornwall's landholdings include a large section of Dartmoor, which by its moorland nature lacks trees, and some of the RSPB's holdings are wetlands.

The Duchy, alongside other major landowners named in the report, such as the Crown Estate and National Trust, also maintains a lot of farmland, much of which cannot be converted without harming the UK's food production capacity.

However, Friends of the Earth said more must be done to encourage forestry schemes on marginal ***agricultural*** ***land*** if the UK is to meet its net zero carbon ***targets***, and said many of the tree-planting schemes planned by the top ten landowners were inadequate.

The group said water companies' plans for 11m trees would cover a tiny proportion of their overall holdings, and that the companies could go much further. For instance, a large amount of the ***land*** owned by United Utilities is given over to rough grazing, which in former times, with less intensive farming, would have contained more trees.

A spokesperson for United Utilities said: "We must balance the sometimes competing interests of water quality, biodiversity, farming and access and recreation. Tree-planting plays an important role, which is why we have planted 2m trees since 1995 and we plan to plant 1m more over the next ten years."

National Rail, which is named in the report as having 11% tree cover on its ***land***, has been criticised in recent years for [*felling large numbers of trackside trees*](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place). The company did not respond to the Guardian's request for comment.

A spokesperson for the Duchy of Cornwall told the Guardian: "Over the last 20 years, in his role as Duke of Cornwall, the Prince of Wales has increased Duchy woodland by more than half, through planting and purchasing, totalling approximately 20,000 trees. Throughout his tenure, the Duke has ensured that most of his woodland is managed inhouse by the Duchy estate."

The Church of England disputed the Friends of the Earth analysis, and said its tree cover was much higher than the 3-4% that the report suggested. A spokesperson for the Church Commissioners for England said: "We do not recognise the data that is presented, as it is incomplete and does not show the full picture. At the end of December, the commissioners owned 102,000 acres of ***forest*** ***land***. The Commissioners planted over 2.6m trees in 2019."

A spokesperson for Highways England said: "We take our environmental responsibilities very seriously and are one of the largest tree-planting organisations in the country. For example, last year we started a major programme of tree and shrub planting along two major roads in the south-west in a bid to connect a 105-mile corridor of wildlife habitat."

Friends of the Earth compiled its findings by examining ***land*** registry data, geographic information system mapping, and the [*National* ***Forest*** *Inventory*](https://www.theguardian.com/society/2019/dec/28/replanting-britain-its-about-the-right-tree-in-the-right-place).

A MoD spokesperson said: "We are committed to making the Defence estate as sustainable as possible and have planted 1.3m trees in the last decade, with plans to plant a further 2m.

"The Defence estate is primarily used for training, which requires large areas of open ***land*** for troops and armoured vehicles to manoeuvre freely. We continue to identify areas where new woodland can be planted that support our military training needs."

This article was amended on 4 August 2020 to correct errors in the accompanying table of data.

**Load-Date:** August 4, 2020

**End of Document**



[***EU wants to tax aviation fuel and phase out polluting cars by 2035***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:634S-1DY1-DXJ7-N36P-00000-00&context=1516831)

EuroNews - English Version

July 14, 2021 Wednesday 1:05 PM GMT

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**Length:** 2134 words

**Highlight:** Brussels has announced a range of new laws to help reduce carbon ***emissions***.

**Body**

The European Commission has announced plans to cut greenhouse gases from the transport sector by 90% by 2050 in order to meet the goals of the European Green Deal.

As part of a raft of new legislation, unveiled on Wednesday, passenger cars – which are responsible for around 12% of total EU ***emissions*** of carbon dioxide (CO2) – that run on fossil fuels like petrol and diesel will be completely phased out by 2035.

Consequently, all new cars registered as of 2035 will be zero-***emission***.

Brussels plans to revamp the bloc's infrastructure to stimulate the uptake of electric vehicles, with new regulations ensuring that all EU citizens can recharge and refuel their vehicles anywhere in the bloc.

The undertaking will be arduous: by the end of 2020, there were only some 226,000 publicly accessible recharging points across EU territory and the market is heavily concentrated in the Netherlands, France and Germany.

Brussels also wants to boost the domestic production of hydrogen and its use as an alternative fuel.

However, this market is even smaller: in 2020, there were only 125 hydrogen stations in the bloc serving a fleet of over 2,000 vehicles.

The objective is to have charging points at regular intervals on major highways: every 60 kilometres for electric cars and every 150 kilometres for hydrogen refuelling.

**13 draft laws**

The EC has put forward a massive legislative package to slash the EU’s greenhouse gas ***emissions*** by at least 55% by the end of 2030, a colossal and drastic endeavour that will irreversibly transform all economic sectors.

The bundle of 13 draft laws include a border tax on polluting imports, a regulation to phase out fossil fuel cars, plans to increase the uptake of alternative fuels, an expansion to the current ***Emissions*** Trading System, a higher price on carbon, a social climate fund to tackle energy poverty and a new ***target*** to double the share of renewable energy over the next 10 years.

In what is arguably one the biggest, boldest – and perhaps riskiest – proposals ever originated in Brussels, the so-called "Fit For 55" initiative aims to realise the ambitious goals of the European Green Deal and make the EU the first climate neutral continent by 2050 – a commitment that is already legally-binding but requires a comprehensive practical architecture.

"Our current fossil fuel economy has reached its limits. And we know that we have to move on to a new model – one that is powered by innovation, that has clean energy, that is moving towards a circular economy," said European Commission President Ursula von der Leyen, while presenting the proposals alongside six commissioners.

Wednesday's presentation sets in motion unprecedented legislative efforts in which the EU's two co-legislators, the European Parliament and the EU Council, will be subject to intense lobbying from industry organisations and civil society. Long-standing clashes between Western and Eastern member states are expected to continue.

Although interconnected, the draft laws will have to be assessed and negotiated individually until both legislators reach a final version, a process that usually takes around two years but could drag on for the most divisive texts.

Given the international dimension of climate change, the legislative package will also be scrutinised by the EU's main allies and trading partners, potentially causing friction with those who lag behind the bloc's climate ambitions.

"This is the make-or-break decade in the fight against the climate and biodiversity crises," said Frans Timmermans, the Commission's vice-president in charge of the Green Deal.

"We're putting a price on carbon so people have the incentive to use less carbon and we put a premium on decarbonising so that we stimulate innovation and adaptation."

**Carbon border tax**

The European Commission wants to slap a price tag on the carbon that is imported into the EU's single market. In practice, this means the introduction of a new border tax.

The executive argues that the bloc is subject to more strict climate rules compared to those of their trading partners, who operate under a more relaxed environment.

This divergence creates a situation known as carbon leakage: as the EU moves decisively to cut down greenhouse gas ***emissions*** (an effort that entails significant costs and innovation for European companies), other non-EU countries increase their ***emissions*** to gain a competitive advantage.

To protect their domestic industry from unfair competition, the Commission is determined to establish a carbon border adjustment mechanism (CBAM) that will put an extra charge on the imports of carbon-intensive goods. The levy will mirror the bloc's own carbon pricing rules, forcing imports to have a similar price as if they had been produced following EU legislation.

The extra charge will be paid by the EU businesses that import the polluting goods into the single market. The revenues obtained from the tax will add to the EU's common budget, which in turn will serve to finance the post-coronavirus recovery and the costly green transition.

Brussels expects to raise about €10 billion a year though the duty.

The carbon adjustment mechanism will be gradually rolled out, with a transitional phase running until 2025. Initially, the instrument will ***target*** the imports considered more at risk of carbon leakage: cement, iron, steel, aluminium, fertiliser and electricity. The list will be later expanded to other sectors.

Countries like Turkey, Russia, Ukraine, Egypt and China will be immediately affected by the measure since they represent the biggest exporters of the selected products. The Commission says it is conducting extensive bilateral discussions with non-EU countries and hopes the levy will incentive their partners to reduce ***emissions*** and adopt greener policies.

The tax could prompt a dispute within the World Trade Organization (WTO) if the measure is seen as an unjustifiable, discriminatory barrier to trade.

**A new *Emissions* Trading System**

Another major proposal presented by the Commission is a revision of the EU's pioneering ***Emissions*** Trading System (ETS), the world' first and biggest carbon market.

Launched in 2005, the system covers 31 countries (the 27 member states plus Iceland, Liechtenstein and Norway) and involves more than 10,000 powers plants and industrial installations.

The ETS works based on a "cap and trade" principle. On the one hand, the EU sets a cap on the maximum amount of greenhouse gases that the installations can emit. On the other hand, it creates permits for each unit of ***emissions***. Companies can then buy and trade emitting permits among each other to fulfil their needs. The cap is reduced over time, ensuring that ***emissions*** decrease.

The current price under the ETS is more than €50 per ton of emitted carbon.

Today, the ETS comprises sectors such as electricity and heat generation, commercial aviation, oil refineries, steel production and several chemical products. In total, the system covers around 40% of the EU's greenhouse gas ***emissions***.

The Commission thinks this figure is insufficient to meet its climate neutrality goals so it is now proposing to upgrade the system and incorporate the maritime sector. The pollution caps will be tightened, raising the price of emitting carbon.

More controversially, the executive plans to create a parallel, stand-alone ETS dedicated to buildings and road transport, two of the most polluting sectors that have been so far exempted from the cap-and-trade system.

"Buildings today consume 40% of the energy consumption and the road transport ***emissions*** have continuously increased – not decreased but increased," said von der Leyen. "We must reverse this trend and we must do it in a fair and in a social way."

The new scheme will make fuel suppliers pay an extra charge to compensate for the pollution coming from heating installations and diesels and petrol cars. The proposal is already raising fears that companies will pass on these expenses onto the consumers and the poorest households, which have fewer resources to transition towards cleaner alternatives, will be the hardest hit.

French MEP Pascal Canfin, who chairs the European Parliament's environment committer, has called the new ETS "politically suicidal" and warned that it might trigger social discontent similar to the 2018 Yellow Vests movement in France, which was caused, among other factors, by a fuel tax.

Environmental organisations, like Greenpeace and the European Climate Foundation, have cast doubt over the effectiveness of this new system, saying there is no guarantee of meaningful ***emission*** cuts.

Taking into account these concerns, the Commission also unveiled a new social fund to cushion the impact of price hikes and cut bills for vulnerable households and small businesses. The Social Climate Fund will be financed through the EU budget and will provide €72.2 billion of funding between 2025 and 2032, with an aim to mobilise €144.4 billion with the contributions from national governments.

Asked about the growing criticism surrounding the new ETS, Timmermans said the scheme was a "good proposal" and was ready to fight for it.

**Aviation and maritime**

Beyond road transport, the Commission has set its sights on the aviation and maritime sector, which have proven harder to decarbonise than road transport.

For aviation, the goal is to bring into the mainstream Sustainable Aviation Fuels (SAFs), which the executive considers "technologically ready" to replace fossil fuels. A new rule will compel airlines to blend fossil fuels with SAFs until the mix is the only one available by 2030. Free emitting permits for air carriers will disappear after 2026 and a tax on kerosene will be gradually introduced.

The maritime sector will be obliged to be more energy efficient and increase the use of clean energy. By 2050, renewable low-carbon fuels should constitute more than 80% of the sector's fuel mix. This strategy will work in parallel to the revised ETS system, where shipping companies will begin buying and trading carbons permits for the first time.

"We need this [the ETS revision] because we just have to consider that one single cruise ship alone uses as much CO2 per day as 80,000 cars," said von der Leyen.

The changes in the aviation and maritime industry could lead to higher prices for plane tickets and goods shipped by sea. "Unilateral and double pricing of CO2 under several market-based measures would be economically counterproductive," said industry group Airlines for Europe (A4E

**What else is part of Fit For 55?**

Fit For 55 introduces another ambitious climate ***target***: over the next ten years, the EU will have to double its share of renewable energy, going from the 20% goal (achieved in 2019) to 40% in 2030.

Greenpeace and other environmental organisations had previously said the 2030 share of renewable energy should be at least 50% in order to comply with the Paris Agreement.

The use of renewable energy varies widely across the bloc: countries like Sweden, Finland and Latvia already surpass the 40% threshold, while others, such as Luxembourg, Malta and the Netherlands are hovering over the 10% mark.

The final figure will be calculated as an EU-wide aggregate: it doesn't mean that all 27 EU member states are compelled to reach the 40% ***target*** by 2030.

In total, the Fit For 55 package includes five brand new proposals, such as an EU ***forest*** strategy and the aforementioned carbon border adjustment mechanism, and eight revisions and updates to existing EU legislation, like the ***emission*** trading system and the renewable energy directive.

The energy efficiency directive will now require the public sector to renovate 3% of its buildings each year. The Commission hopes building renovation will be one of the main sources of job creations in the new green economy. Member states are already allocating hundreds of millions to this costly exercise as part of their post-pandemic recovery plans.

The EU regulation on ***land*** use, ***land*** use change and forestry (LULUCF) is too being revised. Adopted in 2018, this law attempts to strike a balance between the ***land*** use that releases CO2 (for instance, when a ***forest*** is turned into arable ***land*** for ***agricultural*** purposes) and the ***land*** use that ***removes*** CO2 from the atmosphere (natural ***forest*** help absorb ***emissions***).

The EU's revised ***removal*** ***target*** has been set at 310 million tons of CO2 ***emissions*** by 2030. The Commission wants the ***land*** use, forestry and ***agriculture*** sectors to become climate neutral by 2035, including also ***agricultural*** non-CO2 ***emissions***, such as those from fertilisers and livestock.

Reacting to the whole Fit For 55 package, the World Wide Fund For Nature (WWF) said the package was "stronger and wider ranging than anything that has come before" but added the climate ***targets*** contained in the proposals remain "far too low" to keep temperatures below the 1.5°C mark.

**Load-Date:** July 14, 2021

**End of Document**



[***EU climate package will also help Finland achieve climate neutrality***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:634X-16J1-JDG9-Y0H0-00000-00&context=1516831)

Nordic Daily

July 14, 2021 Wednesday

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**Length:** 1420 words

**Body**

Helsinki: Government of Finland has issued the following press release:

On Wednesday, the European Commission unveiled a major package of legislative proposals on climate that would reduce the EU’s net ***emissions*** by at least 55 per cent by 2030. The Fit for 55 package contains 13 legislative proposals, eight of which would strengthen existing legislative instruments and five that are completely new regulations.

“The EU climate package is a huge leap towards a climate-sustainable society built on clean transport, sustainable housing and new green jobs. The EU’s effective climate measures will also help us achieve our own climate neutrality ***target*** and will level the playing field within the EU. This package will ensure that all sectors in all Member States participate in combating the climate crisis,” says Minister of the Environment and Climate Change Krista Mikkonen.

The legislative proposals cover a wide range of sectors of the economy, including ***emissions*** trading reform, burden sharing between countries, energy efficiency, renewable energy, the role of the ***land*** use sector and carbon sinks, ***emission*** limits for cars, energy taxes and carbon duties. In the autumn, the Commission will also submit its proposal for revising the Energy Performance of Buildings Directive.

“During the Finnish Presidency, we agreed that the EU would aim for climate neutrality by 2050. Finland has already had a very active influence on the EU’s shared climate policy in general. Our goal is to make the EU the most competitive, socially integrated climate neutral economy in the world. We have also highlighted our national characteristics so that the Commission would be able to take them into account when preparing the package. There is still work to be done, but it is great that in the midst of the COVID-19 crisis, the Commission has succeeded in laying this extensive groundwork, which we can now begin negotiating,” says Minister for European Affairs Tytti Tuppurainen.

“In order to achieve the more stringent ***targets***, we need a package that functions well and takes into account the need for major investments in low-carbon solutions and technologies. The industrial and energy sectors require large amounts of capital invested over the longer term. With this in mind, we need predictable regulation and technology-neutral funding. We also have to ensure that citizens are involved and that the changes are perceived as fair,” Minister of Economic Affairs Mika Lintilä emphasises.

Finland will formulate its own positions on each of the thirteen legislative proposals during the autumn, once Parliament has also returned from holiday.Finland stresses importance of strengthening ***emissions*** trading

In line with the Commission’s proposal, ***emissions*** should be reduced by 61 per cent by 2030 from the 2005 level in the ***emissions*** trading sector. The Commission proposes tightening the ***target*** for the ***emissions*** trading sector by reducing the amount of annual allowances more swiftly than previously planned, among other measures. At the same time, the free allocation of allowances would be reduced.

“The effectiveness of ***emissions*** trading has been improved in recent years, and it is important that we continue to strengthen its impact. The reforms now being proposed are steps in the right direction. At the same time, we need to remember that not all ***emissions*** are involved in ***emissions*** trading, and we also need robust national plans for climate neutrality,” says Minister of the Environment and Climate Change Krista Mikkonen.

With the new package, ***emissions*** from maritime transport, which are not currently regulated by the EU climate legislation, would also be included in the ***emissions*** trading scheme. The goal is for distributors of heating fuels for buildings and fuels for road transport to be included in a separate ***emissions*** trading scheme from 2026.

“Winter navigation is an important national issue for Finland as an export country, and we will call attention to it in further discussions on ***emissions*** trading in shipping,” Minister of Economic Affairs Lintilä says.Tightening country-specific ***emission*** reduction ***targets*** will be taken into account in national plan

The development of ***emissions*** in non-ETS sectors – ***agriculture***, property-specific heating and transport – is regulated by a burden-sharing agreement that imposes a specific obligation on each EU Member State. As a rule, Member States’ obligations are based on their gross national income.

In its proposal, the Commission has set a ***target*** of 50 per cent ***emission*** reductions for Finland and five other EU Member States by 2030 compared to the 2005 level. This ***target*** will have an impact on the medium-term climate plan and the energy and climate strategy currently under preparation, which are due to be completed in autumn 2021.

The Commission’s proposal includes various flexibilities for promoting the cost-effectiveness of climate policy. The proposal also aims to establish links between sectors to ensure that the ***targets*** are met.Reforms in the ***land*** use sector will bring transparency

In addition to ***emission*** reductions, achieving climate ***targets*** will require the strengthening of carbon sinks in the short and long term. The Commission proposes introducing national ***targets*** for increasing carbon sinks in the ***land*** use sector (LULUCF sector). In line with the proposal, the EU Member States should commit to increasing the carbon ***removals*** from sinks to a total of 310 million tonnes of carbon dioxide equivalent by 2030.

According to the Commission’s proposal, the period 2021–2025 would still be subject to the current regulation. For 2026–2030, a quantitative ***target*** would be set for each Member State, along with the resulting trajectory to which the actual net ***emissions*** would be compared. In addition to strengthening carbon sinks, the reform would simplify the complex accounting framework currently in place and would increase the transparency of monitoring.

A major reform included in the package is that ***agricultural*** ***emissions*** would be included as part of the ***land*** use sector from 2031. In line with the Commission’s proposal, this new AFOLU sector should be climate neutral in 2035. A more detailed legislative proposal on the AFOLU sector would be submitted in 2025.Carbon border mechanism aims to prevent carbon leakage; car ***emissions*** will be reined in

The Commission is also proposing a new climate policy tool, the carbon border adjustment mechanism, which would prevent carbon leakage from the EU to countries with more lenient climate policies. The carbon border mechanism would apply to certain products entering the EU from third countries, such as steel and electricity. The amount of the carbon border mechanism would depend on the price of the EU ***emission*** allowance. The inclusion of electricity in the carbon border mechanism raises specific questions for Finland.

In addition, the Commission proposes tightening ***emission*** limits for new passenger cars and vans. This is also worthwhile in Finland’s view from the perspective of reducing transport ***emissions***.Tightened limits would promote the electrification of transport in Europe.More stringent requirements for renewable energy and energy efficiency

The package also includes a reform of the EU’s key energy legislation and would increase ***targets*** for renewable energy. The Commission’s proposal would see an overhaul of the Renewable Energy Directive, with the exception of individual articles. It would also expand the scope of the directive in relation to the use of renewable energy and hydrogen in industry and with regard to system integration, power purchase agreements and offshore wind power.

The key themes for Finland in the reform are the heating and transport sectors and the use of ***forest*** biomass in energy production (including sustainability criteria). The ***targets*** for energy efficiency will be tightened by significantly limiting the current level of energy consumption by 2030 and by raising the annual savings ***target*** to almost double the current level. In the future, public sector buildings will need to be renovated to nearly zero energy levels and the current number of renovations will need to be almost doubled.What's next?

The legislative proposals will now be submitted to the European Parliament and the Council for negotiations. The EU Ministers of the Environment will discuss the package for the first time next week at their informal meeting. Due to the number and scope of the legislative proposals, the negotiations are expected to last about two years.

**Load-Date:** July 15, 2021

**End of Document**



[***How Government's climate plan will change your farm; Focus on: Climate action targets***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61HP-2K41-JCBW-N03H-00000-00&context=1516831)

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**Section:** FARMING;NEWS; Pg. 6,7

**Length:** 1021 words

**Byline:** Ciaran Movan

**Body**

The Government last week announced its most radical plan to reduce the environmental footprint of Irish farms.

It comes after the Programme for Government, and the recently published Climate Action Amendment Bill 2020, set out the objective to achieve a 'climate neutral economy' which balances ***emissions*** and ***removals*** within the State by the end of 2050 and in subsequent years.

Farm organisations have reacted angrily to the plans, highlighting that food prices remain low despite more regulations being heaped producers.

Here, we answer the questions farmers will be asking about the Government's proposal.

What is Ag Climatise?

The Ag Climatise roadmap aims to make Irish ***agriculture*** climate neutral by 2050 and includes 29 actions with specific and challenging ***targets***.

Through these actions, the Government will try to reduce greenhouse has (GHG) ***emissions*** from the sector, increase carbon sequestration, reduce nutrient loss to the environment and meet our ammonia ***emissions*** reduction ***targets***.

How was it developed?

The actions in the roadmap are primarily based on Teagasc research into the best and most effective methods of reducing GHG and ammonia ***emissions***.

Other actions proposed are based on a public consultation exercise which launched in late 2019 which generated 100 written submissions and 400 online responses.

How will fertiliser use on farms change?

The plan ***targets*** a reduction in chemical nitrogen use to an absolute maximum of 325,000t annually by 2030, with an interim ***target*** of 350,000t by 2025.

Chemical N use on Irish farms peaked at 408,000t in 2018.

To achieve this, the Government wants to: ¦¦ Prohibit the use of urea, replacing it with a urease inhibitor treated urea product (protected urea) by end of 2023; ¦ Have 65pc of straight Calcium Ammonium Nitrate (CAN) sales as protected urea/protected nitrogen by 2030; ¦ Double the use of lime on farms; ¦ ¦ Achieve a ***target*** of 60pc of all slurry spread by low-***emissions*** spreading by 2022; 80pc by 2025; and 90pc by 2027; ¦ Require incorporation and maintenance of clover (and mixed species) in all grass reseeds by 2022.

How will the plan impact animal breeding on farms?

The Government says animal breeding has been identified as a concrete action that will not only reduce the environmental footprint on farm but will also increase farm profitability.

It wants to genotype the entire national herd by 2030 to underpin the development of enhanced dairy and beef breeding programmes that help achieve a reduction in our overall GHG output.

How wi this impact farmers?

¦ All calves in priority categories of herds will be genotyped in 2021, eg herds in the Beef Data and Genomics (BDGP) programme.

¦ Farmers should plan and transition away from the use of stock bulls for replacements in dairy herds by 2025.

¦ Increase the number of dairy herds in milk recording from the current level of 50pc to 90pc and stickler beef herds in beef weight recording from the current level of 30pc to 70pc.

¦ ***Target*** lower age at slaughter and optimum age at first calving for our national dairy and beef herds.

How will farmers' grassland management change?

The Government wants to increase the proportion of grazed grass in the diet of livestock in a bid to reduce methane ***emissions***. It says extended grazing reduces the period manure is stored, thereby reducing methane ***emissions*** generated during this storage period.

The main change will be on farms above 100 livestock units or 130kg organic N per ha as the recording of grass production on all farms will be required.

How will the plan impact /hat farmers can feed livestock?

Too much crude protein in livestock diets leads to increased environmental pressure through ammonia loss from the manure produced.

The Government wants to see a significant reduction in the crude protein content of livestock feeding stuffs. To do this, it wants to: ¦¦ Reduce the average levels of crude protein in pig feeds to 16pc; ¦ In most situations reduce the levels of crude protein in feeds for grazing ruminants to a maximum of 15pc; ¦ Reduce the livestock sector's reliance on imported feed.

low will organic farming by supported?

A ***target*** to increase the area of ***land*** used for organic production from 74,000ha to 350,000ha by 2030 is included in the plan.

However, the Government does not state specifically how this will be achieved, instead highlighting that growth in the sector will be ultimately demand-led.

Howwi tillage farming change?

The Government wants to increase the area under tillage production above the current area of 300,000ha by 2030.

It also wants tillage farmers to: ¦ Grow winter crops and farmers growing spring cereals to consider the use of cover crops to increase nitrogen use efficiency at farm level; ¦ Use buffer strips to minimise the loss of soil organic matter, help retain soil, and potentially improve, soil carbon levels, reduce sediment loss, and increase biodiversity; ¦ Where practical, adopt minimum tillage on farms to protect soil carbon pools; ¦ Aim to have all organic manures applied to tillage ***land*** incorporated within four hours of application

Why will the forestry ***targets*** impact all farmers?

Forestry is a critical part of the Government's climate action plans and is a critical component of its ***target*** for carbon sequestration.

The Government wants all farmers, where practical, to give serious consideration to planting a part of their holding with trees.

Its forestry ***targets*** includes: ¦ Increase afforestation levels to 8,000ha per year.

¦ Through the next round of CAP and the next national Forestry Programme, it will facilitate all landowners to plant some of their farm with trees, from small corners, to shelters belts to larger more commercial size ***forests***.

Will some farmers be rewarded for farming extensively?

The Government wants the many extensively stocked livestock farms with extensive hedgerows and a very small carbon footprint to be rewarded for the public goods they are providing.

It says this will incentivise these farmers to retain and protect these goods.

A pilot scheme in relation to on-farm carbon trading is in development - to reward farmers for the public goods they are providing.

**Graphic**

LESS is more: The Govrnment wants 60pc of all slurry to be applied by low-***emissions*** spreading by 2022; 80pc by 2025; and 90pc by 2027

**Load-Date:** December 15, 2020

**End of Document**



[***'Tree Oscars' search for Scotland's finest farm woodlands***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61WY-8PJ1-F0JC-M24V-00000-00&context=1516831)

The Scottish Farmer

February 2021

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**Length:** 574 words

**Byline:** [*Gordon Davidson*](http://Gordon Davidson)

**Body**

FARMERS WHO have created quality woodlands are being invited to highlight their excellence - and their climate change credentials - by entering the 'Tree Oscars', Scotland's Finest Woods Awards.

Last year's awards were cancelled because of the pandemic, so this new round will include entries carried forward from 2020 as well as 2021's crop. The awards will include a new category for Climate Change Champion, alongside two Farm Woodland Awards, one of which is an open competition and the other restricted to younger entrants.

The main farm woodlands award earns the winner the magnificent Lilburn Trophy, gifted by the Royal Highland and ***Agricultural*** Society of Scotland. In 2019, this went to John Drysdale and Kieran Kelly for Kilrie Farm, Kirkcaldy, Fife, while Peter Gascoigne - the first winner of the Farm Woodland award in 2018 for his farm in Broughton, Peeblesshire - was among the commended entries.

Peter Gascoigne, the inaugural winner of the Farm Woodland award in 2018

The Scottish Woodlands Ltd Trophy for Young People was introduced in 2019, with Sandra Baer and Lynn Cassells of Lynbreck Croft, near Grantown-on-Spey, winning the inaugural prize. It is once again open to any farmer or crofter, and/or their ***forester***/woodland manager, who is over 16 and under 41 on the awards' closing date of March 31.

NFU Scotland president Andrew McCornick said: "For a significant number of NFUS members, forestry and farm woodlands have become an increasingly important strand to the business, bringing a myriad of benefits including biodiversity, animal shelter and alternative income streams. It is clear that high-quality farm woodlands are an important part of the mosaic of 21st century ***land*** management in Scotland."

The awards' judges will be looking for 'exemplary use of both woodland and ***agricultural*** practice with benefits being delivered to both the farming/crofting operation and quality of woodland management'.

Scottish Woodlands' managing director, Ralland Browne, said: "Our Farm Woodland award for young people continues to emphasise the fact that farming and forestry can work together successfully. Woodland can assist by bringing less productive areas of a farm into use, as well as improving the health and value of livestock - and delivering an additional long-term income stream to support a more diversified rural business."

Lynn Cassells of Lynbreck Croft, near Grantown-on-Spey, which won the inaugural Young People's prize

Senior forestry consultant at SAC Consulting - sponsor of the overall Farm woodland Award - Malcolm Young, said: "The 2018 and 2019 competitions showcased some of the highest quality farm woodland across Scotland and SAC is very happy the awards are back to uncover more great examples and reward them in 2021. The Climate Change Champion Award is a very positive addition to the programme to reflect the growing significance of trees and woodlands in meeting net zero carbon ***targets***."

Scottish Government Rural Economy Secretary, Fergus Ewing, said: "During the current climate emergency, Scotland's trees have a bigger role than ever to play as they are helping ***remove*** harmful CO2 ***emissions*** from the atmosphere. By planting more trees we can ***remove*** even more ***emissions*** and our increasing planting ***targets*** reflect this. The addition of the Climate Change Champion Award in the year of COP26 is very welcome in highlighting the contribution of trees to Scotland's ambition to reach net zero by 2045."

**Load-Date:** February 1, 2021

**End of Document**



[***Eating more pulses and legumes could cut carbon emissions - and improve our health; Switching meat for lentils and beans could cut carbon emissions by "more than a decade", according to a new study***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60T7-HBX1-JCJY-G23B-00000-00&context=1516831)

telegraph.co.uk

September 10, 2020 Thursday 11:30 AM GMT

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**Section:** FOOD AND DRINK; Version:1

**Length:** 1100 words

**Byline:** By Madeleine Howell

**Highlight:** Switching meat for lentils and beans could cut carbon ***emissions*** by "more than a decade", according to a new study

**Body**

They're the edible seeds of legume plants, high in protein and fibre: culinary staples used to bulk out soups and stews, salads and side dishes and lend a mild, earthy, nutty flavour.

Associated with the vegetarian counterculture which emerged in southern California in the 1970s - rejecting industrialised food and instead celebrating organic, local, seasonal produce, and whole grains - pulses including beans and lentils have since become mainstream ingredients in the UK.

This week, scientists at New York University's Department of Environmental Studies have produced compelling new evidence in favour of pulses as an environmentally-friendly dietary choice, in a study [*published in the journal Nature Sustainability*](https://www.nature.com/articles/s41893-020-00603-4) - which suggests that switching meat for plant protein foods such as lentils, beans and nuts could ***remove*** more than a decade of our carbon dioxide ***emissions*** from the atmosphere.

According to the study's authors, a drastic reduction in demand for meat and shift in global food production to plant-based diets by 2050 could ***remove*** as much as nine to 16 years of global fossil fuel CO2 ***emissions*** and "effectively double" the earth's rapidly shrinking carbon budget.

The amount of space needed to grow animal-sourced food makes up 83 per cent of the earth's ***agricultural*** ***land***: but pulses and nuts use a small fraction of the ***land*** required to produce meat and dairy, while still providing nutrients. In the study, scientists analysed areas where the production of animal-sourced food suppresses native ecosystems, vegetation and ***forests***, which could offset carbon ***emissions*** if they were able to regrow.

"Restoring native ***forests*** could buy some much-needed time for countries to transition their energy grids to renewable, fossil-free infrastructure," said Matthew Hayek, principal author of the study.

The greatest potential for ***forest*** regrowth was found to exist in high and upper-middle income countries, where "scaling back on ***land***-hungry meat and dairy would have relatively minor impacts on food security." Co-author Nathan Mueller described the potential for restoring the earth's ecosystems as "substantial", adding that "***land*** use is all about trade offs".

As the call to address climate change becomes more acute (in June 2019, [*the UK became the first major economy to pass a net zero* ***emissions*** *law*](https://www.nature.com/articles/s41893-020-00603-4), committing to cut greenhouse gas ***emissions*** in the UK to almost zero by 2050), the question of whether to adopt a plant-based diet for the benefit of the environment is hotly debated.

When the UN released a report last year suggesting that a plant-based diet could cut ***emissions***, [*British beef farmers called the report 'misleading'*](https://www.nature.com/articles/s41893-020-00603-4); some argue that [*meat, if carefully raised using regenerative farming methods, can be good for you and the planet*](https://www.nature.com/articles/s41893-020-00603-4); yet another study has found that[*a 'flexitarian' diet*](https://www.nature.com/articles/s41893-020-00603-4)which includes one portion of meat a day has a lower carbon footprint than a vegetarian diet that includes dairy.

Health benefits

There's no denying that lentils, beans and nuts can be a healthy, nutritious and affordable part of any diet. Pulses (edible seeds that grow in a pod, which include beans, lentils and peas) are a cheap, low-fat source of protein, fibre, vitamins and minerals, and count towards your recommended five daily portions of fruit and vegetables. Eating a diet high in fibre is associated with a reduced risk of [*heart disease*](https://www.nature.com/articles/s41893-020-00603-4) and [*type 2 diabetes*](https://www.nature.com/articles/s41893-020-00603-4).

"Lentils and beans are nutritional gems, packed full of nutrients in a convenient format that can be pulled out the cupboard at a moment's notice," says registered dietician[*Laura Clark*](https://www.nature.com/articles/s41893-020-00603-4). "Versatile and capable of absorbing the flavours in any dish, they are an easy way to boost fibre contents in the diet, feed our gut bacteria and provide a source of plant-based protein to benefit our bodies." Tinned varieties require no preperation, and can be chucked straight into sauces, stews or curries; dried pulses need to be soaked and cooked before they can be eaten.

"Fibre is lacking greatly in the British diet - we should be aiming for 30g a day," says nutritionist [*Rhiannon Lambert.*](https://www.nature.com/articles/s41893-020-00603-4)"Lentils and beans also contain vitamins and minerals such as calcium, iron, magnesium and zinc, niacin, folic acid and vitamin B6. A lot of legumes don't contain gluten, making them suitable for coeliacs. Lentils, beans and nuts are also complex carbohydrates, which means they are slowly absorbed by the body, slowly releasing energy."

Legumes are also low in saturated fat, says nutritionist [*Clarissa Lenherr*](https://www.nature.com/articles/s41893-020-00603-4), "unlike dairy and red meat. UK guidelines recommend that adult males consume less than 30g and women less than 20g per day.

"Introducing legumes as a protein source can therefore reduce your consumption of saturated fats, which have been linked to cardiovascular disease risk. 100g of lentils contains around 9g of protein, and beans contain anywhere between 7-9g of protein per 100g portion. However, be mindful of how quickly you introduce legumes into your diet as they can cause stomach upset. Start with small portions, and build up. To incorporate them into your diet, replace meat for beans in classic dishes. Use lentils instead of mince in lasagne or bolognese, replace mince in chilli con carne with red kidney beans, or use black beans to make black bean burgers."

Meanwhile, nuts are a source of healthy fats and often contain a blend of monounsaturated fats, omega-3 and omega-6. "Walnuts, for example, contain rich amounts of omega-3 which is anti-inflammatory and heart-healthy. Regular consumption of nuts, as part of the Mediterranean diet, have been[*linked to weight loss*](https://www.nature.com/articles/s41893-020-00603-4)," Lenherr points out, and nut consumption has been linked to [*beneficial cholesterol levels*](https://www.nature.com/articles/s41893-020-00603-4).

Aim for balance

If you think that you're eating too much meat, or are eating it every day of the week, then dietician [*Nichola Ludlam-Raine*](https://www.nature.com/articles/s41893-020-00603-4) suggests starting with Meat Free Mondays. "Some people assume that adopting a vegetarian or vegan diet will result in eating less protein, but it can be found in many foods such as soya, nuts, beans and pulses, dairy, eggs, tofu, rice and grains.

"However, there are nine essential amino acids that we must get from our diet (as our body cannot make them), and unfortunately plant-proteins such as beans and pulses do not all contain all of them. 'Protein combining' and good planning can guarantee your intake of all nine. Ensure that your plate is still well balanced, perhaps with two handfuls of veg, one portion of protein, one portion of carbohydrates and one small portion of healthy fats, like a drizzle of olive oil."

**Load-Date:** September 10, 2020

**End of Document**



[***The Brazilian forestry giant striking a blow for sustainability***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:610C-P1D1-JCM7-G3TW-00000-00&context=1516831)

FT.com

October 4, 2020 Sunday

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**Length:** 1466 words

**Byline:** Michael Stott

**Body**

For a company that makes billions of dollars from cutting down and pulping trees in Brazil, Suzano has a surprising following among some environmentalists.

“Suzano has been playing a sustainable leadership role,” says Mauricio Voivodic, executive director of WWF Brazil, a conservation organisation. “Suzano sets a good benchmark for other companies.”

SOS Mata Atlântica, another environmental group, describes both Suzano and its Brazilian sector peers as models. The company also features on the  [*registry of organisations*](https://sustainabledevelopment.un.org/partnership/?p=30660) that have committed to advance the UN’s sustainable development goals.

The explanation for this apparent contradiction is that Suzano uses only sustainably grown wood from eucalyptus plantations. One of the world’s biggest pulp and paper companies, it has also set aside a vast area of natural ***forest***, some 900,000 hectares, for permanent conservation, and is reforesting thousands of hectares more, a task in which it is partnering with WWF Brazil.

Some environmentalists, however, still argue that plantations growing one species of tree to make single-use products are not a sound model. They claim the result is reduced biodiversity, high water consumption and soil erosion, and say such plantations are poor carbon sinks compared with native ***forests***. The Global ***Forest*** Coalition, an alliance of campaign groups, believes that planted ***forests*** should be excluded from the definition of ***forests*** and denied climate finance.

Proponents counter that as long as the world needs toilet tissue, paper and disposable nappies, there will be a demand for pulp and paper, which is much better satisfied by sustainably grown wood than by unlicensed timber of dubious provenance.

Suzano has a strict zero deforestation policy and Walter Schalka, its chief executive, has been among Brazil’s most outspoken business leaders in calling for a halt to illegal logging in the Amazon and in promoting sustainable development.

Mr Schalka touts his business as “part of the solution [to] greenhouse gas ***emissions***”. While he acknowledges the key role of natural ***forests*** in combating global warming, he also argues that “planted ***forest*** is going to be part of the long-term solution to the ***targets*** we have in the Paris agreement [on climate change]”.

The Brazilian company is setting trends in green finance too. Earlier this month, it became the first emerging market company to issue a bond that specified an interest rate penalty if it fails to meet a five-year ***target*** for reducing the intensity of its carbon ***emissions***.

Brazil’s paper and pulp industry has not always been exemplary.

Mario Mantovani, director of public policy at SOS Mata Atlântica, recalls how he was “the greatest scourge” of Suzano in the 1980s. At that time he campaigned against the company, which, like its peers, took advantage of tax incentives to create plantations in areas formerly occupied by natural ***forest***.

“The companies always followed the law,” Mr Mantovani says, “but it was a damaging law.” Suzano says that incentives for planting, not deforestation, existed in Brazil more than three decades ago, before the Rio de Janeiro Earth Summit in 1992 and the strengthening of environmental regulation.

Things changed with Brazil’s adoption of ever-tighter environmental laws during the 1990s and early 2000s, and the birth of the global ***Forest*** Stewardship Council in 1993, which set standards for sustainable forestry.

“These companies completely changed their behaviour with the FSC,” Mr Mantovani says. “We’re talking about another universe. . . the cellulose sector is a paradise now compared to what I faced then”.

Today, tracing the origin of ***forest*** products back to their source to ensure that they have not come from areas deforested after 1994 is a key part of Suzano’s strategy for complying with FSC standards and international best practice.

“We have very rigid controls in place,” says Maria Luiza de Oliveira Pinto e Paiva, executive officer for sustainability. “Every piece of wood that crosses our gates into our mills has a control on it. We know where it comes from and who is behind it.”

The company has offered its tracing technology to Brazil’s  [*beef and soya producers*](https://www.ft.com/content/3a083fdf-7887-4229-b088-01180a0043fb), who are under heavy pressure to show they are not buying from recently deforested ***land***. “Of course for us it’s easier, because you cannot move trees but you can move cattle,” says Mr Schalka. “But it’s not very difficult to do it.”

Another key element in the sustainability strategy is Suzano’s “mosaic system” of planting, which intersperses preserved native ***forest*** with plantations, which in turn grow genetically varied eucalyptus. The aim is to ensure a balanced ecosystem, which allows flora and fauna to move freely, and thus encourages biodiversity.

“We have to preserve the native ***forest***,” says Fernando de Lellis Garcia Bertolucci, chief technology officer. “The ecosystem is the key in our ***forest*** planning.” He explains that mosaic planting encourages natural controls on tree pests and diseases and helps conserve the water supply. The company says its scientific research demonstrates that eucalyptus growing under its forestry model does not compromise the natural water supply.

Suzano’s definition of sustainable business goes beyond ***forest*** conservation. The company joined the UN’s corporate sustainability initiative in 2003, committing to the broader goals of reducing poverty and inequality, redressing gender imbalance and fighting climate change. Its environmental, social and governance ***targets*** include bringing 200,000 people out of poverty in the next decade and raising the standard of education in areas where it operates.

Yet the company still has its critics. The  [*Environmental Paper Network*](https://environmentalpaper.org/) (EPN), an umbrella grouping of non-profit organisations, published a report in 2019 questioning its carbon capture figures. EPN argued that when the plantations of eucalyptus trees are harvested after seven years, most of the carbon they have sequestered is released again.

Mr Schalka agrees that some carbon is released when the trees are cut down, but not all of it; he says the business is “very confident” in its calculations showing that overall its operations contribute to a net reduction in carbon dioxide ***emissions*** and adds that the EPN calculations do not take account of the large native ***forest*** area that Suzano preserves.

Campaigners also argue that single-use paper products are inherently unsustainable and say efforts should be made to reduce the consumption of tissues and printed matter, to increase the proportion of recycled fibres in paper, and to cut the use of chemicals and the ***emission*** of greenhouse gases during production.

Suzano says it has set sustainability ***targets*** to ***remove*** an additional 40m tonnes of CO2 from the atmosphere, to increase supplies of renewable energy to the Brazilian national grid by 50 per cent, and to offer 10m tonnes of renewable ***forest*** products that can substitute for plastic and petroleum derivatives, all by 2030.

Addressing environmental concerns is becoming more and more important at a time when investors are increasingly demanding that companies demonstrate commitment to sustainability. Some large investors are shunning Brazil’s meat companies because of deforestation concerns, and a sharp rise in Amazon fires since President Jair Bolsonaro came to power has led to worries that even the greener Brazilian companies may be  [*caught in boycotts*](https://www.ft.com/content/6e8c91b6-e46a-11e9-b8e0-026e07cbe5b4).

In July, Mr Schalka joined several dozen Brazilian chief executives in writing to the government’s Amazon Council, led by vice-president Hamilton Mourão, to demand comprehensive action to fight illegal deforestation. Mr Schalka argues that his vast country does not need to expand its planted area to increase ***agricultural*** production and should instead boost productivity and improve logistics.

Mr Garcia Bertolucci says Suzano has roughly doubled productivity on its plantations over the past decades to 12 tonnes of pulp per hectare per year and has cut its water use and use of harmful chemicals in processing.

The company is also committed to finding new sustainable uses for its wood. When trees are processed, they are separated into pulp, which is used to make paper, and lignin. The latter has generally been burned in power stations but the company is researching its use in resins, thermoplastics and even carbon fibre.

Perhaps the most eye-catching future use it sees for its trees is to make fabric for clothing, using a type of cellulose extracted from the wood.

It has a partnership with a Finnish startup called Spinnova to develop fluffy, wool-like fibres that can be produced mechanically from pulp without the need for chemicals — a process, Suzano says, that requires far less water than cotton production.

Welcome to a future of wooden T-shirts.

*Michael Stott is the FT’s Latin America editor*

**Load-Date:** October 5, 2020

**End of Document**



[***Amazon rainforest will dry out and become arid, scrubby plain by 2064 due to climate change and deforestation, scientist predicts***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61MY-8761-DY4H-K0PK-00000-00&context=1516831)

MailOnline

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**Section:** SCIENCE; Version:3

**Length:** 1297 words

**Byline:** Jonathan Chadwick For Mailonline

**Body**

* US expert warns of the effect of deforestation and drought from climate change

1. 2064 will see a tipping point' where moist ***forest*** transitions to a tropical savanna
2. Amazon is the largest tropical ***forest*** on Earth at around 2.3 million square miles

South America's Amazon rainforest will be wiped out by 2064 due to deforestation and prolonged droughts from climate change, a scientist predicts in a new paper.

At about 2.3 million square miles, the Amazon is the largest tropical ***forest*** on Earth.

As well as reducing air pollution and regulating the world's oxygen and carbon cycles, it creates its own precipitation to sustain local populations with freshwater.

But it stands on the verge of a 'tipping point' as a consequence of human-caused disturbances, 'for which we are all responsible', according to Robert Walker, a professor of geography at the University of Florida.

Professor Walker says the Amazon will transition over the next few decades from a dense, moisture-filled ***forest*** to an open savannah, dominated by flammable grasses and shrubs.

He added that the local people's dependency on the Amazon as a source of water means 'the magnitude of the catastrophe will be worse than heretofore imagined' in, at the very most, 44 years' time.

2064 marks the point at which 'a tipping point' is reached, where extreme droughts become too frequent for canopy to completely recover from them (something that currently takes about four years).

A 'collapse' of environmental governance in Brazil and other Amazonian nations has renewed public concerns about the fate of the ***forest***, as highlighted by Professor Walker in his paper, published in the journal Environment.

'It is doubtful that the Amazonian ***forest*** will remain resilient to changes in the regional hydroclimate,' he writes.

'The biggest concern involves intensification of drought-based tree mortality stemming from the synergies of fire, deforestation, and logging.

'The development of Amazonia now lies on a collision course not only with the interests of conservation but also with the welfare of the very people it is meant to benefit.'

Deforestation - the permanent ***removal*** of trees - is a major environmental issue, causing destruction of ***forest*** habitat and the loss of biological diversity.

A big driver of deforestation is the deliberate ignition of the rainforest's canopy to clear space for ***agricultural*** crops.

Amazonian fires famously intensified last year - in August 2019, the National Institute for Space Research in Brazil reported more than 80,000 fires across all of the country, a 77 per cent year-on-year increase.

'A generalised collapse of environmental governance in Brazil and other Amazonian nations has renewed public concerns about the fate of the ***forest***,' says Professor Walker.

'These concerns - recently intensified by Amazonian fires in the summer of 2019 -have put the focus on regional climate changes capable of inducing a "tipping point" beyond which the moist ***forest*** transitions to a tropical savanna.'

Shortly after the turn of the millennium, effective environmental policies in Brazil reduced deforestation rates in the Amazon Basin, which is home to the rainforest.

But these policies 'began to unravel at almost the same time they proved effective' and deforestation numbers started to climb after reaching a low point in 2012, Professor Walker says.

There is also mounting evidence that deforestation affects regional climate by reducing precipitation and by lengthening the dry season.

The researcher also points to 'waves of in-migrants' that initiated a process of ***agricultural*** development in the late 1970s, which has to date consumed about 20 per cent of the Brazilian portion of the original ***forest***.

However, poverty and poor use of government resources ultimately drives much of the deforestation, Professor Walker suggests.

'The people there, they don't worry so much about biodiversity, the environment, when they have to worry about eating their next meal,' he told United Press International.

Meanwhile, more frequent spells of drought caused by global warming are killing off the most vulnerable tree species in the Amazon, arising from water and thermal stress.

What's more, drought severely comprises the ability of surviving trees to do their job as the lungs of the world.

The Amazon rainforest absorbs large amounts of carbon from carbon dioxide (CO2) - a major contributor to climate change.

Scientists estimate that the Amazon takes in as much as one-tenth of human fossil fuel ***emissions*** during photosynthesis.

But the rainforest experienced serious episodes of drought in 2005, 2010 and 2015, and studies show its trees absorb a tenth less CO2 from the atmosphere during droughts.

A single season of drought in the Amazon rainforest can reduce the ***forest***'s carbon dioxide absorption for years after the rains return.

Dr Adriane Muelbert, an expert from the University of Leeds who was not involved with Professor Walker's research, previously said the ecosystem's response is lagging behind the rate of climate change.

'Droughts that hit the Amazon basin in the last decades had serious consequences for the make-up of the ***forest***, with higher mortality in tree species most vulnerable to droughts and not enough compensatory growth in species better equipped to survive drier conditions,' she said.

If dry seasons in the Amazon continue to lengthen as over the past few decades, the drought of 2005 will become the region's 'new normal' before the end of the century, Professor Walker believes.

The return period of serious drought once gave canopies sufficient time to recover from fire, but the lengthening dry season has 'begun to squeeze away this respite'.

'A ***forest*** cannot survive if its canopy needs more than four years to recover from a yearly event,' he says.

'In fact, southern Amazonia can expect to reach a tipping point sometime before 2064 at the current rate of dry-season lengthening.

'By then, the return cycle of severe drought will have dipped below the time needed for the canopy to recover, at which point the ***forested*** landscape, denuded by fire, will be permanently invaded by flammable grasses and shrubs.'

Elsewhere in the paper, Professor Walker refers to the Anth­ropocene era - a proposed geological epoch in which human permanently changed the planet.

'The Amazonian environment has proven resilient to long swings of climate change that can be tracked through the geologic record extending over millions of years.

'Even during periods much warmer than today, the ***forest*** held its ground, with some encroachment of tropical savanna along the Basin's rim to the south and east, now known as the arc of deforestation.'

'Will the Anth­ropocene act with greater force, triggering a tipping point transgression at basin scale?,' he asks.

'Whatever the answer, the evidence is indisputable that Amazonia's climate is now changing.'

Britain's obsession with timber, leather and beef 'is having a heavy impact' on the Amazon rainforest

Britain has an obsession with timber, leather and beef from Brazil, according to wildlife charities, who claim it is 'having a heavy impact' on rainforest wildfires.

Brazil, home to two-thirds of the Amazon rainforest, is one of the riskiest countries from which the UK imports key ***agricultural*** commodities, say the WWF and RSPB.

In a new report the WWF say fires are being set deliberately to make room for ***agriculture*** to feed growing demand from places like the UK.

The latest figures suggest that 2,248 fire outbreaks were detected in the Amazon biome for the month of June - the highest number for 13 years.

Brazil represents 13.9 per cent of the UK overseas ***land*** footprint, according to a new report, equal to about 800,000 hectares or five times the area of Greater London.

**Load-Date:** December 30, 2020

**End of Document**



[***How scientists are restoring boreal peatlands to help keep carbon in the ground***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62GW-28J1-JDG9-Y0C6-00000-00&context=1516831)

Impact News Service

April 21, 2021 Wednesday

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**Length:** 1296 words

**Body**

Cologny: World Economic Forum has issued the following press release:

Peatlands are vital to slow the effects of climate change, by acting as carbon sinks, writes expert in peatland restoration, Bin Xu. Globally, peatland covers more than three million square kilometres, and contains more than 550 gigatonnes of carbon. Around 15% of global peatland has been drained by trenching, contributing to 5.6% of global carbon dioxide ***emissions*** already. But it is possible to restore boreal peatlands by focusing on keystone species.

Peatlands are one of the most valuable terrestrial ecosystems in our fight against climate change. These deep layers of partially decayed plants and other organic material are tens of thousands of years old.

Globally, peatland covers more than three million square kilometres, and contains more than 550 gigatonnes of carbon — more than any other type of terrestrial ecosystems, including ***forests***. In fact, one square metre of northern peatlands contains five times the amount of carbon as one square metre of Amazon’s tropical ***forest***.

Unfortunately, peatlands have been heavily exploited and damaged. They’ve been drained, converted into ***agricultural*** fields and burned or mined for access to natural resources.Have you read?

How human activity threatens the world’s carbon-rich peatlands Why the world's peatlands are key to stopping climate change Peatlands are under threat. Here's why we must act now to save them

But the United Nations Environment Program is leading the Global Peatlands Initiative to spearhead a co-ordinated effort to save peatlands, helping keep the global average temperature increase under 2C above pre-industrial levels. Through trial and error, peatland scientists like myself are finding the best ways to return peatlands to a functional state after they’ve been disturbed by oil and gas activity.

What are peatlands?Field view of a boreal peatland of northern Alberta. Sphagnum mosses form the ground base and drive ecosystem functions.Peatlands are vital carbon sinks, helping to reduce the effects of climate change.Image: Bin Xiu

Peatlands are wetlands characterized by the thick accumulation of peat (more than 40 centimetres by the Canadian definition) due to an imbalance between the growth of plants and decomposition by micro-organisms in waterlogged conditions.

The ***removal*** of carbon dioxide from the atmosphere and its storage in peat has had a cooling effect on global climate over the past 10,000 years. If all this stored carbon were released, it would more than double the current atmospheric carbon dioxide concentration (to more than 800 parts per million), a scenarios of disastrous consequences for human civilization and natural ecosystems.

Unfortunately, peatlands have been heavily exploited and damaged. Around 15 per cent of global peatland has been drained by trenching, contributing to 5.6 per cent of global carbon dioxide ***emissions*** (1.3 gigatonnes) already. Natural disturbances such as wildfires also pose serious threats to the the health of peatlands and the stability of stored carbon.

Canada is endowed with the world’s second-largest area of peatlands, the majority of which are found in the boreal and sub-Arctic regions. Yet human activities, such as forestry, ***agriculture*** and resource extraction, and natural disturbances, including increasing temperature and fire frequency, are threatening their health and stability.

For example, winter roads and seismic lines created for resource exploration are extensive across the boreal ***forest***, leading to permafrost disappearance, woodland caribou habitat fragmentation and population decline, and a seven per cent increase in Canada’s annual methane ***emission*** from ***land*** use change.Aerial view of multiple seismic lines and winter roads through a bog in Alberta.Aerial view of multiple seismic lines and winter roads through a bog in Alberta.Image: Bin Xu

Bryophytes: A keystone species of boreal peatlands

In Canada, the boreal peatlands are dominated by bryophytes, a group of small, ancient ***land*** plants, whose importance to peatlands is often overlooked. Some of the most important bryophytes, commonly known as “peat moss” or “black dirt,” belong to Sphagnum, the keystone genus of boreal peatlands.

Bryophytes form the ground surfaces of peatlands, produce plant tissues that are difficult to decompose and release chemicals that slow down microbial activities that produce important greenhouse gases including methane and carbon dioxide. Over time, the undecomposed plant material of bryophytes form the bulk of peat.Close-up of Sphagnum magellanicum, a common peat-forming moss of boreal peatlands.Close-up of Sphagnum magellanicum, a common peat-forming moss of boreal peatlands.Image: Bin Xu

Peatland restoration: Learning from nature

The restoration of boreal peatland is a relatively new field of practice with the early trials developed for horticultural peatlands in Québec and Ontario in the late 1990s. In Alberta, the restoration of peatland disturbed by oil and gas activities has relied on trial-and-error approaches with variable and limited success.

One of the key issues is the lack of understanding of bryophytes and the misplaced focus on trees. There has been a tendency to introduce trees through planting as a restoration practice and to use the establishment of a tree canopy as a measure of success. But these practices are best suited for upland ***forested*** ecosystems.

The approach ignores the fact that boreal peatlands are shaped by the ground-layer bryophytes. Without the keystone bryophytes, important peatland functions will not return.A mosaic of bogs and fens around a small lake in northern Alberta.A mosaic of bogs and fens around a small lake in northern Alberta.Image: Bin Xu

By studying fossil records of peatland plant fragments, pollens and spores, scientists have been able to reconstruct the development and succession of boreal peatlands over time. Many of Alberta’s peatlands formed through a process called “paludification,” the direct establishment and formation of peat in areas formerly occupied by ***forest*** vegetation on mineral soil. The majority of Alberta’s boreal peatlands started to form through paludification around 8,000 years ago.

As the climate became cool and soil moisture increased, Sphagnum mosses slowly expanded into ***forest*** areas. Eventually, the growth and expansion of mosses led to the different types of peatlands we now see.

In North America, blocking drainage ditches and introducing live moss fragments with spores, seeds and roots, have restored Sphagnum moss-dominated horticultural peat fields in eastern Canada. This method is known as the moss layer transfer technique (MLTT).

In Alberta, limited field trials have shown that reclaimed industrial sites (for example, a former in-situ oil and gas well pad) can support the development of peatland mosses once appropriate soil conditions are established.Field view of a restored oil and gas well pad in peatland near Peace River, Alta.Field view of a restored oil and gas well pad in peatland near Peace River, Alta.Image: Bin Xu

Donor moss material can be collected from nearby winter roads and seismic lines. In all cases, the introduction of donor moss fragments was essential to the success of restoring peatland vegetation.

Successful growth of keystone mosses can ensure the return of critical peatland functions over time. Other plants will develop concurrently from seeds and roots in the donor material. Trees will establish naturally or through planting.

When it comes to peatland restoration, we should switch our focus from trees and canopy closure to promoting the development of a carpet of ground-layer bryophytes. We need to learn to use these small but important plants to our advantage in our fight against climate change.

**Load-Date:** April 21, 2021

**End of Document**



[***Growing Climate Solutions Act Passes U.S Senate***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6314-6JG1-JDG9-Y2KJ-00000-00&context=1516831)

Impact News Service

June 25, 2021 Friday

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**Length:** 596 words

**Body**

Washington: Office of the Senator Mike Braun has issued the following news release:

Today the U.S Senate passed the Growing Climate Solutions Act, legislation that will help farmers, ranchers, and foresters understand and access carbon markets, helping the environment and boosting farm income at the same time.

The legislation, introduced by U.S Senator Mike Braun (R-IN) and Chairwoman Debbie Stabenow (D-MI), joined by U.S Senators John Boozman (R-AR), Lindsey Graham (R-SC), and Sheldon Whitehouse (D-RI) and co-sponsored by more than half the Senate, helps producers to generate and sell carbon credits by setting up a third-party certification process through the U.S Department of ***Agriculture***. The bill also creates an online resource for farmers looking to connect with those experts and get more information and establishes an Advisory Council to provide input to USDA and ensure the program remains effective and works for farmers.

“Farmers have always led the way on protecting our environment, and the Growing Climate Solutions Act helps them get paid for their sustainable practices through voluntary carbon credit markets,” said Senator Braun. “Hoosiers and Americans want real-world solutions, and Growing Climate Solutions is a bipartisan, common-sense, pro-jobs win that farmers, industry leaders, and conservationists can all support - all without growing our government or our deficit. ”

“Addressing the climate crisis is one of the most urgent challenges we face and our farmers and foresters are an important part of the solution,” said Chairwoman Stabenow, Chairwoman of the U.S Senate Committee on ***Agriculture***, Nutrition, and Forestry. “The bipartisan Growing Climate Solutions Act is a win-win for farmers, our economy and for our environment. Our bill is a perfect example of how we can work across the aisle and find common ground to address a critical issue affecting all of us and our future. ”

“Farmers, ranchers and private ***forest*** ***land*** owners are eager to explore emerging voluntary markets that will compensate them for reducing their environmental footprint. The Growing Climate Solutions Act seeks to ***remove*** barriers that stand in their way. It will give farmers, ranchers and private ***forest*** ***land*** owners resources at USDA to learn more about the voluntary opportunities they may wish to pursue, as well as information to identify expertise that can help them implement practices to sequester carbon or reduce greenhouse gas ***emissions***,” Ranking Member Boozman said. “I commend Senators Braun and Stabenow for their willingness to partner with me to make improvements to this bill before committee consideration. This bipartisan approach was key to securing Senate passage. ”

“As Americans, we have the ability to come up with climate solutions that can benefit our economy and our way of life,” said Senator Graham. “The United States has long been a leader in innovation. This legislation is an opportunity to put our knowledge and can-do spirit to work to promote business opportunities for the ***agriculture*** industry while promoting the protection of our environment. ”

“Farmers and foresters are seeing firsthand the effects of climate change on their livelihoods, and I’m glad to have them at the table working on solutions,” said Senator Whitehouse. “We will need nature-based solutions like the ones this bill seeks to incentivize in order to rapidly get to net zero ***emissions***, as science tells us we must. ”

More than 175 organizations and companies from across food, ***agriculture***, forestry and conservation support The Growing Climate Solutions Act.

**Load-Date:** June 27, 2021

**End of Document**



[***The EU’s biomass dilemma: can burning trees ever be green?***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:631X-V271-F039-633J-00000-00&context=1516831)

FT.com

July 1, 2021 Thursday

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**Length:** 2385 words

**Byline:** Camilla Hodgson in London

**Body**

In May, a billboard appeared outside the EU parliament in Brussels playing a video that showed sparse, deforested woodland, spliced together with footage of the bloc’s top climate official, and the words “the EU burns ***forests*** as fuel”.

The protest formed part of a campaign by green groups to force  [*Frans Timmermans*](https://www.ft.com/stream/9798f221-7658-44f6-a1d7-9458d1b77c5c), executive vice-president for the EU’s green deal, to strip ***forest*** biomass — combustible pellets burnt for energy — from the list of energy sources classified in Europe as renewable.

The argument goes beyond definitions. Weeks earlier, nervous about the growing pressure on policymakers to change the rules, ministers from 10 European countries  [*wrote to Timmermans*](https://www.government.se/493efb/contentassets/764497619c0d4dda9c433db8c0d6ab5b/ministers-letter-on-bioenergy-in-taxonomy) to stress the “crucial role” played by bioenergy fuels, such as pellets, in helping member states meet the EU’s climate goals.

With a review of the  [*bloc’s climate legislation imminent*](https://www.ft.com/content/c0d4934a-1327-4d17-95a9-e3bfb2ed9201), ministers from countries including Finland, Estonia and Sweden asked for “all forms” of  [*bioenergy currently labelled as renewable*](https://www.ft.com/content/e1c1aba6-5fab-420d-aff1-2ba170672f5b) to also qualify as sustainable investments, “keeping in mind” the EU’s decarbonisation commitments.

It was a none too subtle reminder that if the status of biomass is changed it may be almost impossible for the EU to meet its ***target*** for renewables to provide a third of all energy usage across the region by 2030.

Biomass fuels include pellets, organic waste and crops grown for energy. They produce around half of the world’s renewable energy, and 60 per cent of the EU’s, and are treated as carbon neutral if certain sustainability conditions are met. Across Europe and Asia, the two main markets for pellets, governments hand out billions in subsidies to the industry each year.

But what producers use to make pellets — carbon-absorbing trees, which governments and companies are turning to as part of the solution to runaway climate change — makes them highly controversial.

EU policymakers are now debating  [*changes to the treatment of wood-burning energy*](https://www.ft.com/content/e1c1aba6-5fab-420d-aff1-2ba170672f5b) as part of a wide-ranging package of measures to cut ***emissions***, due to be published on July 14 — revisions that could wreak havoc with the bloc’s renewable energy ***target*** and commitment to more than halve ***emissions*** by 2030.

“Without relying heavily on wood biomass,” many member states “will find it very difficult to meet their future commitments, be it ***emissions*** reductions or renewable energy commitments,” says  [*Jorgen Henningsen*](https://www.ft.com/content/453e5335-a26b-4e96-bcb9-222e6aa323f1), former EU commission director responsible for climate change.

Any changes could also call into question the legitimacy of EU countries having used the fuel to cut ***emissions*** up to now, and narrow the options for further decarbonising the power industry and other sectors.

“The politics of it is so perverse,” says Paul Bledsoe, a former Clinton White House climate adviser. The idea that national ***targets*** might determine the future for biomass, rather than its true environmental impact, is “absurd”.

According to a  [*leaked commission document*](https://www.ft.com/content/e1c1aba6-5fab-420d-aff1-2ba170672f5b), Brussels plans to prevent some forms of wood-burning energy from counting towards the bloc’s green energy goals. Campaigners say the changes must go much further, by excluding ***forest*** biomass from the  [*renewables list*](https://www.ft.com/content/9780fd49-54e5-4c73-a552-d00b35b7e610) altogether.

“We should not be subsidising people to cut down trees and burn them,” says Ariel Brunner, head of EU policy at conservation group BirdLife International. “The notion that you can save ***emissions*** by burning carbon fundamentally doesn’t work.”

A heavily subsidised sector

The multibillion-dollar market for pellets — the modern iteration of a centuries-old fuel — took off in 2009, after the EU classified biomass, at the time little used, as a renewable energy source alongside solar and wind. That incentivised countries with clean energy ***targets*** to adopt the fuel, and made the industry eligible for subsidies. In 2018 — the most recent year for which figures are available — EU countries handed out €10.3bn in support for the biomass sector.

Growth over the past decade “has been tremendous”, says Thomas Meth, executive vice-president of sales and marketing at Enviva, a major US-based pellet producer. The EU’s 2009 move was “certainly one of the catalysts”.

Much of the millions of tonnes of pellets used globally is made and exported from expansive ***forests*** across the US south-east. The US, Vietnam and Canada were the largest exporters of wood pellets by volume in 2019, according to UN data.

And as the world races to decarbonise, the use of wood-based biomass is expected to increase. In a report this year about the pathway to net zero, the  [*International Energy Agency said*](https://iea.blob.core.windows.net/assets/20959e2e-7ab8-4f2a-b1c6-4e63387f03a1/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf) solid bioenergy could produce around 14 per cent of global energy in 2050, compared with just 5 per cent last year.

UK power company Drax — a major user and supplier of pellets — says the market will be driven by “increasingly ambitious global decarbonisation ***targets***”.

The industry insists swelling demand for these small, cylindrical chips can be met sustainably, and that responsibly produced biomass is carbon neutral since the ***emissions*** generated by burning pellets are sucked up by regrowing trees.

Green groups challenge the neutrality argument, and warn that increasing production puts natural ***forests*** in jeopardy. Using more biomass will require “large-scale logging . . . of the ***forests*** we need to store carbon”, says Almuth Ernsting, from the campaign group Biofuelwatch.

‘We need the right biomass’

The debate in the EU is coming to a head over possible changes to the bloc’s renewable energy framework — one of many pieces of legislation being updated to align with the region’s ambition to cut greenhouse gas ***emissions*** by 55 per cent by 2030.

“We are expecting an almighty fight,” says BirdLife’s Brunner. “There’s a very powerful bloc of European governments completely enslaved to the ***agricultural*** and ***forest*** lobby.”

A person familiar with the discussions in Brussels, who spoke on condition of anonymity, says the biomass question is “one of the most politically sensitive files” in the climate package. It has divided agencies, with the commission’s environment department wanting tougher biomass rules and the energy department pushing back.

But if European lawmakers strip “bio-based energy” from the renewables framework, “Europe will not meet any of its goals”, says Enviva’s Meth. Drastic changes are not “realistic”, he adds.

Timmermans himself has said that without biomass the EU will be unable to achieve its clean energy goals. “We need biomass in the mix, but we need the right biomass . . . I hate the images of whole ***forests*** being cut down to be put in an incinerator,”  [*he told the Euractiv*](https://www.euractiv.com/section/energy-environment/interview/timmermans-eu-countries-need-to-face-the-consequences-of-higher-climate-goals/) website in May.

Current EU rules permit the use of whole trees for energy production, though say this should be “minimised”. Critics say the rules are too lax, and that the combination of subsidies and climate ***targets*** incentivises the use of biomass without sufficient safeguards.

Under UN guidance, ***emissions*** from biomass are reported by countries in the ***land***, rather than the energy, sector. As a result, importing nations can enjoy lower domestic ***emissions*** and rely on pellet-producing countries to count the carbon.

Although the rules should deter producing countries from over harvesting, counting ***land*** sector ***emissions*** accurately is notoriously difficult — a view disputed by some in the industry.

“The level of accuracy and transparency with which different countries measure and report ***land*** use ***emissions*** varies,” says Claire Fyson, policy analyst at Climate Analytics, a non-profit organisation. The risk is of “importing biomass that hasn’t been sustainably produced, or whose ***emissions*** from harvesting haven’t been accurately measured”, she adds.

Incentives for ‘burning wood’

The backdrop to the political jostling is a longstanding argument between scientists, campaigners and the industry about whether biomass is carbon neutral.

In February, more than 500 scientists wrote to the European Commission and European Council presidents, urging them “not to undermine both climate goals and the world’s biodiversity by shifting from burning fossil fuels to burning trees”.  [*They added*](https://www.dropbox.com/s/hdmmcnd0d1d2lq5/Scientist%20Letter%20to%20Biden%2C%20von%20der%20Leyen%2C%20Michel%2C%20Suga%20%26%20Moon%20%20Re.%20Forest%20Biomass%20%28February%2011%2C%202021%29.pdf?dl=0): “Governments must end subsidies and other incentives that today exist for the burning of wood.”

Chopping down trees, shipping them around the world on carbon-intensive vessels and burning the wood for energy “doesn’t comport with the idea of clean energy”, says Sasha Stashwick, from the Natural Resources Defense Council, a US-based non-profit organisation.

Pellets can actually emit more carbon per unit of energy than fossil fuels when burnt, since wood is less dense. But the industry argues that those ***emissions*** are offset by the carbon absorbed by trees as they regrow. If the wood is being sourced from sustainably managed ***forests*** — where the volume of carbon stored in the trees is “stable or increasing” — the biomass is carbon neutral, the industry says.

The complex calculation of whether carbon measures are “stable or increasing” is done at a “landscape” level — vast areas surrounding pellet mills that can span millions of hectares. Enviva and Drax say assessments of the US ***forests*** they source from are done roughly every five years using the country’s ***Forest*** Service data, in addition to other monitoring.

However, landscape assessments ignore the fact that trees would have grown more and absorbed extra carbon had they not been harvested, say some scientists and campaigners. A reduction in the amount of carbon being absorbed “is effectively the same as a tonne more of ***emissions***”, says Mary Booth, director of the Partnership for Policy Integrity, a climate campaign group.

Broad landscape assessments can also obscure the effects on ***forests*** of pellet production as opposed to other uses of the wood such as making furniture or paper, says Timothy Searchinger of Princeton University’s School of Public and International Affairs. If ***forests*** are managed so that “they have no net growth, that’s negative for climate change”, he adds. Preventing additional growth is “so obviously wrong. Why does [the industry’s argument] take people in?”

The industry is keen to impress that it does not cut down trees that would otherwise remain standing. Instead, pellets are made largely from wood residues — such as offcuts from trees harvested for other purposes — that would normally go to waste or end up rotting.

“The ***forest*** is never harvested for biomass,” since it is more profitable to use the wood for furniture or other products, says Jean-Marc Jossart, secretary-general of trade association Bioenergy Europe.

Non-profit organisations dispute this, and point to photos of trucks piled high with tree trunks en route to pellet mills. Belinda Joyner, a resident of Garysburg, North Carolina, who has spoken out against the nearby Enviva mill, says the trucks driving through town carry “whole trees”, adding: “I’ve never seen a truck with little logs.”

Enviva says concerns about whole trees are “one of the most common misperceptions . . . An untrained or uneducated eye often mistakes low-value wood for high-value lumber.” Large logs might be diseased or deformed, and unable to be used for other purposes, the company adds.

Route to net zero

Net zero ***emission*** plans around the world map out an increasing use of biomass as countries race to dump fossil fuel energy. The IEA’s latest decarbonisation report estimates that the amount of ***land*** dedicated to bioenergy production could rise from 330m hectares in 2020 to 410m in 2050 — an increase roughly equivalent to the size of Turkey — if bioenergy use jumps as expected.

Stressing the need to proceed carefully, the European Commission’s Joint Research Centre warned this year that most EU countries’ energy and climate plans did not “include an adequate assessment of the potential impacts of expanding ***forest*** bioenergy”. Only one out of the 24 woody biomass scenarios it modelled was likely to pose no risk to biodiversity and deliver short-term climate benefits, it concluded.

How the fuel is used may also change. Some strategies for reaching net zero talk about coupling biomass with nascent carbon capture and storage technology, which advocates say will generate “negative ***emissions***”, in effect ***removing*** carbon from the atmosphere.

Critics say the technology is unproven at scale, and that negative ***emissions*** are only achievable if the biomass fuel is definitely carbon neutral. Without guarantees that it is, “we should certainly not be going full steam ahead” with the technology, says Phil MacDonald, chief operating officer at think-tank Ember Climate.

“In theory, it can work,” he adds. But “you have to get things precisely correct along a complex supply chain.”

In its 2020 [***emissions*** *inventory*](https://www.eea.europa.eu/publications/european-union-greenhouse-gas-inventory-2020), the EU said the “very strong increase in the use of biomass for energy” had reduced carbon pollution across the region, though did not say by how much.

A lobbyist familiar with the discussions in Brussels, speaking on condition of anonymity, says changes beyond those outlined in the leaked document are likely, and that efforts are under way to limit which types of ***forest*** biomass are eligible for subsidies. “The challenge” for lawmakers is partly how drastic changes will be seen, he adds: the EU may have to “stand up in public and [say] what we have been doing . . . hasn’t worked”.

Martin Pigeon, from environmental campaign group Fern, says the commission is “really split internally”, and there is “a serious fight going on” between the energy and environment departments.

“Timmermans and [commission president Ursula] von der Leyen seem to be trying to broker a compromise,” he adds. But the risk is that the commission continues to “tinker at the edges of current sustainability criteria . . . without [producing] anything of substance”.

In the US, green groups are hoping the Biden administration steers clear of biomass as it works towards its new goal of halving ***emissions*** by 2030.

The controversy in the EU over how biomass has been classified and used — including the subsidy system that incentivises its use — should be a “cautionary tale”, says Laura Haight, US policy director at the PFPI. “It’s essential that we define our policies carefully so that we don’t have the outcome that [they have] had.”

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**Letter in response to this article**:

[*Climate goal is consistent with biomass investment*](https://www.ft.com/content/0b8d323a-1b5d-47fa-bff6-03e6a693ab24)*/* [*From Nina Skorupska, Jean-Marc Jossart and Seth Ginther*](https://www.ft.com/content/0b8d323a-1b5d-47fa-bff6-03e6a693ab24)

**Load-Date:** July 5, 2021

**End of Document**



[***We're a long way from ending deforestation, but we can still stop it***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61G0-7F21-JDG9-Y1BN-00000-00&context=1516831)

Impact News Service

December 5, 2020 Saturday

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**Length:** 1454 words

**Body**

Cologny: World Economic Forum has issued the following press release:

In 2014, governments, companies, NGOs and Indigenous groups committed to 10 goals to protect trees, under the New York Declaration on ***Forests***. The goals intended to halve deforestation by 2020, and stop it by 2030. But assessments have concluded we're actually further from stopping deforestation now than we were six years ago. Despite the challenges, the goals can still be achieved with the right measures.

In 2014, the future of ***forests*** looked bright. Governments, companies, non-governmental organizations and Indigenous groups committed to ten ambitious goals under the New York Declaration on ***Forests*** (NYDF). This major international declaration aims to protect ***forests***, driven by the understanding that halting deforestation is essential to mitigating climate change and maintaining other benefits of ***forests***. These goals include halving deforestation by 2020 and stopping it by 2030, while restoring an area of degraded ***land*** larger than the size of India.Have you read?

The African country that inspired more and more countries to plant billions of trees

This year’s assessment of progress on the NYDF firmly concludes that deforestation is not slowing enough to achieve this goal. In fact, by some measures, we are further from stopping deforestation now than we were six years ago. On top of that, limited data is making it difficult to fully assess progress on ***forest*** restoration. Although this reality presents a steep uphill battle, rapidly accelerating actions to end deforestation and restore ***forests*** offer hope that the 2030 goals can still be achieved.

We’re Headed in the Wrong Direction to End Deforestation

Two independent datasets show that the world is not on track to halt deforestation. Global ***Forest*** Watch data — created using a globally standardized remote sensing methodology — indicates that annual tropical primary ***forest*** loss has actually increased by 41% since the NYDF was signed, and annual global deforestation has increased between 55% and 64%. The United Nations ***Forest*** Resources Assessment 2020 also indicates insufficient progress toward the NYDF goals. This aggregation of country-reported statistics on ***forest*** change shows a slight drop in deforestation since 2000, but nowhere near the amount required to achieve the 2020 or 2030 ***targets***.

Despite the differences between the two datasets, they share a key message: the world failed to halve deforestation by 2020 and, as a result, is not on a trajectory to stop it by 2030.An arial photograph of some fields showing showing them being burned.Fires used to clear ***land*** for pasture in Paraguay’s Gran Chaco region can be seen from an airplane.Image: Jordi Ruiz Cirera/WRI

Each year, the world loses about 10 million hectares (24.7 million acres) of ***forest*** area — equivalent to 27 soccer fields per minute. Every year that deforestation is not reduced as quickly as possible will require even larger reductions in the following years to achieve our goal. In the meantime, deforestation will continue to cause ***emissions***, the loss of ***forest*** benefits and the curtailment of Indigenous rights. If the past 19 years are any indication, the necessary decrease in ***forest*** loss seems unlikely in the next decade. Although unlikely, the world can’t afford to not attempt reaching this goal.

Why is progress so slow?

The issue largely arises from the disparity between the commitments made and the actions taken to meet them. Goals two through four of the NYDF track specific contributing factors to global deforestation, while goal five outlines restoration ***targets***. In each of these categories, actions fell short of what is needed.

Goal 2: Ending Deforestation from ***Agricultural*** Commodities

***Forest*** clearing for new ***agricultural*** ***land*** is the largest cause of deforestation. However, ***removing*** deforestation from supply chains is happening unevenly. Even where commitments exist, implementation and consequences are hard to trace through complex supply chains. Last year, nearly one-third of 350 major companies with supply chains at risk of causing deforestation did not report anything about their activities to stop deforestation. Some sectors are progressing faster than others — 81% of Indonesian palm oil exports in 2018 came from companies with no-deforestation pledges, while just 32% of Brazilian beef exports in 2017 were produced under a commitment.

Goal 3: Reducing Deforestation from Other Sectors

Although mining and infrastructure like roads and dams are not globally major causes of deforestation, they can heavily impact ***forests*** at local scales. Companies in these sectors generally provide even less information than the ***agricultural*** sector on what they are doing to prevent deforestation. For example, a recent World Bank report could not identify any mining operations that comprehensively addressed and mitigated their environmental risks, and financial institutions are generally not providing data on the extent to which their mining and infrastructure investments align with their sustainability principles. The ***forest*** impacts of these sectors are expected to intensify as the demand for mined materials increases, and as infrastructure projects bring farmers, loggers and poachers to ***forest*** frontiers.

Goal 4: Support Alternatives for Basic Needs

Efforts are increasing to find ways to meet the basic needs of communities, such as fuelwood and food, without further deforestation. However, these efforts aren’t happening at the necessary scale and are generally not addressing the root causes of poverty, limiting their effectiveness. For example, programs that seek to take pressure off ***forests*** by improving the ***agricultural*** productivity of smallholders’ existing farms often fail to invest in underlying conditions to secure farmer livelihoods such as ***land*** tenure, public services and market access, alongside improvements in governance to ensure ***forest*** protection measures are respected. But some governments, like Malawi’s, have begun doing that hard work and helping communities manage their ***forests*** sustainably while planting fast-growing trees to meet immediate demand for firewood.

Goal 5: Restore ***Forests***

For restoration, the shortcomings can be linked to a lack of investment at scale and a dearth of globally consistent data. Restoring 350 million hectares will require billions of dollars. Funders have committed $4 billion through the AFR100 Initiative in Africa and Initiative 20x20 in Latin America. Even that is not enough to reach the NYDF’s goal, though there are dozens of successful projects in each region. The Great Green Wall in Africa’s Sahel, for example, faces a $4.3 billion yearly funding gap through 2030. There is also no systematic and independent way to track where or how much of that funding has reached projects, though reports indicate that governments, private investors and entrepreneurs are starting to incentivize, finance and scale up their work.

This underscores the importance of developing a global method that consistently tracks where those trees are growing and that complements existing tree cover loss data. That approach will need to work inside the ***forest*** and outside it on farms and pasture, where restoration has the most benefits for people. Regional pilots of this method in Central America and Southeast Asia, conducted as part of the 2019 and 2020 NYDF Progress Assessments, are promising. But understanding tree cover gain and loss together — and assessing the overall health of ***forests*** — will require improved data and techniques.

Transforming commitments into real actionA man is seen overlooking newly planted cocoa trees.In Guatemala, impact investor 12Tree is growing sustainable cocoa while protecting natural ***forests***.Image: 12Tree

While the latest NYDF report is stark in its message, new initiatives that can turn the tide are gaining momentum. The growth of zero-deforestation commitments shows that motivation to halt deforestation still exists across governments, companies, financial institutions and civil society. And innovative restoration programs like the more than 50 private-sector projects aligned with Initiative 20x20 and the growing ***Land*** Accelerator network, whose entrepreneurs are helping 120,000 farmers produce more sustainably, are boosting funding for ***forest*** protection and restoration.

Moving forward will require coordinated effort, improving transparency, employing environmental safeguards, reducing consumption of high-deforestation goods and increasing ambition and financing from companies and governments alike. Growing investments and commitments to protecting and restoring ***forests*** must pair with equivalent action. Failing to do so will seal the fate of ***forests*** for years to come.

**Load-Date:** December 7, 2020

**End of Document**



[***We CAN create a world in which 9+ billion people live within planetary boundaries, by 2050***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:631S-1HG1-JDG9-Y303-00000-00&context=1516831)

Impact Financial News

June 26, 2021 Saturday

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**Length:** 1466 words

**Body**

Geneva: World Business Council for Sustainable Development has issued the following press release:

WBCSD’s Vision 2050: Time to Transform is a comprehensive framework for business action in line with the urgency of the three biggest challenges we collectively face: the climate emergency; nature in crisis; and mounting inequality. Business can and must lead the transformations needed to address these challenges.

Future business success depends on thriving societies to trade with, and a healthy planet for us to exist on, and so Vision 2050 begins by providing companies with a common understanding of what a sustainable future will look and feel like in practice.

Drawing from the latest science, a broad range of expert inputs, and close consultation of intergovernmental instruments and frameworks, we have laid out a tangible picture of the world that we can and need to create, in which 9+ billion people live well, within planetary boundaries. A future that isn’t just possible, but necessary. This blog digs into what it means to live “within planetary boundaries”, and what we are doing to accelerate action to achieve that.

At the highest level, it means that global warming is stabilized at a level no more than +1.5°C and nature is protected, restored and used sustainably. It also means that societies have developed sufficient adaptive capacity to build and maintain resilience in a healthy and regenerative Earth system. These conditions are basic foundations for future business success and long-term prosperity. Vision 2050 lays out eight fundamental foundations for living within planetary boundaries that we need to realize.

Global warming is stabilized at no more than 1.5ºC and clear air is available for everyone

Global anthropogenic greenhouse gas ***emissions*** have reached net-zero; improved air quality supports better health and environmental outcomes; aerosol ***emissions*** to the atmosphere have been minimized; the ozone layer in the stratosphere has stabilized and is repairing.

The biosphere is protected and restored

The biosphere’s ecosystems are sufficiently resilient to sustain and regulate the environment; regulatory services (such as pollination) are thriving; afforestation and habitat creation are embraced; conservation plans for species threatened by climate change are implemented; the spread of invasive species is limited; habitats and ecosystems are enhanced and connected.

Healthy ***land*** and soils are stewarded in an equitable and sustainable way

Expansion of ***land*** used for ***agricultural*** and food production is halted, conserving ***forests***, grasslands, wetlands and peatlands; the importance of ***land*** and ***forest*** restoration is universally recognized; innovative technologies ensure the wide practice of ***land*** management and stewardship.

The oceans and cryosphere are protected and restored

Ocean temperature increase and acidification, sea-level rise and marine heatwaves are kept within manageable bounds; ocean ecosystems regenerate and thrive; losses from ice sheets and glaciers, reductions in snow cover and arctic sea ice, and increases in permafrost temperatures are limited to those that cannot be avoided at 1.5ºC of global warming, and black carbon ***emissions*** are eliminated.

The freshwater cycle is safeguarded, and clean water is available for all

Sustainable management of water systems allows for groundwater to be restored; local water storage capacity is optimized for equitable and efficient use; freshwater systems, including wetlands, are conserved and restored, storing carbon and encouraging nature to thrive.

***Land***, oceans, waterways and coastlines are free from waste and pollution

Plastic pollution has been eliminated; ***emissions*** of other toxic, persistent and bio-accumulative substances have ceased; biogeochemical cycles of nitrogen and phosphorous have been returned to a sustainable balance, protecting waterways from eutrophication.

Natural resources are consumed sustainably

The true value of resources is recognized; service-oriented and circular material flows have enabled people to use natural resources sustainably; the ecological footprint of production and consumption has been reduced by more than half; waste is minimized; efficient and sustainable food systems deliver nutritious food and clean water for all; everyone has access to clean, affordable energy.

Nature is valued

People value nature in its own right, recognizing the intrinsic and existential value of the natural world; governments, companies and financial institutions consider the value of nature in all decision making; everyone enjoys access to nature, which continues to inspire ingenuity and creativity.

While governments, businesses and investors increasingly recognize the urgency for action, the ***emissions*** curve keeps going up, shrinking the small window of time we have left to avert dangerous, irreversible climate change. The longer we fail to act to transform all systems, the more costly, unproven and dangerous the methods and technologies necessary for our survival will be. A systems approach is key, for it is from systems - the food system, the energy system, the waste system - that the most pressing environmental and social problems of today emerge, and where the solutions must be embedded.

Businesses are already showing leadership in this systemic change, with many realigning their purpose and strategy towards a net-zero goal, and thousands joining the UNFCCC Climate Champions-led campaign, Race To Zero, setting science-based ***targets*** and following commitments with strong actions to decarbonize their operations, business models and value chains towards a net-zero future.

Natural solutions can provide up to 30% of the climate mitigation that we need by 2030, but are estimated to receive only 8% of public climate finance. If we had the same level of investment in nature that we have in renewable energy, we would be further ahead on our global climate goals and substantial progress would have been made towards the Aichi Biodiversity ***Targets*** on avoiding further nature loss, as well as towards limiting the severity of the climate crisis as mandated by the Paris Agreement.

Business is playing a critical role in accelerating climate recovery and reversing nature loss. Nature-based solutions and natural climate solutions (NbS and NCS), which sequester carbon from the atmosphere, are fundamental to building true climate resilience and need to occur in tandem with rapid decarbonization of the global economy. Scaling these solutions will be critical to combating the climate emergency while protecting high-value ecosystems and reversing nature loss.

By investing in protecting and restoring nature – through NbS alongside cutting ***emissions*** in line with science – business can have a strong positive impact on climate and people: avoiding ***emissions***, increasing carbon ***removals*** from the atmosphere, providing valuable income streams for rural communities, and protecting high-value ecosystems.

WBCSD is supporting our members to scale investments in quality, nature positive NbS and NCS. In December last year, we launched the report Mapping nature-based solutions and natural climate solutions. This report is our first step to making sure that NbS are understood correctly by business, laying out clear definitions and clarifying the scope for NbS - and in particular NCS – to accelerate consistent and credible actions that are of high quality.

Developing and delivering high-quality NbS can and should support the achievement of critical climate, nature and biodiversity goals, as well as contributing to local communities and providing opportunities for business to invest in positive asset class investments.

At its core, Vision 2050 is about how we can run companies well, well into the future. It shows how we need to, and can, create a world in which more than 9 billion people live within planetary boundaries. The decade ahead is critical if we are to succeed in achieving this vision – every day counts. Join us and our members in accelerating the transformations required!Please do get in touch if you are interested in hearing more about Vision 2050: Time to Transform and feel free to access all the assets we have developed to support businesses in moving from vision to action.

VISION 2050 INSIGHT SERIES

This article is part of an ongoing insight series into WBCSD’s Vision 2050: Time to Transform.

Introduction: Julian Hill-Landolt, Director Vision 2050, introduces the Vision 2050: Time to Transform insight series and provides an overview of the topics that will be covered.

Living Well: Filippo Veglio, Managing Director, People and Society at WBCSD takes a deeper look at what it means to “'live well” - a world in which everyone's dignity and rights are respected, basic needs are met and equal opportunities are available for all.

**Load-Date:** June 30, 2021

**End of Document**



[***Farmers, Ranchers and Landowners Doing Their Part to Improve Water Quality***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60MB-8R91-F0YC-N4SH-00000-00&context=1516831)

Impact News Service

August 17, 2020 Monday

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**Length:** 611 words

**Body**

Washington: US Department of ***Agriculture*** has issued the following news release:

Drive across Florida and you will see evidence of USDA’sNatural Resources Conservation Service(NRCS) work on the landscape.

Conservation practices such as riparian ***forest*** buffers, restored wetlands, contour strips, and fields planted with protective cover are just a few visible signs of the agency’s work in our state.

NRCS conservationists in Florida work with farmers, ranchers, private ***forest*** landowners and local soil and water conservation districts to plan and install conservation practices. NRCS offers more than 170 individual practices and suites of practices that can be used to improve soil health, water quality, air quality and wildlife habitat. When planning these practices, NRCS staff helps producers maintain or improve ***agricultural*** productivity.

In Florida, nutrient management systems, erosion control, conservation tillage, pest management and conservation buffers are conservation practices that improve water quality. Restoring historic longleaf pine ***forests*** by helping landowners’ plant, burn and ***remove*** invasive plants improves wildlife habitat as well as water quality.

As the nation celebrates National Water Quality Month in August, NRCS in Florida salutes the conservation-minded farmers, ranchers and private ***forest*** landowners who do their part daily to improve water quality on their operations. The impacts of their efforts are significant and rewarding. We are fortunate to have clean, safe water for drinking, ***agriculture*** and recreation in Florida and we appreciate your efforts.

***Agriculture*** can and does play a critical role in improving water quality and other natural resources in our state. Because 70 percent of the ***land*** is privately owned in Florida, considerable water quality and other natural resource improvements will be achieved by farmers, ranchers, and private ***forest*** landowners as they make conservation decisions every day.

NRCS and its partners are committed to helping producers find suitable solutions to their natural resource challenges, such as water quality impairment. In many regions of the nation, NRCS offers technical and financial assistance in high-priority watersheds identified by local communities and applicable state agencies.

For instance, the National Water Quality Initiative ***targets*** small watersheds with the highest potential for water quality improvements. Its Mississippi River Basin Healthy Watershed Initiative offers incentives to eligible farmers and landowners to carry out voluntary conservation practices that avoid, control, and trap pollution in 13 states. Its Great Lakes Restoration Initiative ***targets*** producers in select watersheds in the states surrounding lakes Huron, Superior, Michigan, Erie and Ontario.

In Florida the Source Water Protection strategy leverages our programs and practices to protect drinking water sources. In 2019, we established priority areas to focus program funding. This year, we are further refining those areas to identify high priority watersheds to address threats to source water. Outreach and implementation will ***target*** these areas for practices with increased payment rates.

NRCS staff works with farmers and landowners to combat invasive species, protect watersheds and shorelines from non-point source pollution and to restore wetlands in select watersheds. NRCS is seeing results from producers’ efforts through these water-focused initiatives.

Our success in improving water quality in Florida rests with our producers and I am confident they will continue to do their part. For many farmers, investing in environmental resources is a tradition that goes back generations.

**Load-Date:** August 18, 2020

**End of Document**



[***Daines’ Bipartisan Wildfire Prevention Bill Takes Center Stage at Senate Hearing***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60W4-SDV1-JDG9-Y1P1-00000-00&context=1516831)

Impact News Service

September 18, 2020 Friday

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**Length:** 3682 words

**Body**

Washington: Office of the Senator Steve Daines has issued the following news release:

Today at a U.S Senate Energy and Natural Resources Committee hearing, U.S Senator Steve Daines stressed the importance of passing his bipartisan wildfire prevention and ***forest*** management reform bill which will protect Montana communities from deadly wildfires, promote public safety and health, and create good paying timber jobs. Daines introduced his bipartisan bill with Senator Feinstein of California.

“We are at a critical time. The West is burning. People are dying. And our way of life as we know it is in danger… My bill with Senator Feinstein offers 53 pages worth of solutions,' Daines said. 'Now is the time to come together, Democrat and Republican, and pass meaningful forestry reform – my bipartisan bill does just that,” Daines said.

At the hearing, Daines thanked first responders, law enforcement, fire officials and more for their work battling the fires in Montana and across the West, and he held a moment of silence for those who lost their lives because of the fires, including two Montanans: Sara Madsen and Tom Duffy.

Daines’ bipartisan bill will create good paying timber jobs, reduce frivolous litigation, protect wildlife habitats and air and water quality, and reduce the risk of wildfire in at-risk communities. Daines’ bill is especially critical during the ongoing COVID-19 pandemic as wildfires make conditions worse for Montanans with health risks and respiratory illnesses and wildland firefighters are at a greater risk than usual.

Daines’ bipartisan legislation has received significant support from stakeholders across the country.

Statements of Support:

In addition to the statements of support below, Daines received letters of support from Boone and Crockett Club, Congressional Sportsmen’s Foundation, Mule Deer Foundation, National Deer Alliance, National Wild Turkey Federation, Rocky Mountain Elk Foundation, Ruffed Grouse Society, Wildlife Management Institute, Wild Sheep Foundation, California Governor Gavin Newsom (D), ***Forest*** Resource Association, Federal ***Forest*** Resource Coalition, Farm Bureau Federations of the Western States, NorthWestern Energy, Montana Electric Cooperatives Association, Neptune Aviation, National Association of State Foresters, National Association of Conservation Districts, MT Wood Products Association, Montana Telecommunications Association, Montana Logging Association, Family Farm Alliance, and MT Water Resources Association. To read the letters click HERE.

“RMEF strongly supports active ***forest*** management. Doing so not only creates and enhances habitat for elk and other wildlife but it greatly improves overall ***forest*** health while reducing the potential for catastrophic wildfire. There are a number of examples in several different states where wildfires came up against past RMEF habitat enhancement projects and the flames almost immediately died down because they lost their fuel, allowing firefighters to make a successful stand.” - Blake Henning, Chief Conservation Officer, Rocky Mountain Elk Foundation

'The Treasure State Resources Association (TSRA) is pleased to support the Emergency Wildfire and Public Safety Act of 2020. As a diverse association of industry, ***agriculture***, labor, and recreation interests, we understand the complex challenges of ***forest*** management require a common sense approach. The science-based reforms contained in this bill are the exact kind of bipartisan approach needed to put Montanans to work, while protecting communities and critical infrastructure from catastrophic wildfires. We applaud the work of Senators Daines and Feinstein to craft this legislation and look forward to seeing it signed into law.' - Mark Baker, President, TSRA

“The health of America's federal ***forest*** ***lands***, the largest single source of fresh water in our nation, continue to be threatened by catastrophic wildfire. The Emergency Wildfire and Public Safety Act embraces collaborative polices that will improve ***forest*** health and watershed health while protecting critical water infrastructure and communities. The nation’s water providers are grateful to Senator Feinstein and Senator Daines for their leadership on this issue.” - Ian Lyle, Executive Vice President, National Water Resources Association

“The Montana Fire Trustees Association supports Senator Daines' efforts to help reduce the intensity of wildfires and protect lives, homes ,and our ***forests***. The Emergency Wildfire and Public Safety Act will give ***land*** managers additional tools and resources to help protect our communities. This legislation comes at a time when these resources are needed more than ever and we look forward to seeing this legislation move forward.” - Bonnie Jones, Montana Fire Trustee Association

“The Association of California Water Agencies (ACWA) applauds the leadership of Senators Feinstein (D-CA) and Daines (R-MT) in producing S. 4431, the Emergency Wildfire and Public Safety Act of 2020. One of ACWA’s highest priorities is the protection of valuable watersheds from high intensity wildfires. This bipartisan legislation will help address the dangers posed by the unhealthy condition of our ***forests*** that are magnified by our changing climate and more perilous fire behavior” - Dave Eggerton, Executive Director, Association of California Water Agencies (ACWA)

“***Forests*** and fire have been in the center of the American conservation story for well over a century – the Great Fire of 1910 that burned three million acres in western Montana and northern Idaho inspired nationwide recognition of the importance of active ***forest*** management to prevent future fires. Regrettably, decades of fire suppression coupled with insect and disease in our ***forests*** is resulting once again in devastating fire seasons like the one we are seeing this year. As a dedicated group of hunter conservationists, the Boone and Crockett Club has long recognized that active ***forest*** management is essential for the health of our ***forests***. We support the Emergency Wildfire and Public Safety Act pending before the Senate and appreciate Senator Steve Daines’ leadership on this legislation.” -Tim Brady, President, Boone and Crockett Club,

“The Montana Wood Products Association applauds Senators Daines and Feinstein in their dedication and hard work to craft a bill that provides additional tools for public ***land*** managers to reduce hazardous fuels. With over 5 million acres ravaged by wildfire this year, and the loss of 35 lives and countless homes, with no end in sight, the bill could not be more timely! We implore congress to act quickly.” - Julia Altemus, Executive Director, Montana Wood Products Association

“Senators Daines and Feinstein deserve great credit for bringing this bill forward and actually trying to do something --instead of just pointing fingers. Commonsense, intelligent, active ***forest*** management is desperately needed to reduce the fuel accumulation and wildfire risk, as well as to promote healthier ***forests*** and produce jobs. Bravo!” – Raymond Clark

“***Forests*** across the United States need more active management. Active management is central to the health, productivity, and resiliency of all ***forests***. ***Forest*** diseases and pests know no boundaries and easily spread across ownerships to negatively affect even the healthiest of ***forests***. NASF applauds the bipartisan approach of the Emergency Wildfire and Public Safety Act to promote working across boundaries to improve our ***forests*** and make them less prone to wildfire risk.” – Greg Josten, President, National Association of State Foresters

“The only way to protect the health and productivity of all of our nation’s ***forests*** is by managing them all to be more resilient. Greater ***forest*** management requires coordination among state and federal natural resource agencies, private forestland owners, and private and non-profit forestry organizations. NASF supports expanding proposed authorities provided in this bill, in order to benefit all of America’s ***forests***.” – Jay Farrell, Executive Director, National Association of State Foresters

“The Emergency Wildfire and Public Safety Act of 2020 is forward thinking legislation that provides important tools to reduce the threat of disastrous wildfires. PCWA has experienced mega-fire first hand and has invested heavily in mitigation. With that experience, we applaud the leadership of Senator Feinstein and Senator Daines. This bill recognizes the importance of private and public interests coming together to fund and implement active ***forest*** management on public ***land***. It also expands the ability to treat and utilize biomass and establishes a program to train a new generation of skilled workers to better manage ***forest*** resources.” – Andy Fecko, General Manager, Placer County Water Agency

“Our National ***Forests*** in the United States have experienced increased mortality rates over the last 25 years of nearly 93 percent, which is the critical link that fuels these traumatic wildfires we are seeing today. These fires damage our ***forests*** that ***remove*** CO2 from the air, and instead release substantial amounts of CO2 into the atmosphere. The Emergency Wildfire and Public Safety Act provides necessary tools to federal agencies to sustainably manage our nation’s ***forests*** and reduce the fuel hazards. This legislation is a path towards improving ***forest*** health and carbon sequestration on our National ***Forest*** System ***Lands***.” - Deb Hawkinson, President, ***Forest*** Resource Association

“The devastation of western ***forests***, communities and infrastructure this year underscores the critical need for the Emergency Wildfire and Public Safety Act. This bill includes important provisions to reduce the risk of fire in utility infrastructure, allowing our members to take precautions to continue to provide safe, reliable electricity to farms, ranches, businesses and communities. We recognize Senators Daines and Feinstein for introducing this essential bipartisan legislation and encourage the Senate to pass it without delay.” - Gary Wiens, Montana Electric Cooperatives’ Association, Chief Executive Officer

“The bipartisan “Emergency Wildfire and Public Safety Act” is a major leap forward for collaborative ***forest*** management and wildfire prevention across our state. Over 600,000 Montanans live in areas that are at high-risk for wildfire. Unfortunately, for years public ***land*** managers and their local partners have been left without the tools needed to reduce wildfire risk and keep our communities safe. This Act addresses these challenges by mandating and streamlining collaborative ***forest*** projects that reduce fuel build-up and bolster local fire proofing measures. At the same time, the bill gives the ***Forest*** Service the necessary authority to accelerate restoration and salvage operations after a wildfire. As Montana communities continue to expand into ***forested*** ***lands***, the risk for catastrophic wildfires like the ones witnessed in California grows greater every year. This legislation could not be more timely or more needed and I applaud Senator Daines for bringing bipartisan solutions to one of the greatest challenges facing the west.” – Jim McCormick, Lewis and Clark County Commissioner

“The National Association of Conservation Districts (NACD) applauds the introduction of the bipartisan Emergency Wildfire and Public Safety Act of 2020 for addressing forestry management and wildfire prevention as wildfires continue to grow in size and severity. This legislation will provide natural resource managers with the common sense tools they need to succeed, including ***targeted*** categorical exclusions, allowing them to make the best local determinations for managing the landscape to prevent future wildfires.” - Tim Palmer, President, The National Association of Conservation Districts

“We would like to thank Senator Daines for this major breakthrough on bipartisan ***forest*** management reform. Frivolous litigation must end and we need to be able to help prevent catastrophic wildfires. This legislation addresses both important issues and our members stand ready to assist.” - Bryan Lorengo, Southwest Regional Representative, Montana Logging Association

“NorthWestern Energy applauds the “Emergency Wildfire and Public Safety Act of 2020,” introduced by U.S Senators Daines and Feinstein. Wildfires in Montana have and can be devastating to people, property, ***land***, and the environment, and that the ‘Emergency Wildfire and Public Safety Act of 2020’ is a very important tool in reducing wildfire risks for NorthWestern Energy’s Montana customers.” - Heather Grahame, General Counsel and Vice President – Regulatory and Federal Government Affairs, NorthWestern Energy

“Since entering public service, Senator Daines has worked non-stop to protect our natural resources by advocating sound ***forest*** management as the solution. The Emergency Wildfire & Public Safety Act is yet another important tool to achieve healthier ***forests*** while protecting human life. Reaching across the aisle demonstrates that our Senator Daines is leading on this issue.” - Edward Regan, Resource Manager, RY Timber

“We applaud Senator Daines for working to forge a bipartisan bill to address the pressing need for better management of our National ***Forests***. Montanans have endured job losses from mill closures, and then endured many summers filled with wildfire smoke as our unmanaged ***forests*** have gone up in flames. This bill would represent a positive step to address the chronic ***forest*** health problems on our National ***Forests***. We believe the bill can be part of the badly needed solution to the ***forest*** health and wildfire crisis on our National ***Forests***. We look forward to working with Sen. Daines and others in a good faith effort to find common ground that will achieve the results all Montanans want.” - Chuck Roady, President & General Manager, F.H Stoltze ***Land*** & Lumber and President, Federal ***Forest*** Resource Coalition “

“The Montana Telecommunications Association applauds Senator Daines for introducing with Senator Feinstein the bipartisan Emergency Wildfire and Public Safety Act. As we are learning from the Covid pandemic, broadband is more essential than ever for full participation in today’s society. This important legislation, among other things, will make it easier for broadband providers like MTA’s members to maintain critical infrastructure on public ***lands*** and to be able to use disaster relief and emergency assistance to install fire-resistant infrastructure. MTA appreciates the efforts of Senators Daines and Feinstein to facilitate broadband deployment.” - The Montana Telecommunications Association

'Many thanks to Senator Daines & Feinstein for teaming up to introduce the Emergency Wildfire & Public Safety Act. This legislation will help ensure that our public ***lands*** in Montana continue to provide world-class recreational opportunities, protect at-risk communities and their water supplies, plus help to enhance wildlife habitat. I am hopeful that Gov. Bullock, or our next Governor, will have the opportunity to advance implementation of this landmark legislation.” - Rich Lane, ***Forester*** & Log Buyer, Willis Enterprises

“The National Wild Turkey Federation thanks Senator Daines and Senator Feinstein for introducing this important bipartisan legislation. ***Forest*** health and wildfire prevention are important to all Americans and we need well thought out solutions that everyone can support. This legislation provides those solutions and will result in more efficient and effective ***forest*** management where it is needed most. The NWTF looks forward to working with the Senators to enact this legislation into law so we can put it to work on the ground.” - Becky Humphries, CEO, National Wild Turkey Federation.

“Senators Feinstein and Daines are to be commended for their leadership on this bipartisan effort to address perhaps the most pressing environmental issues of our time – unabated threats to communities from catastrophic wildfires and the ***forest*** health crisis in our western national ***forests***. Eighty million acres of national forestland are at risk of catastrophic wildfire and 25 percent of the ***forests*** in the Intermountain West are at risk of mortality from insects and disease within the next 15 years. This legislation provides tools for the ***Forest*** Service to mitigate risks [through active management] from wildfire on public ***lands*** before fires start, while also encouraging expedited post-fire restoration of ***lands*** impacted by wildland fire. Additionally, this legislation also facilitates the ***removal*** of biomass from high risk national ***forest*** areas, which will further mitigate wildfire risks and encourage alternate sustainable uses for material that would otherwise burn.” - Tom Schultz, VP Resources, Idaho ***Forest*** Group

“Reducing the threat of wildfire to communities and watersheds is a critical issue for our public ***lands*** counties. The Emergency Wildfire and Public Safety Act would help advance necessary ***forest*** management projects in a timely and collaborative manner while preventing catastrophic wildfires. We thank Senators Feinstein and Daines for introducing this important legislation to safeguard landscape and watershed health. We hope Congress passes this bill as soon as possible.”- Matthew Chase, Executive Director, National Association of Counties

“With wildfires currently destroying areas in California, Colorado, Montana, Oregon, and other locations throughout the United States, we highly welcome the introduction of The Emergency Wildfire and Public Safety Act of 2020 by Senators Feinstein (CA-D) and Daines (MT-R). As evangelicals Christians, we are commanded to tend and care for God’s creation. Unfortunately, we have not been the best stewards in caring for our ***forests***. Rising temperatures and prolonged drought conditions spurred by climate change place new stresses on most of our National ***Forests*** and put surrounding communities at increased risk. Poor ***forest*** management and other causes further exacerbate these new threats. Reforesting and increase preventive actions in wildfire affected areas restores our national ***forest*** system while building resilience for our communities and drawing down heat-trapping carbon ***emissions*** all at the same time. The Emergency Wildfire and Public Safety Act of 2020 provides a start to addressing some of these immediate concerns. We look forward to seeing it move and improved as part of the legislative process.” - The Rev. Mitch Hescox, President and CEO, The Evangelical Environmental Network

“I am excited about implementation of this act. The Emergency Wildfire and Public Safety Act is about results. Effective ***forest*** management requires action, and this bill encourages action through the use of Collaboratives, risk reduction pre-fire mitigation work, and post fire restoration initiatives. This act is about reducing the threat of catastrophic wildfires to our communities.” - Greg Chilcott, Chairman, Montana Coalition of ***Forest*** Counties

“EEI thanks Senators Feinstein and Daines for their leadership in introducing this bipartisan wildfire mitigation legislation. This bill will enable more effective industry-government coordination on ***land*** management policies, technology development and deployment, hazard mitigation, and workforce training. Electric companies across the country are committed to working with our government partners and other stakeholders on preparation and mitigation efforts that combat the wildfire threat and on the rapid deployment of technology solutions that address wildfire risks, while still maintaining the safe, reliable, and affordable energy we all need.” - Edison Electric Institute

“The Congressional Sportsmen’s Foundation applauds the introduction of this bipartisan legislation that would improve ***forest*** health and wildlife habitat. Collaboratively developed ***forest*** management projects that minimize wildfire risk are a benefit to local communities, including hunters and anglers, and this legislation seeks to do just that.” - Jeff Crane, President, Congressional Sportsmen’s Foundation

“We applaud Senator Daines for his work in introducing the bipartisan Emergency Wildfire and Public Safety Act of 2020. While providing aerial support to combat wildfires is the backbone of Neptune Aviation’s business, we strongly support a multi-pronged approach in waging this nearly year-round battle. Increasing active ***forest*** management and deploying additional wildfire detection equipment are critical and commonsense measures to protect the communities most at risk from catastrophic wildfires. We encourage Congress to pass this legislation and provide the tools needed to prevent the spread of wildfires across Montana and the West.” - Dan Snyder, Senior Vice President, Neptune Aviation Services

“This month’s devastating wildfires have impacted communities across the West, many of which are home to our collective friends, families, and member companies. It is past time to move beyond political posturing and advance real solutions to address the bureaucracy and gridlock contributing to a growing ***forest*** health crisis impacting our federal ***lands***. We thank Senators Daines and Feinstein for their bipartisan leadership and support for active ***forest*** management tools like logging, thinning and prescribed fire, which are more important than ever to make our overstocked ***forests*** more resilient in the face of drought, insect infestations, and a changing climate,” Travis Joseph, President/CEO, American ***Forest*** Resource Council, Portland, Oregon

“Foresters and natural resource managers can and will use every tool at their disposal to proactively address fire-prone landscapes. In doing so, they provide fire managers more options to address new fires and maintain their safety. SAF is proud to support this crucial piece of legislation, which also invests in workforce development, accelerates post-fire restoration efforts, and creates new markets for biomass. These measures will help make our ***forests*** more resilient, give our wildland firefighters more suppression options, create safer communities, and develop new generations of ***forest*** stewards.” - Terry Baker, CEO, Society of American Foresters

**Load-Date:** September 19, 2020

**End of Document**



[***How big a challenge is carbon neutrality?***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62BX-BP61-JC8V-4022-00000-00&context=1516831)

Irish Examiner

March 18, 2021 Thursday

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**Section:** FARMING; Opinion and analysis; Pg. 3

**Length:** 1037 words

**Byline:** Stephen Cadogan

**Body**

The Government has set a long-term challenge for the Irish ***agriculture*** sector to achieve carbon neutrality, while not compromising our capacity for sustainable food production.

We are still learning just how big a challenge that is.

The latest research report says that in the industrialised countries, eating and food generate 24% on averag e of the damaging ***emissions***.

It isn't just the ***agriculture*** end of the food chain that must make the effort.

When food is farmed, harvested or caught, it needs to be transported, processed, packaged, distributed and cooked, and any food waste disposed of.

Each step generates the greenhouse gases blamed for global warming.

According to the new research, in industrialised countries, sectors beyond the farm gate contribute 43% of food system ***emissions***, which is as big as the share coming from primary production (farming, including production of inputs for farming).

And the challenge posed by the global threat of warming climates varies across the world.

In developing countries, food is behind about 39% of ***emissions*** (down from 68% in 1990).

The global share of greenhouse gases which can be traced back to food averages out at 34% across industrialised and developing regions.

The latest findings on the ***emissions*** challenge come from the Joint Research Centre (JRC), the European Commission's science and knowledge service, and the Food and ***Agriculture*** Organisation (FAO), the agency of the United Nations that leads international efforts to defeat hunger.

They got together to produce what they claim is the first ***emission*** database of greenhouse gases covering all countries and sectors of the food system.

Their findings were published last week in the *Nature Food* online journal of top-tier original research on the challenge to sustaining the health of the planet and 10bn people occupying it by 2050.

The publication reveals food system ***emissions*** increased 12.5% from 1990 to 2015.

However, global food production is estimated to have increased more than 40% in that 25-year period.

It had to increase, because the population went up 39%. But the pressure is now on to do even better.

Food ***emissions*** must be reduced, even if climate action tampering with feeding the world runs the risk of something going wrong, and people starving as a result.

All new research and knowledge that helps us understand the huge challenge ahead is welcome.

The authors of the JRC/FAO research say their findings make it possible to estimate the effect of changes in food systems.

For example, it can be calculated how certain consumer behavioural changes, or technological breakth roughs, might affect ***emissions***.

For instance, using renewable energy for food processing could help, and the data compiled by the authors could be used to see how worthwhile that opt ion would be.

Robust data of this kind is needed to understand the complexity of food systems, analyse the ***emissions*** from the different food stages, and work on policy tools for transition to more sustainable and informed consumption patterns.

This must be done without upsetting evolution of food systems in response to changes in population, welfare, dietary habits, and technology.

One of the welcome trends confirmed in the new study is ***emissions*** increasing at less than one third of the increase in global food production.

If that continues, population growth need not necessarily mean growing ***emissions***.

Unfortunately, the same cannot be said for ***emissions*** from non-food activities.

They increased at a much faster rate.

As a result, the global food system's share of total GHG ***emissions*** has decreased from 44% in 1990 to 34% in 2015.

The lesson here must be that governments should equally look for ***emission*** reduction in non-food areas, where adjustments do not pose the risk of rising global hunger.

Within food systems, they may have as much scope to cut ***emissions*** beyond the farm gate as within the farm gate.

Beyond the farm gate, transport and re tail ***emissions*** (driven largely by refrigeration) are high.

And at the end of the food chain, around 9% of food ***emissions*** come from waste and waste disposal.

These are hotspots in food systems, where efforts to reduce ***emissions*** could be intensified, usefully identified by the JRC/FAO findings.

***Emissions*** from the retail sector have been increasing rapidly, and are now up to three times higher than in 1990.

Included is the industrial and domestic refrigeration estimated to account for 5% of global food system ***emissions*** (but 43% of energy consumption within the global retail/supermarket sector).

With refrigeration capacity in developing countries likely to increase, refrigeration will become an even hotter global hotspot for climate action.

It is part of an increasingly energy-intensive global food system, with almost a third of food system ***emissions*** coming directly from energy consumption.

Use of energy (electricity, heat and fuels, including fertiliser and pesticide manufacture) inside the farmgate increased 15% from 1990 to 2015, with the highest increase happening in developing regions.

The food system will therefore need to invest in energy efficiency and decarbonisation to reduce GHG ***emissions***, maybe as much as in ***land***-based mitigation technologies.

We are also reminded that there are six stages of global food chain ***emissions***.

They are ***land*** use and ***land*** use change; primary production of food commodities, including production of inputs such as fertiliser; food processing; food distribution including packaging, transport and retail; food consumption: including domestic activities; and food waste management.

It may come as a surprise to some that food packaging contributes about 5.4% of total food systems ***emissions***.

"Food miles" are therefore less important than packaging, according to the research authors, in a global food system which has become characterised by an increase in convenience and processed food.

***Agricultural*** ***land***-use ***emission*** sources include deforestation, degradation of organic soils (including peat-***lands***) due to drainage and fires, and the 80% of global ***forest*** ***removals*** associated with ***agricultural*** expansion.

***Agricultural*** ***land***-use ***emission*** are approximately equal to farming (production ***emissions***), each about 40%, with a further 20% from the other sources.

**Graphic**

Picture, **New research on greenhouse gas *emissions* in the global food chain reveals that food packaging contributes about 5.4%, refrigeration about 5%. Food system *emissions* increased 12.5% from 1990 to 2015, while global food production increased more than 40%**.

**Load-Date:** April 3, 2021

**End of Document**



[***Dynamic global monitoring needed to use restoration of forest cover as a climate solution***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:671W-P2B1-JCWX-C2R2-00000-00&context=1516831)

Nature Climate Change

May 2021

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**Section:** Pg. 366-368; Vol. 11; No. 5; ISSN: 1758-678X,1758-6798

**Length:** 1720 words

**Byline:** [*susan.cook-patton@tnc.org*](mailto:susan.cook-patton@tnc.org)

**Body**

Restoration of ***forest*** cover — restoring trees to locations that historically supported ***forests*** — is a climate solution in vogue. At its best, it is a powerful tool for tackling the climate crisis, a scalable strategy with the potential to pull petagrams of CO2 out of the atmosphere while conserving biodiversity and advancing sustainable development goals. At its worst, it is a dangerous distraction from critical efforts to decarbonize the industrial sector and reduce ***emissions*** from the ***land*** sector, and can waste resources when projects fail to deliver the promised mitigation. This benefit–risk spectrum is true for most tools. A hammer can build a house or smash a thumb depending on how it’s wielded (Fig. ).

Three pillars of dynamic global monitoring for restoration of ***forest*** cover.

Figure reproduced with permission from The Nature Conservancy.

Evolving on-the-ground conditions further complicate our ability to use restoration of ***forest*** cover wisely. There are at least two fundamental inputs that determine the mitigation potential (MgCO2 yr–1) from restoration of ***forest*** cover: the location where additional action is possible (‘extent’ of opportunity measured in hectares (ha)) and the sequestration rate associated with that restoration action (‘flux’; MgCO2 ha–1 yr–1). Extent and flux can both shift in response to changes in climate and human ***land*** use, and yet are often gauged with limited or outdated data. To extend the analogy, it is very difficult to hammer a nail when the boards we hammer together keep shifting and we have not gauged our alignment for some time.

For example, in some sites, the extent of opportunity is growing as stand-clearing disturbances like wildfire increase, or as ***lands*** are abandoned. Conversely, in other sites, extent may shrink due to novel disturbance regimes that do not support ***forest*** (for example, an increasing frequency of drought due to climate change) or because of ***agricultural*** or urban expansion. Measurement challenges further vex our ability to accurately determine, or ‘nail’, extent estimates: the best available data of current ***land*** use and ***land*** cover are often several years out of date, and best estimates of potential ***forest*** area are based on historic suitability, which does not necessarily reflect future suitability as the climate changes. Given the time required to restore ***forest*** cover, a robust understanding of the influence of future conditions is particularly important. One study estimated, for example, a 25% decline in suitable area for restoration of ***forest*** cover by 2050 due to future warming, highlighting the need to ***target*** interventions towards locations with a greater likelihood of ***forest*** permanence.

Flux is also impacted by changes in ***land*** use and climate, and estimates similarly rely on potentially outdated data. For example, a recent study compiled over 13,000 field-derived measurements of flux to develop the most spatially-resolved global map of potential carbon sequestration in naturally regrowing ***forests***. However, this map relies on data sourced from studies published 1953 to 2017, which may not capture contemporary flux and does not capture future climate-induced changes in flux.

A final challenge is that we often find ourselves ‘hammering’ blindly, and not learning from previous efforts. It can be difficult to find consistent and reliable details about where restoration actions have occurred, what was done and whether the project succeeded in restoring lasting ***forest*** cover. There are some examples of failed tree planting projects, but because those projects were monitored, at the very least they offer an opportunity to learn. More often, ex-post monitoring does not occur, or the results are not disseminated, and both situations represent lost opportunities to scale successes and minimize failures.

To better ensure that restoration of ***forest*** cover is used to its highest potential, we need a global system of dynamic monitoring to rapidly update and refine estimates of climate mitigation potential, track progress towards restoration goals and course-correct actions to improve outcomes. The three crucial pillars to a global system of dynamic monitoring include: (1) an aggregated global network of restoration projects with information on the location and restoration practices employed, (2) a distributed network of paired restoration treatment and control plots that employs a consistent and comparable field-based monitoring protocol, and (3) robust remote-sensing capacity (Fig. ).

Pillars of global dynamic monitoring

Aggregating existing restoration projects into an accessible global platform will allow determination of what is working and what is not. It will elucidate any consistent pinch points in the system, such as insufficient planting stock or skilled labour, limited knowledge on best restoration practices, limited resources for monitoring or other factors that are hindering restoration at scale. This information will allow ***targeting*** investments and research towards alleviating the places with the greatest friction.

However, a network of restoration projects is necessary but is not sufficient. Making full use of a network of restoration projects requires a distributed system of paired control plots to answer questions such as: did a project fail because it was poorly implemented, or because the weather was not conducive for ***forest*** regeneration? What is the direct benefit of a deliberate restoration effort? Are carbon sequestration benefits maintained under changing climate?

Paired restoration and control plots solve several issues simultaneously. First, they allow us to experimentally determine the causes of project success or failure. Second, they establish more credible baselines to quantify the impacts directly attributable to restoration efforts. The need for continuously monitored controls reflects the reality of shifting baselines, where the influence of external factors like climate change, policies or markets can blur understanding of the outcomes specifically attributable to restoration projects. Attribution is central to demonstrating additionality (that is, that restoration projects result in climate mitigation that would not have otherwise occurred). While additionality can be difficult to demonstrate, failure to attribute rigorously and transparently undermines the credibility of using nature to tackle climate change. Robust evaluation of the direct benefits of restoration projects is also critical for focusing restoration strategies towards activities that will have the greatest impact, and avoiding misallocation of limited resources towards activities that are often more costly and resource-intensive. Paired control plots could demonstrate, for example, how deciding to let ***forests*** regrow on their own (for example, by ***removing*** grazers) can result in more cost-effective ***forest*** regrowth than active planting and relieve the general notion that tree planting is required to demonstrate additionality.

The utility of paired restoration and control plots hinges on the appropriateness of the match since a control plot’s primary purpose is to capture baseline conditions against which restoration may justifiably be compared. Restoration and control plots should be matched, for example, by climate, jurisdictional policies and other external factors that will influence ***forest*** dynamics in the project area. A range of impact evaluation approaches that have been pioneered in the biomedical field, like nearest neighbour matching and the synthetic control method, represent fertile ground for application to natural resource management,.

The third and final pillar of a dynamic system of global monitoring is a robust and evolving system of remote-sensing products. Given both limited capacity for project-level field monitoring and the bias for self-reporting of success, a globally consistent and cost-effective method for using remotely sensed data to monitor progress and changing baselines is essential. The field data collected via the network of restoration projects and paired restoration and control plots should be used to calibrate and validate machine-learning tasks applied to classify these remote-sensing products. Similarly, global maps of flux (for an example, see ref. ) could be used to spatially or temporally interpolate field-based estimates of regrowth from field plots. More generally, remote sensing can vastly expand the potential of paired restoration and control plots with a network of remotely sensed plots to complement field-based plots.

While a global system of dynamic monitoring may sound like a grandiose vision, many of the elements are already falling into place. There are at least two platforms that seek to aggregate existing restoration projects — Restor (restor.eco) and the Global Restoration Observatory — and these represent promising advances towards an adaptive learning system for restoration of ***forest*** cover. Carbon verification methodologies using paired control and implementation plots are in development for improved ***forest*** management activities, and can be further adapted to encompass efforts to restore ***forest*** cover. Finally, new research is emerging to link ground- and/or airborne-based monitoring with remote-sensing techniques at global scales. Accurate, globally consistent, frequently updated maps of ***forest*** extent are readily achievable with current satellite technology. Additionally, recent advances in machine learning enable derivation of multi-sensor products that, when calibrated appropriately, can more accurately detect smaller increments in carbon accumulation.

We have about a decade remaining to avoid the worst effects of climate change. Decarbonization of the industrial sector is paramount, but we will likely need every tool in the toolbox to solve this global problem. Restoration of ***forest*** cover represents only one tool of many promising natural climate solutions to protect, manage and restore natural ecosystems and working ***lands*** for additional climate mitigation. However, it is a tool with high potential. Let’s use it to the best of our ability, and dynamically improve both science and practice as we go.

**Acknowledgements**

We thank E. Belair and S. Yeo for their critical review. The writing of this Comment was supported by a grant from the Bezos Earth Fund.

**Load-Date:** May 3, 2023

**End of Document**



[***Five Projects Split $860,000 to Further Grow Natural Climate Solutions in U.S***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60W4-SDV1-JDG9-Y099-00000-00&context=1516831)

Impact News Service

September 18, 2020 Friday

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**Length:** 523 words

**Body**

Arlington, Virginia: The Nature Conservancy has issued the following press release:

Through the generous support of the Doris Duke Charitable Foundation, today The Nature Conservancy’s Natural Climate Solutions Accelerator program is announcing the award of $860,000 to be split among five projects designed to help scale climate change mitigation by capturing and storing carbon on natural and working ***lands*** in the U.S The five recipients are part of the third round of grantees for the Accelerator program, which has awarded over $2.5 million dollars to fifteen climate projects around the country.

The 2018 Fourth National Climate Assessment and Intergovernmental Panel on Climate Change’s 1.5 degrees Celsius Report provided additional urgent wake-up calls on the need for ambitious and innovative climate action to achieve a low carbon economy and accelerate ***removal*** of greenhouse gases already emitted into the atmosphere.

“We are pleased to be able to support these organizations,” said Catherine Macdonald, TNC’s North America Natural Climate Solutions Director, who serves on the Steering Committee for the Accelerator program. “By funding these innovative projects, we hope to expand the use of promising, cost-effective nature-based climate solutions.”

“In addition to their climate benefits, natural climate solutions can improve life and livelihood, by protecting water supplies, improving soil health and productivity, providing wildlife habitat, buffering flood zones, creating healthier communities, and increasing income for private landowners,” Macdonald explained.

The five recent grant recipients are advancing new climate solutions in ***forests*** and ***agricultural*** ***lands*** across the country:

The American Farmland Trust was awarded $200,000 to accelerate the adoption of regenerative farming practices and water conservation, such as cover crops and groundwater recharge to increase carbon sequestration and reduce greenhouse gas ***emissions*** and climate impacts in Illinois and California’s San Joaquin Valley. Success in these major, but distinct, ***agricultural*** regions has the potential to store a significant amount of soil carbon and could help leverage support for regional and state and federal policy efforts to scale-up regenerative farming practices across America. Within fifteen months the project anticipates it will improve soil management across 150,000 acres and deliver conservation plans for increasing groundwater recharge potential and water conservation on at least 100,000 acres with 150 to 200 producers.

“The U.S Natural Climate Solutions Accelerator grant will provide American Farmland Trust the opportunity to accelerate the adoption of cover crops and catalyze cooperation among public agencies and private partners around the efficient use of financial and technical assistance” says Kristopher Reynolds, AFT Midwest Regional Director.

“In the San Joaquin Valley of California, funds will reduce greenhouse gas ***emissions***, sequester carbon in soil, conserve precious water resources, increase biodiversity, and protect the nation’s leading farming region,” says Kara Heckert, regional director of AFT California.

**Load-Date:** September 19, 2020

**End of Document**



[***Register of Commission documents: Written answer : Climate taxes and their importance for food production and carbon leakage P9\_RE(2020)003169 / FULL / EN19/08/2020***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60RT-67D1-JDG9-Y04W-00000-00&context=1516831)

Impact News Service

September 3, 2020 Thursday

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**Length:** 633 words

**Body**

Brussels: Public Register European Parliament has issued the following document:

(English version)Question for written answer E-003169/20to the CommissionLinea Søgaard-Lidell (Renew), Asger Christensen (Renew)(25 May 2020)Subject: Climate taxes and their importance for food production and carbon leakageOn 18 May 2020, Danish media reported on a paper written by researchers at the University of Copenhagen. (1) The findings set out in the paper come from the EUCalc programme sponsored by the EU and Horizon 2020 (2) .The conclusion is that a correlation can be demonstrated between the EU's 2050 reduction ***targets*** and the transfer of food production, and thus EU ***emissions***, to third countries. The paper explains that this will only happen if the EU goes it alone in the world and imposes taxes on carbon ***emissions*** in food production.Has the Commission read the EU-funded report and, if the Commission is in possession of the report, will it make it available to the European Parliament?How does the Commission view the conclusion that imposing taxes as a way of achieving climate goals can create carbon leakage, and should there be a focus on incentives to create green food production and promote technology instead of taxes in EU climate legislation? The Commission should also address how to ensure that food imported into the EU from third countries complies with the same rules as EU-produced food.Answer given by Executive Vice-President Timmermans on behalf of the European Commission(19 August 2020)The Farm to Fork Strategy (3) aims at supporting food operators in the transition to sustainable practices. The Common ***Agricultural*** Policy is the main tool to help farmers to improve their climate performance through compulsory and voluntary support schemes and investment into green technologies. The Commission will also promote a new business model called carbon farming, whereby farmers are rewarded for carbon ***removals***.While environmental standards may influence production costs and have a leakage effect (4), this can be offset by higher efficiency and better marketing of sustainable food. Moreover, imported food products must comply with relevant EU regulations and standards and, should differences in levels of climate ambition worldwide persist, the Commission will also propose a carbon border adjustment mechanism for selected sectors, to reduce the risk of carbon leakage.The Farm to Fork Strategy aims to lead a global transition towards competitive sustainability, pointing at several actions. For instance, the EU, in its trade negotiations, will seek to obtain ambitious commitments from third countries in the area of sustainability; it will present legislative and non-legislative proposals to avoid or minimise the placing of products associated with deforestation or ***forest*** degradation on the EU market; it will take into account environmental aspects when assessing import tolerances for pesticide substances, and will ensure that products of animal origin imported into the EU comply with strict requirements on the use of antibiotics.Finally, the establishment of a policy framework for sustainable food systems, combined with labelling or other incentives, could raise sustainability standards for all products placed on the EU market.⋅1∙[*https://nyheder.ku.dk/alle\_nyheder/2020/05/ambitioese-klimaplaner-i-eu-kan-oege-udledningen-af-drivhusgasser-i-resten-af-verden/⋅2∙https://cordis.europa.eu/project/id/730459⋅3∙COM(2020)*](https://nyheder.ku.dk/alle_nyheder/2020/05/ambitioese-klimaplaner-i-eu-kan-oege-udledningen-af-drivhusgasser-i-resten-af-verden/⋅2∙https://cordis.europa.eu/project/id/730459⋅3∙COM(2020)) 381 final⋅4∙All deliverables of the Horizon 2020 project mentioned in the original EP question are published here: [*www.european-calculator.eu/deliverables-disseminations*](http://www.european-calculator.eu/deliverables-disseminations)/ . The specific results referred to are summarised in this policy brief: [*http://www.european-calculator.eu/wp-content/uploads/2020/04/EUCalc\_PB\_no7\_Trade.pdf((((*](http://www.european-calculator.eu/wp-content/uploads/2020/04/EUCalc_PB_no7_Trade.pdf(((()) ) ) )

**Load-Date:** September 3, 2020

**End of Document**



[***BBC Radio 4 - 05:05 AM GMT***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61DP-8FP1-DY08-311D-00000-00&context=1516831)

TVEyes - BBC Radio 4

December 1, 2020 Tuesday

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**Section:** U.K. NATIONAL RADIO

**Length:** 729 words

**Body**

**Speech to text transcript:**[[1]](#footnote-2)1

authorities said tech companies were complying with requests to ***remove*** what they called propaganda against the state in rugby Union Argentina's captain problem it ever has been stripped of that role in suspended from the national side together with two of his team-mates For making racist comments online the messages were posted between 2011 in 2013 Yeah no Wittenberg reports just over two weeks ago Abu Omar Khadr was widely praised for leading the pumice to their first ever win over New Zealand now he has lost the captaincy and being kicked out of the squad along with get better and Santiago Socino the Argentine rugby Union condemned their comments made more than 7 years ago as discriminatory and xenophobic the offending social media posts resurfaced after the team was criticised by many Argentines for failing to adequately honour the footballer Diego Maradona in their rematch with new Zealand at the weekend the all Blacks a dedicated their traditional pre-game hacker to their opponents national hero as Sailor involved a global round the world yacht race has been rescued by a third competitor after 12 hours in a liferaft Kevin its coffee a abandoned his vessel after it began taking in water hundreds of miles of the Cape of good hope he was spotted by a fellow Frenchman BBC News many thanks indeed for the latest Hello welcome Lawrence and James more than a football pitch of it disappears a second is the Amazon why it matters so much is what we will be talking about in just a minute matters particularly if we're going to make those Paris climate ***targets*** we are talking about business talks about travel and the pandemic also we have an inventor talking about recycling pandemic PP into bricks and we are joined by Anthony factory Yes Anthony felt she of the us he says actually the pandemic is as bad as he sees it interview on the way you're on Tuesday new scientific analysis seen by the BBC suggest the goals of the Paris climate agreement are coming within reach the Paris deal seeks to limit the temperature increase to two degrees globally by the end of the century but the study also finds that short term plans to cut ***emissions*** and not matching long-term aspirations one problem is deforestation the world's largest rainforest the Amazon has recorded its highest level of destruction in more than a decade this according to Brazil space agency the Amazon is a vital carbon store that slows down the pace of global warning I spoke to Stuart Pimm Professor of conservation at Duke University in the US the Amazon in Brazil is now losing 10000 square kilometres of ***Forest*** a year that's about a billion tons of carbon dioxide that's been put into the atmosphere it and that's about as much of the carbon dioxide ***emissions*** of of the United Kingdom and France and Italy put together Wow Why's it happened a execs a huge deforestation tropical deforestation is the Hues component of global greenhouse gas ***emissions*** And very often blame for that has been put directly on the shoulders of President Jair Bolsonaro his his his policies his drive for development as he would see it is it a fair critique I think it is very much a criticism the show both now over a decade ago starting in 2006 2008 Brazil reduced its deforestation by about 80% and kept its deforestation low for about a decade at the same time It managed to increase its soybean production we did that by by by putting emphasis on efficient ***agriculture*** one rather than just clearing a lot of areas of ***Forest*** to two really not do a great deal for the Brazilian economy you know clear in the the Amazon rainforests doesn't lead by a large two very productive ***agricultural*** ***land*** much of it leads to two A very barren cattle pastures that don't contribute very much to why is it being cleared them I mean a lot of it has to do with with local people who view this as being a part of who they are you know you can be a big man if you go and and clear the ***Forest*** and you have huge London means I think it's so exciting you know a much is mo expression rather than any any great economic sense I mean when you clock these places the cattle pastures that are You know former tropical ***forests*** are you Richard places I mean Brazil is a big country it's about the same

**Load-Date:** December 1, 2020

**End of Document**



[***Biochar's ability to store carbon explored***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62T4-CJ81-JDG9-Y3D6-00000-00&context=1516831)

Impact News Service

May 28, 2021 Friday

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**Length:** 522 words

**Body**

London: The Institute of Materials, Minerals and Mining has issued the following press release:

Work on the four-and-a-half-year project has begun, with field trials in arable and grassland sites in the Midlands and Wales, as well as former mines, railway embankments where engineering work has resulted in loss of vegetation, and woodlands across England and Wales.

Biochar is a charcoal-like substance, produced by heating organic biomass from ***agriculture*** and forestry waste in the absence of oxygen (pyrolysis) to make it carbon-rich and chemically-stable. At present, in the UK, it is produced on an extremely small-scale in kilns and it is mainly sold as a mulch for horticulture. However, its effectiveness, cost, social acceptability and limitations need to be better understood and proven at scale.

The gases generated in the charring process can be used to provide renewable heat and power.

Project lead, Professor Colin Snape, Director of Nottingham’s EPSRC Centre of Doctoral Training in Carbon Capture and Storage and Cleaner Fossil Energy, explains, '40% goes into the biochar and 60% is converted into heat and power which is recovered in a large-scale plant. It’s a very energy-efficient, carbon neutral system.

'The aim is to take carbon from atmospheric ***emissions*** and trap it in the biochar. That carbon will then be locked in the soil for centuries, if not millennia, so its sustainable production could be a powerful tool in the fight against climate change. However, we need to get a detailed and accurate picture of the longevity and stability of biochar carbon in soils to ensure it has no detrimental impact.'

To facilitate the research, over 200t of biochar will be prepared from virgin and recycled wood. It will be tested prior to field application.

Dr Will Meredith, Assistant Professor in Fuel Science and Technology, says, 'Chemical analysis will tell us how much of the carbon applied as biochar is actually locked away in the soil long-term, and how much goes back into the atmosphere as CO2. This will show how effective large-scale biochar deployment could be as a method of greenhouse gas ***removal***.'

Small field-plot trials will then investigate the interplay between biochars (applied at different rates), fertiliser, soil health, and plant and microbial responses. The application combinations and rates that elicit the most positive results will be selected and used at the demonstrator sites to ascertain if responses are replicable at scale.

The researchers will be adding the safe maximum of a few tonnes per hectare in a number of settings – arable, grassland and forestry – to understand the impact.

Biochar will also be incorporated in soil prior to tree planting at several nursery woodlands and spread on the surface in other mature ***forest*** locations. Additionally, it will be used on sites where the ***land*** is contaminated with heavy metals from prior industrial use. Biochar acts as an adsorbent, binding metal pollutants to its surface, which immobilises them and, over time, reduces their toxicity.

Former open cast mines will also be investigated as potential carbon stores, in-filled with biochar.

**Load-Date:** May 30, 2021

**End of Document**



[***Pesticides and fertilisers have overtaken fossil fuels as the largest human source of sulphur in the environment, study shows***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60JN-7W51-F021-60CF-00000-00&context=1516831)

MailOnline

August 10, 2020 Monday 3:59 PM GMT

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**Section:** SCIENCE; Version:2

**Length:** 702 words

**Byline:** Ian Randall For Mailonline

**Body**

* Sulphur is one of the key components of acid rain which can harm ecosystems

1. Regulations of fossil fuel ***emissions*** have helped reduce this form of damage
2. US experts have found sulphur used in farming is now causing similar effects
3. In Florida, for example, sulphur release is helping to form toxic methylmercury
4. This compound can accumulate up the food chain to reach unsafe levels in fish

Pesticides and fertilisers from ***agriculture*** have overtaken fossil fuels as the largest human source of sulphur in the environment, a study has revealed.

Reactive sulphur is a key component of acid rain - but one that used to be derived primarily from the use of coal-fired power plants.

The threat from acid rain was first revealed in the 1970s, when experts found it was responsible for damage to ecosystems across the northeastern US and Europe.

This rain, they realised, was derived from fossil fuel ***emissions*** from industrial centres as far as hundreds of kilometres away from the affected ***forests*** and waterways.

In the US, the findings ultimately led to the establishment of the Clean Air Act in 1990, with this and similar legislation helping to lower atmospheric sulphur levels.

However, experts led from the University of Colorado have found that the increasing use of sulphur in farming is causing similar effects to the acid rain of the past.

SULPHUR: THE FACTS

Sulphur is a naturally occurring element.

It is a plant nutrient and can be used to make fertiliser - along with pesticide.

When released into the atmosphere, it can create sulphuric acid to help form acid rain - damaging plant life and making water ecosystems acidic.

Researchers have found that sulphur release from farming is helping to methylmercury - a neurotoxin which can build up across the food chain.

'It seemed like the sulphur story was over,' said paper author and environmental scientist Eve-Lyn Hinckley, of the University of Colorado, Boulder.

'But our analysis shows that sulphur applications to croplands in the US and elsewhere are often ten times higher than the peak sulphur load in acid rain.

'No one has looked comprehensively at the environmental and human health consequences of these additions.'

In their study, Professor Hinckley and colleagues examined the use of sulphur in US ***agricultural*** practices across various important crops - including corn in the Midwest, sugarcane in Florida and grapes in California.

The team found that while areas like New England are showing signs of recovery from the historic deposition of sulphur into the atmosphere, sulphate release into the environment from ***agricultural*** areas is increasing.

'Although sulphur is applied to ***agricultural*** ***lands*** to improve the production and health of crops, it can have detrimental effects to ***agricultural*** soils and downstream waters,' added paper author Charles Driscoll of New York's Syracuse University.

These effects, Professor Driscoll added, are 'similar to what occurred in remote ***forest*** landscapes under acid rain.'

One example the researchers have highlighted is the Everglades ***Agricultural*** Area in Florida, where sulphur draining into waters is enhancing the formation of methylmercury - a potent neurotoxin which accumulates in living organisms.

When methylmercury is passed up the food chain, it can accumulate in high concentrations - risking the exposure of wildlife and humans to the toxic metal if such fish are consumed.

Past research had predominantly focused on understanding and managing the use of nitrogen and phosphorus fertilisers, which have the potential to cause harmful algal blooms, resulting in the ***removal*** of oxygen from waters and killing fish.

The team have called for more research investigating the impacts of the high levels of sulphur use in modern farming practices - both to explore the environmental and health implications but also to work with farmers to optimise sulphur usage.

'Sulphur in ***agriculture*** is not going away,' said Professor Hinckley.

'Yet there is an opportunity to bring science and practice together to create viable solutions that protect long-term environmental, economic and human health goals.'

The full findings of the study were published in the journal Nature Geoscience.

**Load-Date:** August 10, 2020

**End of Document**



[***the future is forestry***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60X6-FGP1-DYTY-C3J5-00000-00&context=1516831)

The Press and Journal

September 24, 2020 Thursday

Edition 1, National Edition

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**Section:** FORESTRY;NEWS; Pg. 10,11

**Length:** 1551 words

**Body**

The forestry and wood industry is thriving in Scotland in 2020, with even the founders of the punk Aberdeenshire brewery recognising its benefits by planting the Brewdog ***Forest***. Trees take a while to grow, so by its very nature, this is a long-term business with an eye on the future. So, what are the major trends where forestry and wood can make a real impact? Confor chief executive Stuart Goodall highlights 10 reasons why "the future is forestry".

Leading the green recovery Forestry is perfectly placed to lead the green recovery from Covid-19 because it delivers economic and environmental benefits simultaneously.

For most industries, an increase in economic activity has a negative impact on the environment, but when trees are planted, they soak up carbon and that carbon is then stored in wood products while another carbon-sequestering tree is planted in its place.

Forestry and wood processing employs more than 25,000 people in Scotland and adds £1 billion in annual economic value, with a big footprint in north and north-east of Scotland. Major employers include Norbord at Dalcross, near Inverness, which has invested £145m over the last two years in manufacturing OSB (oriented strand board), while James Jones & Sons Ltd have invested millions in the world-leading Timber Systems Division site at Forres.

There is potential for even more jobs and far greater economic value as planting rates increase to meet government ***targets***, and as more timber becomes available.

Diversifying farm income Trees provide valuable income at a time when farmers face uncertainty with the end of Common ***Agricultural*** Policy funding.

Tom Pate, who manages Middleton Farm in Angus, has described how "forgotten forestry" allowed the farm to gain a new lease of life. Timber in several dispersed groups of trees was sold for a high price, allowing more ***forest*** to be planted in a planned way (supported by grants for planting and fencing), which in turn created space for a deer herd.

As well as providing new income streams, trees deliver welfare benefits by offering shelter and warmth to animals in winter and reducing feed costs, while woodland can be thinned to provide firewood for farm use and/or sale.

The potential for beneficial integration between forestry and farming is recognised by Peter Chapman, North East Scotland MSP and Scottish Conservative rural affairs spokesman, who farms at Strichen.

As a former vice-president of the National Farmers' Union Scotland, he has challenged the view that planting trees is a failure of the farming business model, saying: "Farm woodland would assist in making farmers less dependent on volatile food prices by diversifying their businesses, and is vital if we are to deliver tree-planting ***targets***."

Thinking Global, Planting Local Global demand for wood is estimated by WWF to triple by 2050. The UK imports 80% of the wood it uses, the world's second-largest net importer after China. This can put pressure on fragile global ***forests*** overseas and encourage illegal logging. A two-year investigation by environmental charity Earthsight revealed up to 40% of wood sold to the European Union from Ukraine, to make everything from furniture to garden fences, was illegally cut.

While the UK is a global leader in tackling illegal logging, Confor is urging the UK and Scottish governments to "Think Global, Plant Local" and take more responsibility for producing the timber we use.

Scotland is ahead of the game, planting more than 80% of new UK woodland every year. Littlewood Estate near Alford in Aberdeenshire is a prime example of modern, mixed forestry with one-third of new planting native woodland and two-thirds productive conifers. People in the north-east should expect more mixed, modern ***forests*** delivering economic, environmental and social benefits as Scotland looks to meet its new ***target*** of 18,000 hectares of woodland creation annually by 2025 (recently increased from 15,000 hectares).

Plugging the timber gap Scotland is heading for a "timber gap", as we pay the price for not planting in the 1990s and early 2000s. Despite increased planting in recent years, a shortfall of wood is forecast in the late 2030s and 2040s. One possible solution is "short rotation forestry" where trees are planted and harvested in 15-20 years, rather than 30+ years. They can provide fibre for a range of uses, including board factories like Norbord, for biomass and potentially as a replacement for chemicals, textiles and many other products.

Meeting the 2045 net-zero ***target*** Scotland is more ambitious than the UK in its efforts to reduce carbon ***emissions***, with a net-zero ***target*** of 2045 against the UK's 2050. With ***emissions*** reductions from existing industry only able to deliver finite benefits, the focus is also on ***removing*** atmospheric carbon, with forestry seen as a vital contributor in this area. Scotland has always linked planting ***targets*** to climate change ambitions and will showcase its forestry credentials when climate conference COP26 is held in Glasgow in late 2021.

Brewdog founders James Watt and Martin Dickie have recognised the importance of trees for carbon capture. The pair, who launched the brewery in Ellon, Aberdeenshire, have bought 2,000 acres of ***land*** north of Loch Lomond to create the Brewdog ***Forest***, part of the company's Make Earth Great Again campaign.

Tackling the nature crisis as well as the climate crisis As well as tackling climate change, forestry can also deliver biodiversity benefits. The industry has been criticised for 1970s and '80s plantations, but modern forestry has high environmental standards which include planting a range of different tree species, leaving open space and managing areas for biodiversity. Confor produced Biodiversity, Forestry and Wood this summer, which concluded that ***forests*** planted primarily to produce wood can have significant biodiversity benefits. Examples from the Highlands included benefits for species like red squirrels, sea eagles and hen harriers, while the Rothiemurchus Estate case study concluded that nature conservation and timber harvesting could go hand in hand - with many priority species present, including capercaillie, Scottish crossbill, goshawk and many rare insects.

Promoting building with wood - because Wood Co2ts Less The benefit of using wood goes beyond storing carbon. The Wood CO2ts Less campaign highlights using more wood in place of alternative CO2-intensive materials. A 2018 European analysis of the impact of using wood instead of concrete suggested an average reduction of 2.1 tons of CO2 ***emissions*** per one ton of wood products used - while an average timber frame home locks up five tonnes of carbon, almost three years of an average person's carbon footprint.

Independent government advisers, the Committee on Climate Change, said in a 2019 report: "Using wood in construction to displace high-carbon materials such as cement and steel is one of the most effective ways to use limited biomass resources to mitigate climate change."

Companies like Makar, based in Inverness, are creating beautiful homes that lock up significant amounts of carbon.

Meeting the need for 21st Century skills Many of today's senior foresters trained at Aberdeen University, which offers an MSc in environmental and ***forest*** management, while the expanding Scottish School of Forestry at Balloch, near Inverness, offers a range of further and higher education programmes within its own practical training environment.

With the significant potential for further industry growth, Confor believes investment and support in talent attraction and training across the wood supply chain is needed to fulfil the wide range of emerging job opportunities.

This could include a job/skills match-up scheme to attract post-Covid career changers, public/private partnership to deliver the forestry skills action plan, and support for small businesses to recruit and support new talent.

Investing in timber transport Growing more trees and harvesting them for wood products means we need to find safe, environmentally-friendly solutions to move timber from the ***forest***.

The Strategic Timber Transport Fund has invested tens of millions of pounds to create ***forest*** roads and improve public roads where timber is moved. The £7m allocation in 2019-20 includes money for Aberdeenshire and Highlands, with an extra £1m as part of the Return to Work package, including almost £190,000 for improvements in Aberdeenshire - the C43M Glacks and the A97 at Boultenstone Bridge.

This year has also seen thousands of tonnes of timber transported by rail from Halkirk in Caithness to

Inverness in a six-week trial.

Three trains a week have been running since last month in the Scottish Government-funded trial involving Victa Railfreight. Long-term plans could see wood unloaded at a new siding at Dalcross near Inverness Airport and taken to the Norbord panel board factory.

Providing great places for people Covid-19 restrictions saw more people enjoy their local ***forests*** and the sector will continue to take the opportunity to continue promoting the health and wellbeing benefits of ***forest*** activities, including walking, cycling and bird-watching.

So while you enjoy that ***forest*** setting, please remember that you are surrounded by a natural "machine" that is sucking in carbon - and supporting thousands of local jobs.

**Graphic**

¦ Logs at Darroch Wood, Scaniport Estate, near Inverness.¦ Tree planting.¦ Trees growing in Scotland.¦ Stuart Goodall in the ***forest***.¦ Littlewood Estate at Alford, a good example of mixed planting. Picture by Ian Cameron.

**Load-Date:** September 24, 2020

**End of Document**



[***Roberts, Sen Malcolm speech on ADJOURNMENT - Banking and Financial Services, Land Clearing, Foreign Investment, Water***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61DX-WBC1-JDG9-Y1FJ-00000-00&context=1516831)

Impact News Service

December 1, 2020 Tuesday

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**Length:** 802 words

**Body**

Canberra: Parliament of Australia has issued the following speech:

As a servant to the people of Queensland and Australia, I draw attention to the Australian parliament's failure to protect the interests of the Australian people. In the Senate yesterday, the Liberals, the Nationals and the Labor Party united in standing beside big banks against the interests of everyday Australians. Together they voted down my bill to prevent bank deposits being bailed in—meaning that when banks get into trouble they can steal depositors' money. Their madness is simple: Australia has the world's safest banks; the only thing that could bring our banks down is a loss of confidence; that's the very thing my bill was designed to stop. Not once has the Treasurer, the Prime Minister or APRA, the banking regulator, come out and said, 'We will not bail in your deposits.' It's time the Australian people heard those words. The right to use a banking service without losing our money is just one of many rights that everyday Australians have lost—another is the loss of property rights.

Prime Minister John Howard's government's response to the UN's Kyoto Protocol in 1996 was to use the deceitful trick of protecting junk vegetation from destruction. The carbon dioxide that this saved counted to our UN Kyoto ***targets*** and it still does. It enabled his government to bypass its constitutional duty to compensate farmers for stealing their property rights. This is a perfect example of mad climate policies that are about bowing to unelected, unrepresentative foreign UN bureaucrats, rather than showing actual environmental outcomes. The ***land*** that John Howard's capricious actions supposedly protected was not something worthwhile like an old-growth ***forest*** or riparian vegetation; no, it was ***agricultural*** ***land*** that was stolen. John Howard's government stole our farmers' rights to clear junk vegetation that grows on a field not used for a few years. It prevents farmers making productive use of their ***land***.

To this day the general public think this ban on ***land*** clearing relates to actual ***forests***. This conjures up images of evil farmers chopping down virgin ***forests*** and sending koalas to their deaths. The reality is this ban stops farmers clearing salt bush and junk vegetation that's stopping productive ***agriculture*** on ***land*** that has been farmed many times. The old parties never let the truth stand in the way of virtue signalling.

The Liberal-National government with John Howard as Treasurer is largely to blame for banking misconduct. It was John Howard who deregulated banking. This exposed bank customers to the atrocious behaviour that was found during the Senate inquiry into rural and regional lending that I chaired. Our inquiry led to the banking royal commission finding even more wrongdoing.

The Morrison government recently demonstrated another failure in looking after small business. Aussie company CuDeco operated the Rocklands copper mine near Cloncurry in Queensland. It was driven into insolvency from the actions of the minority Chinese owners. The mine was sold to a local Chinese company who promptly onsold it to a Chinese government entity. China now owns an important Australian copper mine, thanks to the ineffective Morrison government. The mine's workers will never get their missing wages, and local contractors are out of pocket $60 million. The only way we will see CuDeco's copper again is if we buy that copper inside Chinese manufactured electronics. Chinese corporations continue to cherrypick their way through our resources sector. China is buying mines, real estate, farms and even our water.

I do compliment Treasurer Frydenberg, though, on his recent decision to block the sale of PURA milk to the Chinese, resulting in the Australian company Bega buying PURA. It's a welcome break after the Liberal-National and Labor parties selling Australia out for a generation.

Since my return to the Senate last year, the Liberal, Labor and National parties have been acting together and have voted down One Nation's motions—many motions—to restore farmers' water rights. The 2007 Water Act takes their water rights and forces Aussie farmers, family farmers, off the ***land***. Even now, with all the rain this year, farmers are on as little as 39 per cent allocation. Who passed the 2007 Water Act? Prime Minister John Howard. Who introduced the Murray-Darling Basin Plan in 2012? Prime Minister Julia Gillard. The whole point of the Water Act was to ***remove*** family farms from the ***land***, then to ***remove*** their water rights to new irrigation areas on cheap ***land*** belonging to corporate ***agriculture***—windfall profits all round; Australian farmers and local communities being gutted. The Australian parliament must decide whether it represents the interests of big business or the interests of everyday Australians.

**Load-Date:** December 2, 2020

**End of Document**



[***Senate OKs bill to certify farm practices limiting emissions***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:630P-SST1-JBNF-W4VS-00000-00&context=1516831)

The Independent (United Kingdom)

June 25, 2021 Friday 9:20 PM GMT

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**Section:** NEWS; Version:21

**Length:** 652 words

**Byline:** Via AP news wire

**Highlight:** The U.S. Senate is supporting a plan to encourage greater use of farming and forestry practices that prevent greenhouse gas ***emissions***

**Body**

The U.S. Senate has approved a measure intended to encourage greater use of farming and forestry practices that prevent greenhouse gas ***emissions*** and ***remove*** planet-warming carbon dioxide from the atmosphere.

It authorizes the federal [*Department of* ***Agriculture***](https://www.independent.co.uk/topic/department-agriculture) to create a program helping farmers, ranchers and private ***forest*** landowners earn payments through private markets for planting offseason cover crops, reducing tillage and taking other steps to lock up carbon in soils and trees.

"Solving the climate crisis is a critical challenge for all of us ... and we are taking landmark steps toward supporting ***agriculture*** and forestry leadership in addressing this," ***Agriculture*** Committee Chairwoman Debbie Stabenow, a [*Michigan*](https://www.independent.co.uk/topic/michigan) Democrat and the bill's chief sponsor, said Thursday before it passed on a 92-8 vote.

It now goes to the House, which is considering a similar proposal.

Federal policies have long supported environmentally friendly practices such as planting buffer strips to prevent soil and nutrient erosion that feeds harmful algae blooms in waters.

Some of those actions also work against climate change. Pulling marginal ***lands*** out of crop production, for example, can make way for carbon-absorbing grasses, trees and wetlands.

The [*National Academy of Sciences*](https://www.independent.co.uk/topic/national-academy-sciences) estimates ***agricultural*** soils could take in 250 million metric tons (276 million tons) of atmospheric carbon dioxide annually, which would offset 5% of U.S. ***emissions***. If scaled up significantly, farm and forestry actions could offset the yearly carbon output from nearly 110 million automobiles, Stabenow said.

In recent years, companies wanting to shrink their environmental footprints have begun purchasing credits for carbon and other greenhouse gases stored in farmlands and ***forests***, working through brokers who contract with farmers to use the best-management practices.

Under the Senate bill, the ***agriculture*** department program would certify those who provide technical assistance to farmers entering carbon markets - and third-party experts who verify that the ***emission***-preventing steps are taken.

Sen. Mike Lee, a [*Utah*](https://www.independent.co.uk/topic/utah) [*Republican*](https://www.independent.co.uk/topic/republican) who voted against the bill, argued the federal program wasn't needed and could hamper innovation.

"It would insert the federal government into a market that is blossoming on its own, imposing burdensome regulation and picking winners and losers in the carbon credit marketplace," Lee said.

Some environmental advocates contend voluntary actions by farmers won't do enough to prevent climate change.

"Rather than embracing offset schemes, we need to keep fossil fuels in the ground and transition away from ***emissions***-intensive ***agricultural*** practices like factory farming and large scale monoculture," said Mitch Jones, policy director of Food & Water Watch.

But the bill drew support from other environmentalists - and farm groups which which they are often at odds.

The Department of ***Agriculture*** is "perfectly positioned to define science-based best practices for measuring, reporting and verifying ***agricultural*** carbon credits," said Elizabeth Gore, senior vice president of the Environmental Defense Fund.

Without the department's involvement, it could be risky for farmers to participate in the markets and hard to determine whether the credits represent genuine ***emissions*** prevention, she said.

Zippy Duvall, president of the American Farm Bureau Federatioin, said lack of access to reliable information about carbon markets and a shortage of technical assistance have deterred some landowners.

The bill "acknowledges the potential of climate-smart farming while ensuring farmers would be respected as partners who can build on our strong foundation of environmental stewardship," Duvall said.

Read More

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**Load-Date:** June 26, 2021

**End of Document**



[***USDA Requests Information on USDA’s Climate-Smart Agriculture and Forestry Strategy***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6275-FCK1-F0YC-N30F-00000-00&context=1516831)

Impact News Service

March 15, 2021 Monday

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**Length:** 496 words

**Body**

Washington: US Department of ***Agriculture*** has issued the following news release:

The U.S Department of ***Agriculture*** (USDA) today published a Federal Register Notice requesting public input on a climate-smart ***agriculture*** and forestry strategy. The Notice represents an important step toward implementing President Biden’sExecutive Orderon Tackling the Climate Crisis at Home and Abroad. The Order, signed January 27, states that,“America’s farmers, ranchers, and ***forest*** landowners have an important role to play in combating the climate crisis and reducing greenhouse gas ***emissions***, by sequestering carbon in soils, grasses, trees, and other vegetation and sourcing sustainable bioproducts and fuels. ”The Order directs ***Agriculture*** Secretary Tom Vilsack to solicit input from stakeholders as USDA develops a climate-smart ***agriculture*** and forestry approach.

“USDA is committed to addressing climate change through actions that are farmer, rancher, and ***forest*** landowner-focused and that create new market opportunities for the sector in a fair and equitable way,” said Vilsack. “We want your ideas on how to position the ***agriculture*** and forestry sectors to be leaders on climate smart practices to mitigate climate change. This includes making the most of USDA programs, developing new USDA-led climate strategies, strengthening existing markets and developing new markets that generate income. ”

The Notice seeks information on four topics: climate-smart ***agriculture*** and forestry; biofuels, bioproducts, and renewable energy; catastrophic wildfire; and meeting the needs of disadvantaged communities through USDA’s climate strategy.

Under the Biden-Harris Administration, USDA is engaged in a whole-of-government effort to combat the climate crisis and conserve and protect our nation’s ***lands***, biodiversity, and natural resources, including our soil, air and water. Through research, conservation practices and partnerships, USDA aims to find solutions to ***agricultural*** challenges, enhance economic growth and create new streams of income for farmers, ranchers, producers and private foresters. Successfully meeting these challenges will require USDA and our agencies to pursue a coordinated approach alongside USDA stakeholders, including state, local, and tribal governments.

USDA touches the lives of all Americans each day in so many positive ways. In the Biden-Harris Administration under Secretary Vilsack, USDA is committed to transforming America’s food system with a greater focus on more resilient local and regional food production, fairer markets for all producers, ensuring access to healthy and nutritious food in all communities, building new markets and streams of income for farmers and producers using climate smart food and forestry practices, making historic investments in infrastructure and clean energy capabilities in rural America, and committing to equity across the Department by ***removing*** systemic barriers and building a workforce more representative of America.

**Load-Date:** March 16, 2021

**End of Document**



[***There's a Booming Business in America's Forests. Some Aren't Happy About It.***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62GM-GDK1-JC85-N0CK-00000-00&context=1516831)

The New York Times - International Edition

April 21, 2021 Wednesday

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**Section:** CLIMATE

**Length:** 2370 words

**Byline:** Gabriel Popkin and Erin Schaff

**Body**

**ABSTRACT**

The fuel pellet industry is thriving. Supporters see it as a climate-friendly source of rural jobs. For others, it's a polluter and destroyer of nature.

**FULL TEXT**

GARYSBURG, N.C. - In 2013, Kathy Claiborne got a noisy new neighbor. That's when a huge factory that dries and presses wood into roughly cigarette-filter-sized pellets roared to life near her tidy home in one of the state's poorest counties. On a recent afternoon in her front yard, near the end of a cul-de-sac, the mill rumbled like an uncomfortably close jet engine.

"I can't even recall the last time I had a good night's sleep," said Ms. Claiborne, who in 2009 moved to the neighborhood, which is majority African-American. She wears a mask outdoors, she said, because dust from the plant can make it hard to breathe.

The slumberless factory's output is trucked to a port in Chesapeake, Va., and loaded on ships bound for Europe, where it will be burned to produce electricity and heat for millions of people. It's part of a fast-growing industry that, depending on whom you ask, is an unwelcome source of pollution or a much-needed creator of rural jobs; a ***forest*** protector, or a destroyer.

In barely a decade, the Southeast's wood pellet industry has grown from almost nothing to 23 mills with capacity to produce more than 10 million metric tons annually for export. It employs more than 1,000 people directly, and has boosted local logging and trucking businesses.

The industry is not done growing. It is courting new markets in Asia - Japan, which retreated from nuclear power after the 2011 Fukushima disaster, has become a major buyer of pellets - and is lobbying for greater prominence in the United States. It has backers at the ***Agriculture*** Department, which recently asked for suggestions on increasing wood bioenergy use.

Pellets are undoubtedly having a moment. The open question is whether a world increasingly desperate to avert climate disaster will continue to embrace, or turn away from, humanity's original fuel: wood.

Most divisive is the industry's claim to battle climate change by replacing dirty fossil fuels with clean bioenergy.

Many foresters, economists and environmental policy experts endorse that idea. But a legion of ecologists, conservationists and others strongly disagree. Some 500 recently wrote to heads of state including President Joseph R. Biden urging them to reject wood burning as a tool for fighting climate change.

Michael Regan, the new administrator of the Environmental Protection Agency is also seen as lukewarm. During his previous job running the North Carolina Department of Environmental Quality, the department granted permits to mills but also required them to address air pollution and recommended against including wood bioenergy in the state's clean energy mix.

An EPA spokeswoman said the agency wasn't currently considering adding most wood pellets to its renewable fuel standard, an action that would raise their prospects here.

The story of industrial wood pellets in places like Northampton County begins in climate policy made an ocean away. In 2009, European officials decided to declare biomass energy - basically, the burning of wood or other plants, rather than fossil fuels - to be carbon neutral. The idea is that regrowing plants, over time, would ultimately reabsorb the carbon dioxide released by the burning.

Britain and other countries set ambitious climate ***targets*** and began subsidizing electrical utilities to build biomass plants or retrofit coal plants to burn wood. The largest power plant in Britain, Drax, which is based in Selby, in the north of England, now produces 2.6 gigawatts of electricity from biomass, versus just 1.3 gigawatts from coal. (One gigawatt is enough to power a medium-sized city.)

Drax buys pellets from Enviva - a company based in Bethesda, Md., that bills itself as the world's largest pellet producer - and others. It also operates its own pellet mills in Gulf Coast states.

Bioenergy has in recent years accounted for some 14 percent of Britain's total electricity generation. Denmark, Belgium and the Netherlands have also invested heavily.

Many scientists have long been skeptical of biomass's climate benefits. Wood releases more carbon dioxide per unit of electricity produced than coal or gas, and a newly planted tree can take decades to reabsorb the carbon dioxide emitted by burning. "Wood is a sucky fuel," said Tim Searchinger, a researcher at Princeton.

In 2009, a group led by Mr. Searchinger wrote in the journal Science protesting what they called a "critical climate accounting error." They argued that certain major international climate policies and legislation designed to reduce countries' greenhouse gas ***emissions*** allow nations to burn biomass and discount their smokestack ***emissions*** but fail to account for the carbon losses caused by cutting down trees to burn them.

"It's just cheating," Mr. Searchinger said.

Despite scientists' misgivings, policymakers barreled ahead. While wood burning dates back millenniums and pellet stoves have long warmed homes in places like New England, Europe's renewable-energy directive opened up a new, industrial-scale market.

The biggest supplier of that market quickly became the rural United States Southeast, a patchwork of mostly privately owned, lightly regulated hardwood ***forests***, swamps, farms, small towns and pine trees. Lots and lots of pine trees.

Pellet makers source wood from thousands of landowners, who are often eager to earn revenue to offset ***land*** taxes. Enviva opened its first mill in Ahoskie, N.C., in 2011, promising to make pellets mainly from wood "residues" such as tree tops, branches and sawdust with no other market.

When ***land*** is logged, the thick, straight trunks typically go to a sawmill that churns out things like two-by-fours. Pellet makers take small pieces that may have no other market and vie with makers of paper, cardboard boxes and diaper fluff for the rest. About 3 percent of harvested wood from the South goes to pellets, according to Consuelo Brandeis, a research ***forester*** with the United States ***Forest*** Service.

Several Enviva mills were soon processing material from logging sites and sawmills throughout the region. Environmental groups say they have documented truckloads of logs and whole trees, not just leftovers, entering pellet mills. Publicly available images show logs stacked at mills, and a reporter outside a pellet mill entrance saw trucks of logs entering.

Pellet makers' pledges to rely on waste wood "painted them into a corner," said Robert Abt, a ***forest*** economist at North Carolina State University in Raleigh, because the wood-products industry already used its supplies relatively efficiently, leaving little waste.

While longer pieces of wood that are too crooked or knotted for sawmills do make up part of Enviva's supply, Jennifer Jenkins, Enviva's chief sustainability officer, who holds a Ph.D. in ecosystem ecology, said the company's sourcing was sustainable because it buys only from landowners who commit to regrow trees, and because the Southeast's ***forests*** overall are expanding. Pellets sourced from such regions should be considered carbon neutral, according to accounting rules laid out by the Intergovernmental Panel on Climate Change, a United Nations body that provides scientific information on climate change, Dr. Jenkins said.

Dr. Jenkins said the company had installed air pollution controls that exceed requirements. A community relations manager said he had received no noise complaints related to the Northampton County mill.

The United States wood pellet industry, which exported more than seven million tons of pellets last year, has generated strong opinions in North Carolina.

At a morning meeting organized by Enviva outside a Cracker Barrel late last month, local leaders hailed the company's contributions to the economy, schools and vocational training programs. An ongoing expansion of the Enviva plant in Garysburg "will bring great things," said Charles Tyner, the county commission chairman.

Half a state away, in Moore County, Jesse Wimberley, coordinator for the Sandhills Prescribed Burn Association, a nonprofit conservation group, is thrilled that Enviva is buying small, scraggly oaks growing thick under some longleaf pine trees. The ***removal*** of the oaks, followed by controlled burns of the ***forest*** floor, is crucial for regenerating the longleaf savanna ecosystem, which has shrunk by more than 90 percent in the past four centuries.

On a recent afternoon, amid intermittent rain squalls, a Caterpillar loader grabbed the oaks, shook out loose vines and shoved them into a chipper. The chipper spewed out a high-speed stream into a trailer truck bound for a nearby Enviva mill.

Before that mill opened, the ***land*** trust that owns the site would have had to clear the oaks at its own expense, Mr. Wimberley said. "When you have the right market, you can have the restoration paying for itself."

Richie Harding, a pastor in Northampton County, took a dimmer view.

He said he was incensed that Enviva had plopped its mill amid established neighborhoods. "Northampton County has a lot of ***land***," he said. "Why would you put it in the backyard of these people?"

Pellet mills, which can emit volatile organic compounds and other hazardous air pollutants, are 50 percent more likely to be located near "environmental justice-designated" communities, defined as counties with above-average poverty levels and a population that's at least 25 percent nonwhite, according to an analysis by the Dogwood Alliance, an environmental nonprofit based in Asheville.

In November, the Mississippi Department of Environmental Quality fined Drax, the power company, $2.5 million for air-quality violations at mills it operates there.

Derb Carter, a Chapel Hill-based lawyer for the Southern Environmental Law Center, voiced another concern. He and colleagues have tracked some of Enviva's source material to bottomland ***forests*** that have the some of the highest tree biodiversity in the country. In 2016, a global environmental partnership named the Atlantic Coastal Plain, most of which is in the Southeast, a biodiversity hot spot, recognizing both its unique plant species and its rate of habitat loss.

Enviva said it now sources only from bottomlands it considers nonsensitive and that these provide only 1 percent of its supply.

Mr. Carter said he viewed such claims with skepticism. "They play word games," he said.

The company said its sourcing practices now beat industry standards and that it encourages suppliers to certify their ***forests*** as sustainable, though it acknowledged that most are still not certified. (Enviva as a whole maintains several sustainability certifications.) "Enviva has grown and learned over time," said Dr. Jenkins, the Enviva executive.

She also disputed two recent investigations that the Dogwood Alliance claims show trees harvested from wet bottomlands.

Whether Enviva's actions promote sustainable ***forests*** may depend on one's definitions of "sustainable" and "***forest***."

Owen Strickler, who owns a 6,000-acre woods in Virginia that Enviva describes as a model, and who calls the pellet industry "a good thing," manages a mosaic of different-age loblolly pine stands. When one area is harvested, Mr. Strickler sprays the native hardwoods that pop up with herbicide and plants more fast-growing loblollies.

Dr. Jenkins laid out the industry's case: Demand for pellets creates an incentive for landowners like Mr. Strickler to grow more trees, which suck up more carbon, offsetting the carbon dioxide emitted from power plant smokestacks. The argument has support from some forestry experts and economists such as Dr. Abt.

One recent study found that, through 2017, commercially harvestable ***forests*** near pellet mills in the Southeast had more carbon stored in trees than ***forests*** farther away, indirectly supporting Dr. Jenkins's argument.

Dr. Jenkins acknowledged, however, that there is no direct evidence that Enviva's presence has added any carbon to America's ***forests*** to offset the carbon dioxide emitted from European smokestacks.

Even if the Southeast's ***forest*** carbon is increasing, "it doesn't mean everyone is off the hook," said Francisco X. Aguilar, a ***forest*** researcher at the Swedish University of ***Agricultural*** Sciences in Umea, who led the recent study. His data revealed potentially concerning trends, including fewer standing dead trees and losses of carbon from the soil of ***forests*** near mills in the Southeast, suggesting the pellet industry may be taking wood that otherwise would have decomposed on site, feeding the soil.

Pellet opponents have scored some successes, forcing the installation of pollution controls at mills. The Dutch Parliament recently banned subsidies for new biomass plants and the country has imposed strict sourcing standards that cut out many suppliers in the United States. This year, the European Union is expected to announce new regulations for wood pellet sourcing.

Still, the industry's explosive growth continues. Permits have been filed for a dozen new pellet mills, mostly in Gulf Coast states, according to the Southern Environmental Law Center, Mr. Carter's organization. Enviva's newest corporate office is in Tokyo; the company expects Asian countries to eventually buy roughly half its pellets, according to a spokeswoman.

Despite the industry's optimism, even its supporters stress that pellets are a limited solution and cannot fully replace fossil fuels. Gert-Jan Nabuurs, a professor of ***forest*** resources at Wageningen University in the Netherlands, has calculated that the Southeast might be able to sustainably supply 35 million metric tons of pellets annually, roughly three times today's production capacity.

"If indeed the whole world starts to ask for pellets, then things go out of control," Dr. Nabuurs said. "That's very obvious."

Erin Schaff contributed reporting.

*Erin Schaff contributed reporting.*

**Load-Date:** April 20, 2021

**End of Document**



[***Financial assistance available to Oregon farmers, ranchers, forest owners***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:614C-86J1-JDG9-Y1BV-00000-00&context=1516831)

Impact News Service

October 22, 2020 Thursday

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**Length:** 600 words

**Body**

Washington: US Department of ***Agriculture*** has issued the following news release:

Opportunities are available for Oregon farmers, ranchers and ***forest*** owners to perform voluntary conservation activities with financial assistance from the USDA Natural Resources Conservation Service (NRCS).

NRCS Oregon announces new sign-up deadlines for the Environmental Quality Incentives Program (EQIP) and the ***Agricultural*** Conservation Easements Program (ACEP). Applicants must apply byNovember 20, 2020to be considered for the first round of fiscal year 2021 funding.

To apply for EQIP, contact yourlocal USDA Service Centeror apply online atfarmers.gov.To apply for RCPP and see what is available in your area, call yourlocal USDA Service Centeror lead partner for the RCPP Project.To apply for ACEP, contact yourlocal USDA Service Center.

The November 20 deadline applies to the following funding pools:

* General EQIP:In Oregon, general EQIP dollars are only available to producers within a Conservation Implementation Strategy (CIS) area. CIS’s are locally-led projects developed by farmers and partners through the NRCS Local Work Group process. See a map of current CIS’s on theNRCS Oregon homepage.

1. Organic EQIP:Offers assistance to USDA certified organic producers and to producers wishing to transition their operation to obtain an organic certification.
2. Seasonal High Tunnel EQIP:Offers assistance to install a seasonal high tunnel (hoop house) to extend seasonal crop production to strengthen local and regional food markets while reducing pesticide use and energy inputs.
3. On-Farm Energy EQIP:Assists producers to conserve energy on their farms through an on-farm energy audit and provides assistance to implement various recommended measures identified in an energy audit.
4. Sage Grouse Initiative EQIP:Focuses on making measurable and significant progress toward treating threats to rangeland health including sage grouse habitat on private ***lands***.
5. Animal Feeding Operation (AFO) Initiative:Available to AFO producers statewide to address water quality and air quality resource concerns by developing a Comprehensive Nutrient Management Plan to manage manure and organic byproducts; and to implement conservation practices identified in that plan.
6. Joint Chiefs Landscape Restoration Initiative:These projects focus on reducing the risk of catastrophic wildfire on private forestlands and adjacent federal ***lands*** managed by the U.S ***Forest*** Service.
7. National Water Quality Initiative:NRCS works closely with conservation partners to select priority watersheds where on-farm conservation investments will deliver the greatest water quality improvements. Fiscal year 2021 funding is available for the Lost River watershed in Klamath County.
8. National Air Quality Initiative:In Oregon, NAQI funding is available to farmers in Hood River County to help orchard producers reduce the use of high-***emission***, diesel-fuel smudge pots which are commonly used to protect crops from damaging spring frosts. NRCS is providing a financial incentive to help growers ***remove*** smudge pots from their operations, so they can be replaced with cleaner, more efficient systems.
9. RCPP-EQIP projects: There are currently 15 active RCPP projects throughout Oregon. These are typically 5-year projects with specific goals within regions and watersheds.
10. ***Agricultural*** Conservation Easements Program (ACEP): NRCS provides financial and technical assistance to secure easements for both working ***agricultural*** ***lands*** and for wetlands. The program has two components: one for ***Agricultural*** ***Land*** Easements (ALE) and one for Wetland Reserve Easements (WRE).

**Load-Date:** October 24, 2020

**End of Document**



[***Bennet Surveys Wildfire Damage in Grand County, Renews Call to Scale Up Forest and Watershed Restoration in the West***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62M5-S1V1-F0YC-N4F1-00000-00&context=1516831)

Impact News Service

May 6, 2021 Thursday

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**Length:** 1107 words

**Body**

Washington: Office of the Senator Michael Bennet has issued the following news release:

Colorado U.S Senator Michael Bennet surveyed damage to a watershed that flows into Grand Lake and the Blue Ridge prescribed burn area in Grand County yesterday with representatives from Northern Water, Colorado River District, the National Resources Conservation Service (NRCS), the U.S ***Forest*** Service (USFS), the Department of Natural Resources (DNR), Grand County, the Town of Grand Lake, Three Lakes Watershed Association, Middle Park Conservation District, and the Bureau of ***Land*** Management (BLM). Bennet recently re-introduced his Outdoor Restoration Partnership Act to create jobs in the outdoors by investing in ***forest*** and watershed restoration. His proposal was included in President Joe Biden’s American Jobs Plan.

The Outdoor Restoration Partnership Act will provide direct support to local, collaborative efforts to mitigate wildfire, restore habitat, and expand outdoor access. It will also restore areas at high-risk of wildfire, with high priority wildlife habitat, or in the wildland-urban interface––where homes and businesses meet wildland vegetation––to build climate resilience in the West.

“Last year, Colorado faced the three largest wildfires in state history. Across the country the threat of wildfire is growing, which comes at a terrible cost for communities like Grand Lake and Hot Sulphur Springs in Grand County,” said Bennet. “That’s exactly why we wrote the Outdoor Restoration Partnership Act––a comprehensive plan crafted hand in hand with Coloradans to improve ***forest*** conditions, reduce wildfire risk to communities, and protect our water supply. In passing this bill we can build climate resilience and create millions of good-paying jobs. With bipartisan support in the House and the support of the Biden Administration, we have a real opportunity to invest in our ***forests*** and watersheds and leave them better off for the next generation. ”

“The Blue Ridge ***Forest*** Health Project is a wonderful example of a community working together with a multitude of partners to take a strategic look at wildfire risk reduction. No one entity can do this alone, which is why a project across all jurisdictions, that is science- and risk-based, will lead to more effective treatments and safer communities. The partners and community members in Grand County should be recognized for sharing in the stewardship of their public and private ***lands***. The continued commitment and support of elected officials such as Senator Bennet and Governor Polis for this work is truly what moves the results from ordinary to extraordinary,” said Frank Beum, Regional ***Forester*** for the Rocky Mountain Region.

“Senator Bennet appreciated the urgency that Grand Lake faces with fire recovery and mitigation,” said Grand Lake Mayor Steve Kudron. “We spoke about the funding imperatives for time sensitive projects, including protecting against post-fire flooding and the huge backlog of mitigation work on public and private ***lands*** so the impacts of fires in the future are less severe. I thank the senator for his commitment to addressing these critical issues and needs for our community. ”

“Having joined Senator Bennet’s visit yesterday to a prescribed burn site on the Arapaho National ***Forest*** in Grand County, I was struck by the collaboration and partnership that is starting to take place regarding ***forest*** management,” said Grand County Commissioner Merrit Linke. “I believe that we are seeing a culture shift in our federal, state and local partners as we deal with devastating wildfires, impacted watersheds, and destruction of property. This culture shift in how ***forests*** are managed is not only out of necessity but also out of research and sound science. A holistic, landscape-based approach to ***forest*** management that includes fuels treatment, logging, grazing, and working with public and private partners can both reduce wildfire risks and better protect communities. This is a long term, proactive strategy that will have positive impacts far into the future. ”

The Outdoor Restoration Partnership Act would:

Establish an Outdoor Restoration Fund to support local collaborative efforts to restore ***forests*** and watersheds, reduce wildfire risk, clean up public ***lands***, enhance wildlife habitat, ***remove*** invasive species, and expand outdoor access. The bill establishes an advisory council of local, industry, conservation, and national experts to advise on funding priorities, coordinate with existing regional efforts, and provide oversight.

Empower local leaders by making $20 billion directly available to state and local governments, tribes, special districts, and non-profits to support restoration, resilience, and mitigation projects across public, private, and tribal ***lands***. Empowering local leaders that have an ability to bring diverse voices to the table is the path for progress in the West.

Partner with states and tribes to invest $40 billion in ***targeted*** projects to restore ***forests***, improve wildlife habitat and reduce wildfire risk across the country. This investment allows agencies to partner with local stakeholders to improve ***forest*** and watershed health and build climate and community resilience. Tackling the backlog of restoration and resilience projects across public, private, and tribal ***land*** will sustain our economy and way of life.

Create or sustain over two million good-paying jobs, primarily in rural areas, to support ***agriculture*** and outdoor recreation, while providing an opportunity for communities to address long-standing restoration needs and draw in new business.

Save landowners and local governments money by investing in wildfire prevention and natural hazard mitigation, which is three to six times more cost effective than recovering from natural disasters like wildfires or post-fire floods.

Generate over $156 billion in economic output, with a return of up to $15 for every dollar spent on restoration, while upgrading our natural infrastructure for the millions of Americans whose livelihood, health, and wellbeing rely on them.

The bill text is available HERE. A one-pager on the bill and a list of supporting organizations is available HERE. A section-by-section summary of the bill is available HERE.

The Outdoor Restoration Partnership Act is supported by National Wildlife Federation, National Association of State Foresters, The Nature Conservancy, National Wild Turkey Federation, American ***Forests***, National Audubon Society, Family Farm Alliance, Theodore Roosevelt Conservation Partnership, Western Landowners Alliance, Western Resource Advocates, Trout Unlimited, Conservation Legacy, and Mule Deer Foundation.

**Load-Date:** May 7, 2021

**End of Document**



[***52% of global viscose supply now verified as low risk***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:616H-FP61-JDNW-40BV-00000-00&context=1516831)

just-style global news

November 1, 2020 Sunday 3:34 PM GMT

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**Length:** 659 words

**Byline:** Beth Wright

**Body**

Not-for-profit environmental organisation Canopy says that more than 50% of global viscose supply is now verified as low risk of coming from ancient and endangered ***forests***.

Outlined in its '2020 Hot Button Report and Ranking', the findings assess the performance of 31 viscose and rayon producers to help guide fibre sourcing in the fashion sector.

The report shows audited and assessed 'green shirt' producers now account for 52% of global viscose production as more producers take action to ***remove*** the risk of sourcing from ancient and endangered ***forests*** and introduce innovative feed-stocks such as recycled clothing. This compares to 42.5% last year.

The report also shows that more than 90% of the entire viscose supply chain now has a publicly available CanopyStyle policy in place, and 72% of suppliers are voluntarily undergoing audits to confirm and address any risk of sourcing from ancient and endangered ***forests***.

Eliminating such ***forests*** from the man-made cellulosic fibre (MMCF) supply is a crucial first step in brands' and producers' CanopyStyle commitments.

Canopy's partners have also committed to investigating, trialling, and scaling up next generation solutions such as using recycled, post-consumer textiles, ***agricultural*** residues and/or microbial cellulose to make the pulp that forms the basis of MMCF fabrics like rayon and viscose.

A third component of the CanopyStyle vision is translating supply chain shifts into lasting conservation in critical ***forests*** around the globe.

Canopy says this year's report documents real progress by many producers in all three key impact/performance areas.

"It's incredible to see how quickly the majority of viscose production has moved, and now we need the rest of the industry to keep pace," says Nicole Rycroft, Canopy's executive director.

"In addition to many of the leaders reducing risk, we're buoyed by the substantive advancements of next generation solutions, as well as conservation gains in key landscapes. This year's Hot Button Ranking is good news for all sustainability-conscious brands, as well as for the world's ***forests*** and climate."

Hot Button highlights

The majority of the 320 brands in the CanopyStyle initiative worth a combined US$578bn in revenue are implementing commitments to only source from producers ranked with green shirts. This includes Inditex, Stella McCartney, Amazon, H&M, Levi's, ***Target***, Marks & Spencer, and Gap Inc.

Highlights of the 2020 Hot Button Ranking include:

Ten MMCF producers  Eastman, ENKA, Formosa, Jilin, Kelheim, Tangshan Sanyou, Xinxiang Chemical Fiber (Bailu) and Yibin Grace have earned green shirt designations, with Birla Cellulose and Lenzing obtaining the first-ever ranking of dark green shirts. 11 producers have offered support to conservation solutions. Aditya Birla has also invested in conservation planning in carbon-rich Boreal landscapes, agreeing to scenarios with Canopy that propose to conserve about 70% of key ancient and endangered ***forests***. Four of the top five largest producers with deep supply chain integration have invested significantly in advancing next generation solutions and are now selling viscose made from recycled textiles. MMCF producers declared to be investing a combined sum of $233m in next generation research and development, and an intent to procure 274,000 tonnes of Next Generation Fibre Solutions.

This year's Hot Button report also features new information on each producer's performance in chemical management for the first time, with support from the Zero Discharge of Hazardous Chemicals (ZDHC) Foundation.

"Embedding chemical use and ***emissions*** criteria in Canopy's Hot Button report adds value for all who want to understand concrete solutions in the viscose supply chain, and shows the value of collaborative partnership, with each party bringing and reinforcing each other's expertise,'' says Frank Michel, executive director, ZDHC Roadmap to Zero.

Click here to access the full report.

**Load-Date:** February 3, 2021

**End of Document**



[***Nature's great struggle; There is much debate about the precise quantity of carbon plants can absorb from the atmosphere but there will never be enough trees to offset emissions, reports Bonnie Waring***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62RJ-VWJ1-F072-40HG-00000-00&context=1516831)

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**Section:** THE NEW REVIEW; Pg. 41

**Length:** 3387 words

**Byline:** BONNIE WARING

**Body**

One morning in 2009, I sat on a creaky bus winding its way up a mountainside in central Costa Rica, light-headed from diesel fumes as I clutched my many suitcases. They contained thousands of test tubes and sample vials, a toothbrush, a waterproof notebook and two changes of clothes. I was on my way to La Selva Biological Station, where I was to spend several months studying the wet, lowland rainforest's response to increasingly common droughts. On either side of the narrow highway, trees bled into the mist like watercolours into paper, giving the impression of an infinite primaeval ***forest*** bathed in clouds.

As I gazed out of the window at the imposing scenery, I wondered how I could ever hope to understand a landscape so complex. I knew that thousands of researchers across the world were grappling with the same questions, trying to understand the fate of tropical ***forests*** in a rapidly changing world.

Our society asks so much of these fragile ecosystems, which control freshwater availability for millions of people and are home to two thirds of the planet's terrestrial biodiversity. And increasingly, we have placed a new demand on these ***forests*** - to save us from human-caused climate change.

Plants absorb CO2 from the atmosphere, transforming it into leaves, wood and roots. This everyday miracle has spurred hopes that plants - particularly fast growing tropical trees - can act as a natural brake on climate change, capturing much of the CO2 emitted by fossil fuel burning. Across the world, governments, companies and conservation charities have pledged to conserve or plant massive numbers of trees.

But the fact is that there aren't enough trees to offset society's carbon ***emissions*** - and there never will be. I recently conducted a review of the available scientific literature to assess how much carbon ***forests*** could feasibly absorb. If we absolutely maximised the amount of vegetation all ***land*** on Earth could hold, we'd sequester enough carbon to offset about ten years of greenhouse gas ***emissions*** at current rates. After that, there could be no further increase in carbon capture.

Yet the fate of our species is inextricably linked to the survival of ***forests*** and the biodiversity they contain. By rushing to plant millions of trees for carbon capture, could we be inadvertently damaging the very ***forest*** properties that make them so vital to our wellbeing? To answer this question, we need to consider not only how plants absorb CO2, but also how they provide the sturdy green foundations for ecosystems on ***land***.

How plants fight climate change

Plants convert CO2 gas into simple sugars in a process known as photosynthesis. These sugars are then used to build the plants' living bodies. If the captured carbon ends up in wood, it can be locked away from the atmosphere for many decades. As plants die, their tissues undergo decay and are incorporated into the soil.

While this process naturally releases CO2 through the respiration (or breathing) of microbes that break down dead organisms, some fraction of plant carbon can remain underground for decades or even centuries. Together, ***land*** plants and soils hold about 2,500 gigatonnes of carbon - about three times more than is held in the atmosphere.

Because plants - especially trees - are such excellent natural storehouses for carbon, it makes sense that increasing the abundance of plants across the world could draw down atmospheric CO2 concentrations.

Plants need four basic ingredients to grow: light, CO2, water and nutrients (like nitrogen and phosphorus, the same elements present in plant fertiliser). Thousands of scientists across the world study how plant growth varies in relation to these four ingredients, in order to predict how vegetation will respond to climate change.

This is a surprisingly challenging task, given that humans are simultaneously modifying so many aspects of the natural environment by heating the globe, altering rainfall patterns, chopping large tracts of ***forest*** into tiny fragments and introducing alien species where they don't belong. There are also over 350,000 species of flowering plants on ***land*** and each one responds to environmental challenges in unique ways.

Due to the complicated ways in which humans are altering the planet, there is a lot of scientific debate about the precise quantity of carbon that plants can absorb from the atmosphere. But researchers are in unanimous agreement that ***land*** ecosystems have a finite capacity to take up carbon.

If we ensure trees have enough water to drink, ***forests*** will grow tall and lush, creating shady canopies that starve smaller trees of light. If we increase the concentration of CO2 in the air, plants will eagerly absorb it - until they can no longer extract enough fertiliser from the soil to meet their needs. Just like a baker making a cake, plants require CO2, nitrogen and phosphorus in particular ratios, following a specific recipe for life.

In recognition of these fundamental constraints, scientists estimate that the earth's ***land*** ecosystems can hold enough additional vegetation to absorb between 40 and 100 gigatonnes of carbon from the atmosphere. Once this additional growth is achieved (a process which will take a number of decades), there is no capacity for additional carbon storage on ***land***.

But our society is currently pouring CO2 into the atmosphere at a rate of ten gigatonnes of carbon a year. Natural processes will struggle to keep pace with the deluge of greenhouse gases generated by the global economy. For example, I calculated that a single passenger on a round trip flight from Melbourne to New York City will emit roughly twice as much carbon (about 1600 kg) as is contained in an oak tree half a meter in diameter (about 750kg).

Peril and promise

Despite all these well recognised physical constraints on plant growth, there is a proliferating number of large scale efforts to increase vegetation cover to mitigate the climate emergency - a so called "nature-based" climate solution. The vast majority of these efforts focus on protecting or expanding ***forests***, as trees contain many times more biomass than shrubs or grasses and therefore represent greater carbon capture potential.

Yet fundamental misunderstandings about carbon capture by ***land*** ecosystems can have devastating consequences, resulting in losses of biodiversity and an increase in CO2 concentrations. This seems like a paradox - how can planting trees negatively impact the environment?

The answer lies in the subtle complexities of carbon capture in natural ecosystems. To avoid environmental damage, we must refrain from establishing ***forests*** where they naturally don't belong, avoid "perverse incentives" to cut down existing ***forest*** in order to plant new trees, and consider how seedlings planted today might fare over the next several decades.

Before undertaking any expansion of ***forest*** habitat, we must ensure that trees are planted in the right place because not all ecosystems on ***land*** can or should support trees. Planting trees in ecosystems that are normally dominated by other types of vegetation often fails to result in long term carbon sequestration.

One particularly illustrative example comes from Scottish peatlands - vast swathes of ***land*** where the low-lying vegetation (mostly mosses and grasses) grows in constantly soggy, moist ground. Because decomposition is very slow in the acidic and waterlogged soils, dead plants accumulate over very long periods of time, creating peat. It's not just the vegetation that is preserved: peat bogs also mummify so-called "bog bodies" - the nearly intact remains of men and women who died millennia ago. In fact, UK peatlands contain 20 times more carbon than found in the nation's ***forests***.

But in the late 20th century, some Scottish bogs were drained for tree planting. Drying the soils allowed tree seedlings to establish, but also caused the decay of the peat to speed up. Ecologist Nina Friggens and her colleagues at the University of Exeter estimated that the decomposition of drying peat released more carbon than the growing trees could absorb. Clearly, peatlands can best safeguard the climate when they are left to their own devices.

The same is true of grasslands and savannahs, where fires are a natural part of the landscape and often burn trees that are planted where they don't belong. This principle also applies to Arctic tundras, where the native vegetation is covered by snow throughout the winter, reflecting light and heat back to space. Planting tall, dark-leaved trees in these areas can increase absorption of heat energy, and lead to local warming.

But even planting trees in ***forest*** habitats can lead to negative environmental outcomes. From the perspective of both carbon sequestration and biodiversity, all ***forests*** are not equal - naturally established ***forests*** contain more species of plants and animals than plantation ***forests***. They often hold more carbon, too. But policies aimed at promoting tree planting can unintentionally incentivise deforestation of well established natural habitats.

A recent high-profile example concerns the Mexican government's Sembrando Vida programme, which provides direct payments to landowners for planting trees. The problem? Many rural landowners cut down well established older ***forest*** to plant seedlings. This decision, while quite sensible from an economic point of view, has resulted in the loss of tens of thousands of hectares of mature ***forest***.

This example demonstrates the risks of a narrow focus on trees as carbon absorption machines. Many well meaning organisations seek to plant the trees which grow the fastest, as this theoretically means a higher rate of CO2 "drawdown" from the atmosphere.

Yet from a climate perspective, what matters is not how quickly a tree can grow, but how much carbon it contains at maturity, and how long that carbon resides in the ecosystem. As a ***forest*** ages, it reaches what ecologists call a "steady state" - this is when the amount of carbon absorbed by the trees each year is perfectly balanced by the CO2 released through the breathing of the plants themselves and the trillions of decomposer microbes underground.

This phenomenon has led to an erroneous perception that old ***forests*** are not useful for climate mitigation because they are no longer growing rapidly and sequestering additional CO2. The misguided "solution" to the issue is to prioritise tree planting ahead of the conservation of already established ***forests***. This is analogous to draining a bathtub so that the tap can be turned on full blast: the flow of water from the tap is greater than it was before - but the total capacity of the bath hasn't changed. Mature ***forests*** are like bathtubs full of carbon. They are making an important contribution to the large, but finite, quantity of carbon that can be locked away on ***land***, and there is little to be gained by disturbing them.

What about situations where fast growing ***forests*** are cut down every few decades and replanted, with the extracted wood used for other climate-fighting purposes? While harvested wood can be a very good carbon store if it ends up in long lived products (like houses or other buildings), surprisingly little timber is used in this way.

Similarly, burning wood as a source of biofuel may have a positive climate impact if this reduces total consumption of fossil fuels. But ***forests*** managed as biofuel plantations provide little in the way of protection for biodiversity and some research questions the benefits of biofuels for the climate in the first place.

Fertilise a whole ***forest***

Scientific estimates of carbon capture in ***land*** ecosystems depend on how those systems respond to the mounting challenges they will face in the coming decades. All ***forests*** on Earth - even the most pristine - are vulnerable to warming, changes in rainfall, increasingly severe wildfires and pollutants that drift through the earth's atmospheric currents.

Some of these pollutants, however, contain lots of nitrogen (plant fertiliser) which could potentially give the global ***forest*** a growth boost. By producing massive quantities of ***agricultural*** chemicals and burning fossil fuels, humans have massively increased the amount of "reactive" nitrogen available for plant use. Some of this nitrogen is dissolved in rainwater and reaches the ***forest*** floor, where it can stimulate tree growth in some areas.

As a young researcher fresh out of graduate school, I wondered whether a type of under-studied ecosystem, known as seasonally dry tropical ***forest***, might be particularly responsive to this effect. There was only one way to find out: I would need to fertilise a whole ***forest***.

Working with my postdoctoral adviser, the ecologist Jennifer Powers, and expert botanist Daniel Pérez Avilez, I outlined an area of the ***forest*** about as big as two football fields and divided it into 16 plots, which were randomly assigned to different fertiliser treatments. For the next three years (2015-2017) the plots became among the most intensively studied ***forest*** fragments on Earth. We measured the growth of each individual tree trunk with specialised, hand-built instruments called dendrometers.

We used baskets to catch the dead leaves that fell from the trees and installed mesh bags in the ground to track the growth of roots, which were painstakingly washed free of soil and weighed. The most challenging aspect of the experiment was the application of the fertilisers themselves, which took place three times a year. Wearing raincoats and goggles to protect our skin against the caustic chemicals, we hauled back-mounted sprayers into the dense ***forest***, ensuring the chemicals were evenly applied to the ***forest*** floor while we sweated under our rubber coats.

Unfortunately, our gear didn't provide any protection against angry wasps, whose nests were often concealed in overhanging branches. But, our efforts were worth it. After three years, we could calculate all the leaves, wood and roots produced in each plot and assess carbon captured over the study period. We found that most trees in the ***forest*** didn't benefit from the fertilisers - instead, growth was strongly tied to the amount of rainfall in a given year.

This suggests that nitrogen pollution won't boost tree growth in these ***forests*** as long as droughts continue to intensify. To make the same prediction for other ***forest*** types (wetter or drier, younger or older, warmer or cooler) such studies will need to be repeated, adding to the library of knowledge developed through similar experiments over the decades. Yet researchers are in a race against time. Experiments like this are slow, painstaking, sometimes backbreaking work and humans are changing the face of the planet faster than the scientific community can respond.

Humans need healthy ***forests***

Supporting natural ecosystems is an important tool in the arsenal of strategies we will need to combat climate change. But ***land*** ecosystems will never be able to absorb the quantity of carbon released by fossil fuel burning. Rather than be lulled into false complacency by tree planting schemes, we need to cut off ***emissions*** at their source and search for additional strategies to ***remove*** the carbon that has already accumulated in the atmosphere.

Does this mean that current campaigns to protect and expand ***forest*** are a poor idea? Emphatically not. The protection and expansion of natural habitat, particularly ***forests***, is absolutely vital to ensure the health of our planet. ***Forests*** in temperate and tropical zones contain eight out of every ten species on ***land***, yet they are under increasing threat. Nearly half of our planet's habitable ***land*** is devoted to ***agriculture***, and ***forest*** clearing for cropland or pasture is continuing apace.

Meanwhile, the atmospheric mayhem caused by climate change is intensifying wildfires, worsening droughts and systematically heating the planet, posing an escalating threat to ***forests*** and the wildlife they support. What does that mean for our species? Again and again, researchers have demonstrated strong links between biodiversity and so-called "ecosystem services" - the multitude of benefits the natural world provides to humanity.

Carbon capture is just one ecosystem service in an incalculably long list. Biodiverse ecosystems provide a dizzying array of pharmaceutically active compounds that inspire the creation of new drugs. They provide food security in ways both direct (think of the millions of people whose main source of protein is wild fish) and indirect (for example, a large fraction of crops are pollinated by wild animals).

Natural ecosystems and the millions of species that inhabit them still inspire technological developments that revolutionise human society. For example, take the polymerase chain reaction ("PCR") that allows crime labs to catch criminals and your local pharmacy to provide a Covid test. PCR is only possible because of a special protein synthesised by a humble bacteria that lives in hot springs.

As an ecologist, I worry that a simplistic perspective on the role of ***forests*** in climate mitigation will inadvertently lead to their decline. Many tree planting efforts focus on the number of saplings planted or their initial rate of growth - both of which are poor indicators of the ***forest***'s ultimate carbon storage capacity and even poorer metric of biodiversity. More importantly, viewing natural ecosystems as "climate solutions" gives the misleading impression that ***forests*** can function like an infinitely absorbent mop to clean up the ever increasing flood of human caused CO2 ***emissions***.

Luckily, many big organisations dedicated to ***forest*** expansion are incorporating ecosystem health and biodiversity into their metrics of success. A little over a year ago, I visited an enormous reforestation experiment on the Yucatán Peninsula in Mexico, operated by Plant-for-the-Planet - one of the world's largest tree planting organisations. After realising the challenges inherent in large scale ecosystem restoration, Plant-for-the-Planet has initiated a series of experiments to understand how different interventions early in a ***forest***'s development might improve tree survival.

But that is not all. Led by director of science Leland Werden, researchers at the site will study how these same practices can jump-start the recovery of native biodiversity by providing the ideal environment for seeds to germinate and grow as the ***forest*** develops. These experiments will also help ***land*** managers decide when and where planting trees benefits the ecosystem and where ***forest*** regeneration can occur naturally.

Viewing ***forests*** as reservoirs for biodiversity, rather than simply storehouses of carbon, complicates decision making and may require shifts in policy. I am all too aware of these challenges. I have spent my entire adult life studying and thinking about the carbon cycle and I too sometimes can't see the ***forest*** for the trees. One morning several years ago, I was sitting on the rainforest floor in Costa Rica measuring CO2 ***emissions*** from the soil - a relatively time intensive and solitary process.

As I waited for the measurement to finish, I spotted a strawberry poison dart frog - a tiny, jewel-bright animal the size of my thumb - hopping up the trunk of a nearby tree. Intrigued, I watched her progress towards a small pool of water held in the leaves of a spiky plant, in which a few tadpoles idly swam. Once the frog reached this miniature aquarium, the tiny tadpoles (her children, as it turned out) vibrated excitedly, while their mother deposited unfertilised eggs for them to eat. As I later learned, frogs of this species (Oophaga pumilio) take very diligent care of their offspring and the mother's long journey would be repeated every day until the tadpoles developed into frogs.

It occurred to me, as I packed up my equipment to return to the lab, that thousands of such small dramas were playing out around me in parallel. ***Forests*** are so much more than just carbon stores. They are the unknowably complex green webs that bind together the fates of millions of known species, with millions more still waiting to be discovered. To survive and thrive in a future of dramatic global change, we will have to respect that tangled web and our place in it.

Bonnie Waring is a senior lecturer at the Grantham Institute - Climate Change and Environment, Imperial College London. This article first appeared on The Conversation

**Load-Date:** May 22, 2021

**End of Document**



[***Federal Register: Notice of Intent To Prepare an Environmental Impact Statement for the Husky 1 North Dry Ridge Phosphate Mine and Notice of Cancellation of Environmental Impact Statement Preparation for the Nu-West Mining Husky 1-North Dry Ridge Phosphate Mine Project Pages 83994 - 83996 [FR DOC #2020-28242]***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61KG-1661-JDG9-Y3N7-00000-00&context=1516831)

Impact News Service

December 23, 2020 Wednesday

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**Length:** 2739 words

**Body**

Washington: Office of the Federal Register has issued the following notice:DEPARTMENT OF THE INTERIORBureau of ***Land*** ManagementDEPARTMENT OF AGRICULTUREForest Service[20XL.LLIDI00000.L71220000.EO0000.LVTFDX814600.241A;4500150180]Notice of Intent To Prepare an Environmental Impact Statement for the Husky 1 North Dry Ridge Phosphate Mine and Notice of Cancellation of Environmental Impact Statement Preparation for the Nu-West Mining Husky 1-North Dry Ridge Phosphate Mine ProjectAGENCY: Bureau of ***Land*** Management, Interior; U.S ***Forest*** Service, Department of ***Agriculture***.ACTION: Notice of intent to prepare an Environmental Impact Statement and notice to terminate preparation of Another Environmental Impact Statement.-----------------------------------------------------------------------SUMMARY: The Bureau of ***Land*** Management (BLM) and ***Forest*** Service will consider approving the Husky 1 North Dry Ridge phosphate Mine and Reclamation Plan (MRP) on Federal Phosphate Leases, lease modifications, and Special Use Authorizations for ancillary facilities located off-lease on National ***Forest*** System ***lands***. Previous plans submitted by Nu-West Mining (doing business as Agrium Conda Phosphate Operations) for the mining property are no longer being considered for approval. The former Notice of Intent published in 2012 (77 FR 46107) is cancelled and preparation of the Environmental Impact Statement (DOI-BLM-ID-I020-2012-0047-EIS) is terminated.DATES: The BLM and ***Forest*** Service request comments concerning the scope of the analysis and identification of relevant information, studies and analyses. All comments must be received by January 22, 2021. The draft Environmental Impact Statement is scheduled for May 2021 and the final Environmental Impact Statement is scheduled for November 2021, with BLM and ***Forest*** Service Records of Decision in February 2022. The BLM will announce dates of scoping meetings at least 15 days in advance of the meeting on the BLM National ePlanning website--[*https://go.usa.gov/x7HSJ*](https://go.usa.gov/x7HSJ). Scoping meetings will be held online.ADDRESSES: Send written comments to: Husky 1 North Dry Ridge Mine EIS, C/O Tetra Tech, 2525 Palmer Street, Suite 2, Missoula, MT 59808. Send comments via email to [*BLM\_ID\_Husky1NDR\_EIS@blm.gov*](mailto:BLM_ID_Husky1NDR_EIS@blm.gov) Submit comments online at the website [*https://go.usa.gov/x7HSJ.FOR*](https://go.usa.gov/x7HSJ.FOR) FURTHER INFORMATION CONTACT: Wes Gilmer, BLM Pocatello Field Office, (208) 478-6369 or [*wgilmer@blm.gov*](mailto:wgilmer@blm.gov) Persons who use a telecommunication device for the deaf (TDD) may call the Federal Relay Service (FRS) at 1-800-877-8339 to contact the above individual during normal business hours. The FRS is available 24 hours a day, seven days a week, to leave a message or question with the above individual. You will receive a reply during normal business hours. Documents pertinent to this proposal may be examined at the Pocatello Field Office, address 4350 Cliffs Drive, Pocatello, ID 83204; information is also available at the BLM's website at [*https://go.usa.gov/x7HSJ.SUPPLEMENTARY*](https://go.usa.gov/x7HSJ.SUPPLEMENTARY) INFORMATION:Purpose and Need for the Proposed Action Itafos Conda LLC is proposing to exercise mining rights that the Unites States has previously granted in Federal phosphate leases that it currently holds or controls. The company has developed and submitted an MRP for the Husky 1 North Dry Ridge Phosphate Mine. The purpose is for the BLM and ***Forest***[[Page 83995]]Service to evaluate and respond to the plan submitted for the recovery of phosphate ore and to modify leases, in accordance with the Mineral Leasing Act of 1920 as amended. As the surface management agency, the ***Forest*** Service will provide the BLM with formal recommendations on the BLM's action to modify the lease (43 CFR 3503.20), evaluate and respond to the MRP, and issue Special Use Authorizations for the portion of operations that would occur on National ***Forest*** System (NFS) ***lands*** outside lease boundaries (36 CFR 251.50). Itafos Conda LLC has the exclusive right and privilege to recover phosphate from their leases, including the exploration, mining, and disposal of the phosphate or phosphate rock. The U.S Army Corps of Engineers (USACE) purpose as a cooperating agency in preparation of an Environmental Impact Statement, is to evaluate and consider the MRP relative to a permit decision under Section 404 of the Clean Water Act. The need for the Husky 1/North Dry Ridge Project is to develop the phosphate resource, using an economically viable method, in accordance with Federal laws and regulations governing Federal mineral leases, and to allow Itafos Conda LLC to exercise its right to develop the leases and ensure economically viable and continuous phosphate operations that are in compliance with established requirements. Ultimately, the project would supply phosphate ore to the plant in Soda Springs, ID.Preliminary Proposed Action and Alternatives The proposed action includes two open phosphate mining pits--the North Dry Ridge and Husky 1--in portions of the existing North Dry Ridge, Husky 1, and Maybe Canyon Mine leases, and proposed lease modifications. Mining would proceed in phases with overburden first placed in existing South Maybe Canyon pits, followed by backfilling the Husky 1 and North Dry Ridge pits as room is made available. A portion of the Husky 1 pit overburden would also be used to construct a permanent external overburden stockpile for use in reclamation and to buttress mine features such as the relocation of the upper portions of Maybe Creek. Additional mine facilities include growth media stockpiles, temporary overburden storage areas, water management features, dust suppression and water supply wells, haul roads, equipment staging areas, fuel storage areas, train loading facility (tipple), ore stockpiles, and the shop and office area. The existing offices and shop facilities at the Dry Valley Mine would be used as the main base for Project operations. The Dry Valley yard area would be used for fuel storage tanks, an equipment parking/hot start line, and a laydown yard. Ore would be transported via haul roads from the mine pit areas to an ore stockpile and tipple, then loaded onto railcars and transported by existing rail line to Soda Springs. The proposed action includes closing a portion of an existing NFS Road (#134) for the duration of mining and reclamation. It also proposes that the Blackfoot River Road be used as the primary means for the public to access Diamond Creek Valley and Dry Valley. The mine would encompass approximately 2,096 acres of Federal ***land***, including existing Federal phosphate leases (1,504 acres), proposed lease enlargement modifications (479 acres), and ***Forest*** Service Special Use Authorizations (113 acres), and an additional 9 acres of private ***land***. Mining operations would disturb approximately 1,145 acres of which approximately 1,122 acres, or 98 percent, would be reclaimed. The remaining 2 percent consists of some residual pit walls exposed in the partially backfilled pit area and haul roads that would be partially reclaimed to allow for continued access necessary for maintenance and monitoring activities. To reduce environmental impacts, the MRP emphasizes the backfilling of mine pits and covering with earth, and in some locations compacted clay, to minimize the release of contaminants to ensure that water quality meets the Idaho Ground Water Quality Rule and other established requirements. Portions of Maybe Creek and Stewart Creek may be realigned to ensure the creeks do not encounter selenium materials or backfill and transport contaminants offsite. Suitable soil or other growth media would be salvaged from disturbed areas for use in reclamation. Concurrent mine reclamation would include backfilling pits as mining progresses, grading slopes, capping overburden disposal areas and backfilled pits, reestablishing drainages, spreading growth media, stabilizing surfaces, promoting revegetation, and testing and treatment for any remaining contaminants. Facilities and equipment would be removed at closure. Environmental monitoring would be performed to ensure impacts do not exceed those authorized. Mining would occur for approximately 15 years, followed by approximately one year of final reclamation. A complete evaluation of the project consistency with the Caribou National ***Forest*** Revised ***Forest*** Plan may indicate the need for project-specific ***Forest*** Plan amendments. In addition to the No Action (not approving the MRP, lease modifications, or Special Use Authorizations) and the Proposed Action, possible alternatives may include: Changing the type or location of cap and cover materials or permanent drainage, modifying the mining area to avoid the Inventoried Roadless Area, eliminating the permanent overburden stockpiles, avoiding closure of the Stewart Canyon Road to recreation during mining, avoiding the lease modifications, avoiding the need for special use permits, or avoiding or modifying the realignment of Maybe and Stewart creeks. Other alternatives may be identified from scoping comments or through analysis.Summary of Expected Impacts The BLM expects mining and hauling operations to change groundwater and surface water quantity and quality within regulatory limits; ***remove*** and change the structure and composition of vegetation including species important to Native American tribes; disturb wetlands and riparian habitat; modify wildlife and fish habitat; temporarily reduce areas available for recreation (including hunting and camping) until reclamation is complete; change scenery; disturb soil; permanently ***remove*** mineral resources; create vehicle ***emissions*** and fugitive dust; extend economic activity such as employment and the continued operation of an elemental phosphorous plant; support businesses and generate tax revenue; and reduce livestock grazing.Anticipated Permits and Authorizations The BLM anticipates that the following permits and approvals will be required for the mine: BLM; MRP approval or modification of approved MRP; 43 CFR 3590.2(a), 3592.1(a) ***Forest*** Service; 36 CFR 228.5 BLM; Lease Modification/Fringe Lease; 43 CFR 3510 BLM; Right-of-way; 90 Statute 2776; 43 U.S Code (U.S.C ) 1761 BLM; Phosphate Use Permit; 43 CFR 3501.10, 43 CFR 3516 ***Forest*** Service; Special Use Authorizations; 36 CFR 251 Idaho Department of Environmental Quality; Point of Compliance under the Idaho Groundwater Quality Rule; IDAPA 58.01.11.401 Idaho Department of Environmental Quality; Certification of Water Quality (Clean Water Act, Section 401); IDAPA[[Page 83996]]39-101 et seq.; Idaho Code Parts 39-3601 et seq. Idaho Department of Water Resources; Water Rights; Idaho Code Parts 42-201 et seq.; IDAPA 37.03.08, Water Appropriation Rules and 37.03.11 Conjunctive Management of Surface and Ground Water. Idaho Department of Environmental Quality; Stormwater Pollution Prevention Plan, Idaho Pollutant Discharge Elimination System; (IDAPA 58.01.25) USACE; Section 404 Permit--required if surface disturbance and placement of fill is more than 0.5 acres of wetlands and 500 feet of stream channels; Clean Water Act (Title 33 U.S.C 1344, Section 404(a)). Idaho Department of Water Resources; Stream Channel Alteration Permit; IDAPA 42-3801 Idaho Department of Environmental Quality; Air Quality Permit to Construct; IDAPA 58.01.01 Idaho Department of ***Lands***; Reclamation Plan approval and modification of approved Reclamation Plan; IDAPA 20.03.02.010, 20.03.02.120, and 20.03.02.140 Caribou County; Conditional Use Permit for facilities within an approved ***land*** use; Caribou County Zoning Ordinance, Chapter 13Schedule for the Decision-Making Process The BLM anticipates a decision in February 2022; the ***Forest*** Service anticipates a decision on support facilities and the special use authorizations in February 2022; the U.S Army Corps of Engineers anticipates a 404 permit decision in February 2022. Idaho Department of Environmental Quality anticipates a Point of Compliance in December 2021 and Idaho Department of ***Land*** anticipates a reclamation plan approval in 2022.Public Scoping Process This notice of intent initiates the scoping process, which guides the development of the Environmental Impact Statement. Scoping meetings will be virtual. An announcement about when and how to access the virtual meetings online will be posted on the BLM's project website. The purpose of public scoping is to identify relevant issues that will influence the scope of the environmental analysis, including alternatives, and guide the process for developing the environmental impact statement. The BLM and ***Forest*** Service will use and coordinate the NEPA public scoping to help fulfill the public involvement requirements under the National Historic Preservation Act (54 U.S.C 306108) as provided in 36 CFR 800.2(d)(3). The information about historic and cultural resources within the area potentially affected by the proposed action will assist the BLM and ***Forest*** Service in identifying and evaluating impacts to such resources. The BLM and ***Forest*** Service will conduct government-to-government consultation with Indian tribes in accordance with Executive Order 13175 and other policies. Agencies will give due consideration to Tribal concerns, including impacts on Indian trust assets and treaty rights and potential impacts to cultural resources. The lead agencies invite Federal, State, and local agencies, along with Tribes and other stakeholders that may be interested in or affected by the proposed Husky 1 North Dry Ridge Mine to participate in scoping. Agencies with regulatory authority or special expertise, if eligible, may request or be requested by the BLM and ***Forest*** Service to participate in the development of the environmental analysis as a cooperating agency.Request for Identification of Potential Alternatives, Information, and Analyses Relevant to the Proposed Action BLM and ***Forest*** Service request assistance with identifying potential alternatives to the Proposed Action to be considered. As alternatives should resolve a problem with the Proposed Action, please indicate the purpose of the suggested alternative. The BLM and ***Forest*** Service also request that potential impacts that should be analyzed be identified. Impacts should be a result of the action; therefore, please identify the activity and the potential impact that should be analyzed. Information that reviewers have that would assist in the development of alternatives or analysis of resources issues is also helpful.Lead and Cooperating Agencies The BLM and ***Forest*** Service are joint lead agencies. U.S Army Corps of Engineers, Idaho Department of Environmental Quality and Idaho Governor's Office of Energy and Minerals are cooperating agencies.Decision Makers Idaho Falls District Manager Mary D'Aversa is the BLM responsible official. Caribou-Targhee ***Forest*** Supervisor Mel Bolling is the ***Forest*** Service responsible official.Nature of Decisions to Be Made The BLM will decide, regarding approval of the MRP and appropriate mitigation measures, the proposed Federal Phosphate Lease modifications, and other appropriate ***land*** use authorizations for activities that take place on leased ***lands***. The ***Forest*** Service will decide on (1) recommendations to the BLM concerning surface management and mitigation on leased ***lands*** within the Caribou National ***Forest***; (2) decisions on mine-related activities that occur off-lease on NFS ***lands*** (Special Use Authorization), and (3) whether to approve project-specific amendment(s) to the ***Forest*** Plan. The USACE will decide whether to issue permit(s) under Section 404 of the Clean Water Act for placement of fill or dredge material into waters of the U.S based on their determination of compliance with the EPA's 404(b)(1) Guidelines (40 CFR 230) including selection of the least environmentally damaging practicable alternative and the public interest review finding at 33 CFR 320.4(a).Public Disclosure Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment--including your personal identifying information--may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.John F. Ruhs,State Director, Bureau of ***Land*** Management, Idaho.Mel Bolling,***Forest*** Supervisor, Caribou-Targhee National ***Forest***.[FR Doc. 2020-28242 Filed 12-22-20; 8:45 am]BILLING CODE 4310-GG-P

**Load-Date:** December 23, 2020

**End of Document**



[***The Green Brief: The die is cast for ETS reform***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6336-FM31-DYXB-V000-00000-00&context=1516831)

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**Length:** 2688 words

**Byline:** Frédéric Simon, Kira Taylor, Nikolaus J. Kurmayer

**Highlight:** The EU's ***emissions*** trading scheme - which establishes the world's largest carbon market - is often described as the crown jewel of EU climate policy. Now it is up for revision and all eyes are on the European Commission's draft plan.

**Body**

The EU's ***emissions*** trading scheme - which establishes the world's largest carbon market - is often described as the crown jewel of European climate policy.

The scheme is now set for a revision in order to align it with the EU's more ambitious climate ***target*** for 2030 - a reduction in greenhouse gas ***emissions*** of "at least 55%" by the end of the decade.

The draft of the reform, which was recently leaked to the press, was therefore worth all the attention it got (read our article [*here*](https://www.euractiv.com/section/emissions-trading-scheme/news/leaked-the-eus-carbon-market-reform-proposal/)).

So what did it reveal?

First, the existing scheme, which currently covers the electricity sector and energy consuming industries as well as intra-EU flights, will be extended to cover maritime ***emissions***.

According to the draft, the same rules will apply to maritime as to other sectors in the ETS, including on auctioning, transfer and surrender of allowances as well as penalties for non-compliance.

More controversially, the leak also confirmed the creation of "a separate self-standing" ETS  that will apply as of 2025 to heating and transport fuels.

The extension to road transport and buildings will be contentious to say the least. Poland and senior lawmakers in the European Parliament have publicly criticised it, warning it is likely to hit the poor hardest and[*cause social unrest similar to the 2018 Yellow Vest movement in France*](https://www.euractiv.com/section/climate-environment/news/planned-eu-carbon-market-reform-is-politically-suicidal-warns-french-mep/).

But senior EU officials briefing the press earlier this week said the new system will be ***targeted*** at fuel suppliers, not households.

"They will have a new assessment to make: do I buy all those allowances which are getting more expensive every year or do I decarbonise my products so I have to buy less allowances," the official explained.

More fundamentally, the official argued, including transport and buildings in the ETS will also guarantee meeting an ***emissions*** reduction ***target***, something that a tax would not automatically do.

In addition, "at least 50%" of the revenue generated by the new transport and buildings ETS would have to be redistributed to low-income households via a new "climate action social facility," according to the draft.

How to allocate the revenues would be decided "with a distribution key between member states" and submitted to "conditionality" on how the money is spent - "a bit comparable to what we do at the moment with the recovery fund," the official said.

This is likely to be a sticking point. Currently, ETS auction revenues go back to the coffers of the EU countries organising the bidding process. If at least half of that money is now diverted to the EU budget and redistributed to poorer households, it could be seen as an unacceptable money grab.

Other crucial details of the reform are still lacking, such as the annual pace of ***emissions*** reduction that will be required from industry - the so-called Linear Reduction Factor. The final decision on that is likely to be subject to last-minute political haggling.

The same goes for the EU's upcoming carbon border adjustment mechanism (CBAM) proposal, which is still hanging in the air. [*A recent leak only raised more questions than it answered*](https://www.euractiv.com/section/energy-environment/news/eus-carbon-border-tariff-to-target-steel-cement-power/), particularly around exemptions for developing countries.

The leaked ETS reform is still unclear about when the EU's external carbon border tariff will replace free allowances distributed to industry. This will be crucial to determine whether the measure is compatible with World Trade Organisation rules or not.

The final European Commission proposal, expected on 14 July, will give more clarity on all these points. But it will only be the beginning of the journey as negotiations between the European Parliament and EU countries to adopt laws usually take around two years.

"Let me be very clear: this is going to be bloody hard to do," the EU's climate chief[*told the European Parliament*](https://twitter.com/TimmermansEU/status/1313829235887419392?s=20)when he presented the EU's updated climate ***targets*** for 2030.

The coming months will show us exactly how hard it will be.

*- Frédéric Simon*

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News from the capitals

**VIENNA. Austrian government, opposition agree on new renewable energies law.** The ÖVP-Green coalition, together with the Social Democrats in opposition, presented a bill that aims to have the country's electricity run entirely on renewable energy by 2030. Read [*more*](https://www.euractiv.com/section/politics/short_news/austrian-government-opposition-agree-on-new-renewable-energies-law).

**LJUBLJANA. Irregularities reported as voting starts in Slovenia referendum.** Proponents of a referendum on Slovenia's Waters Act have sharply criticised the organisation of early voting, alleging voter suppression had taken place. Read [*more*](https://www.euractiv.com/section/politics/short_news/irregularities-reported-as-voting-starts-in-slovenia-referendum).

**PRAGUE. CAP reform criticised by Czech small farmers and environmentalists.** The newly reformed Common ***Agricultural*** Policy (CAP) has come under fire from the Czech Republic's small farmers and environmentalists as the trialogue deal revealed there will not be a mandatory cap placed on direct payments. Read [*more*](https://www.euractiv.com/section/politics/short_news/new-cap-criticised-by-czech-small-farmers-and-environmentalists).

**BRATISLAVA. Slovakia sends record low volume of waste to landfill in 2020.** For the first time in Slovakia's history, less than half of the municipal waste went to landfills in 2020 while 44% was recycled, the country's statistics office has announced. Read [*more*](https://www.euractiv.com/section/politics/short_news/slovakia-sends-record-low-volume-of-waste-to-landfill-in-2020).

**NICOSIA. Cyprus' worst *forest* fire in decades kills four.** Cyprus said a deadly ***forest*** fire that was the worst to hit the island in decades was close to being brought under control Sunday (4 July) after water bombing by Greek and Israeli aircraft. [*More*](https://www.euractiv.com/section/climate-environment/news/cyprus-worst-forest-fire-in-decades-kills-four).

**LJUBLJANA. Commission endorses Slovenia's recovery plan.** The European Commission has endorsed Slovenia's (EURO)2.5 billion national recovery and resilience plan, allowing the country to draw (EURO)1.8 billion in grants and (EURO)705 million in loans under the Recovery and Resilience Facility (RRF), pending confirmation by member states. The plan earmarks 42.4% for green transition goals and 21.4% for digital goals. [*Read more.*](https://www.euractiv.com/section/politics/short_news/commission-endorses-slovenias-recovery-plan)

**PRAGUE | WARSAW. Czechs near Turów mine want Commission to join talks with Poland.** Czech citizens living near the Polish lignite mine in Turów sent a letter to European Commissioner Virginijus Sinkevicius, asking him to join the ongoing negotiations between Czechia and Poland.[*Read more.*](https://www.euractiv.com/section/politics/short_news/czechs-near-turow-mine-want-commission-to-join-talks-with-poland)

**VILNIUS. Lithuania adopts national climate change agenda.** The Lithuanian parliament on Wednesday adopted a National Climate Change Management Agenda with 120 votes in favour and 3 abstentions. The agenda sets short, medium and long-term goals relating to climate change mitigation as well as ***targets*** for individual sectors, which use fossil fuels, pollute the atmosphere with CO2 ***emissions*** and have the biggest impact on climate change. Main goals include an 85% reduction in greenhouse gas ***emissions*** by 2040 and a 100% reduction by 2050, compared to 1990. (Sniege Balciunaite, LRT.lt/en)

News in brief

**New study warns about green hydrogen bottleneck**. A new study by Aurora research warns about a potential shortage of green electricity to meet surging demand for hydrogen produced from renewables. It says Europe will be able to produce enough hydrogen to meet demand "only if all forms of renewable and decarbonised electricity are considered". Restricting the EU's hydrogen supply to only "additional new-build renewables" risks creating a bottleneck "and may also result in higher costs and a reliance on hydrogen imports," the study says.

The study was financed by a consortium of European energy consumers and producers comprising ArcelorMittal, EDF, Fortum and UPM. "Between green additional hydrogen and blue hydrogen, there is a third way that was not yet much explored: hydrogen produced by electrolysis with low carbon electricity. It is cost-effective, it saves ***emissions*** and it would limit the EU's reliance on imports. Why close the door to it when we really need industrial scale use cases and an enabling policy framework for hydrogen economy to prosper?," said UPM Biofore, one of the sponsors of the study. Full report [*here*](https://www.euractiv.com/wp-content/uploads/sites/2/2021/07/Aurora-MCS-Enabling-the-European-hydrogen-economy-20210322.pdf). (Frédéric Simon | EURACTIV.com)

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**West Balkans need ambitious climate *targets*, says NGO.** Significant ***emissions*** reductions are required to avoid worsening environmental, social and financial challenges in the West Balkans, [*according to a paper by Climate Action Network Europe.*](https://caneurope.org/content/uploads/2021/07/WB-GHG2030-policy-and-recommendations_final_July-22021-1.pdf) The NGO is calling on the region's leaders to set ambitious climate ***targets*** for 2030 and to reach net zero ***emissions*** by mid-century.

According to the NGO, the region cannot cut corners on reductions and will need to tackle its heavily polluting energy sector, particularly its outdated and inefficient coal power plants.

"It is of vital importance to seize this moment and set the path towards the necessary ambition in order to be able to reach climate neutrality by 2050 in the Western Balkans, respect the Paris Agreement pledges and most importantly ensure a clean and healthy future," said Viktor Berishaj, Southeast Europe climate and energy policy coordinator, at Climate Action Network Europe. Read [*the paper here*](https://caneurope.org/content/uploads/2021/07/WB-GHG2030-policy-and-recommendations_final_July-22021-1.pdf). (Kira Taylor | EURACTIV.com)

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**93% of Europeans think climate change is a serious problem.** Over nine out of ten Europeans consider climate change a serious problem, according to a [*Eurobarometer survey published this week*](https://ec.europa.eu/commission/presscorner/detail/en/ip_21_3156). The survey of 26,669 citizens from across all EU countries and different social and demographic groups found that almost a third considered climate change as the most serious problem facing the world and that 90% believed greenhouse gas ***emissions*** should reach net zero by mid-century.

The survey serves as a rallying call for politicians and businesses, said EU Green Deal chief, Frans Timmermans, adding: "Despite the pandemic and the economic hardship Europeans are facing, support for climate action remains high. Europeans recognise the long-term risks posed by the climate and biodiversity crises, and expect industry, governments and the European Union to take action." Read [*more*](https://ec.europa.eu/commission/presscorner/detail/en/ip_21_3156). (Kira Taylor | EURACTIV.com)

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**German scientific advisory body calls for thinking beyond climate neutrality.** Heading into COP26, Germany's global change advisory body has submitted a report to the German cabinet on Tuesday (6 July), calling for the government to include ecosystem restoration and protection as well as atmospheric carbon ***removals*** besides existing climate neutrality goals.

The report highlights the carbon sink utility of healthy ecosystems, calling for a secondary focus on sustainable use of marine and ***land*** ecosystems, like diversifying ***agriculture***. It also hints that the German government is thinking ahead on atmospheric carbon ***removal***, suggesting that other countries may fail to reach their carbon neutrality ***targets***. Therefore, Germany should consider options to permanently sequester CO2 from the atmosphere, eventually going carbon negative. (Nikolaus J. Kurmayer | EURACTIV.de)

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**EU set to spend (EURO)41.7 billion on gas projects.** Under the European Commission's current methodology for selecting priority energy infrastructure projects, 74 candidate gas projects -  worth (EURO)41.7 billion - could be eligible for EU funding despite evidence showing that [*Europe needs little more gas infrastructure*](https://www.euractiv.com/section/energy-environment/news/europe-risks-e87-billion-in-stranded-fossil-gas-assets-report-reveals/), according to [*research by NGOs*](https://caneurope.org/content/uploads/2021/06/unveiling-the-costs-of-future-fossil-gas-infrastructure_CANE_FWAE_June2021-1.pdf).

Projects selected for the list of EU projects of common interest can gain access to EU funding and fast-tracked permitting, but the Commission [*has faced criticism for its selection process*](https://www.euractiv.com/section/energy/news/campaigners-ring-alarm-over-eu-funding-for-gas-projects-through-the-back-door/). The report warns that the current list includes major fossil gas investments for Greece, Romania and Poland, totalling over (EURO)24 billion. Environmentalists fear that these investments risk jeopardising the EU's climate ***targets*** and wasting money on infrastructure that risk becoming stranded assets.

The regulation that governs which energy projects are selected is currently under negotiation, but [*attempts by some EU governments to keep fossil gas out*](https://www.euractiv.com/section/energy/news/infrastructure-dispute-reveals-deep-divisions-in-europe-over-gas/) were overruled by the majority of EU countries. Read the full report [*here*](https://caneurope.org/content/uploads/2021/06/unveiling-the-costs-of-future-fossil-gas-infrastructure_CANE_FWAE_June2021-1.pdf). (Kira Taylor | EURACTIV.com)

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**Solar power facing administrative barriers.** The deadline for EU countries to implement the latest (2018) version of the EU's renewable energy directive has passed on 1 July, just two weeks before the European Commission is due to announce another revision of the EU's renewables law.

But there are still bottlenecks and lengthy administrative processes which need to be overcome to reach the full potential of solar, according to the industry. Administrative issues are a problem across the board for renewable energy, with the wind and geothermal industry also saying more needs to be done to tackle administrative hurdles and reach Europe's climate goals.

"Implementation is the key word of successful climate politics. While the Fit for 55 Package must set the EU on track to reach climate neutrality by 2050 by setting higher ***targets*** for 2030, increased ambition will be required for Member States to fully implement the existing RED II provisions and for the European Commission to effectively monitor the process," said Walburga Hemetsberger, CEO of SolarPower Europe.

Opinions

* [*A majority of Europeans favour a tax on jet fuel*](https://www.euractiv.com/section/aviation/opinion/a-majority-of-europeans-favour-a-tax-on-jet-fuel/)- *by Ciarán Cuffe*

1. [*Why is the European Commission dismantling the continent's most successful EV charging model?*](https://www.euractiv.com/section/electric-cars/opinion/why-is-the-european-commission-dismantling-the-continents-most-successful-ev-charging-model/)- *by William Todts | Transport & Environment*
2. [*Why the renovation wave matters more than the EU knows*](https://www.euractiv.com/section/energy/opinion/why-the-renovation-wave-matters-more-than-the-eu-knows/)- *by Adeline Rochet and Pedro Guertler | E3G*
3. [*How to make a success of the EU carbon border adjustment*](https://www.euractiv.com/section/energy-environment/opinion/how-to-make-a-success-of-the-eu-carbon-border-adjustment/)- *by Anne Gläser and Oldag Caspar*
4. [*ETS extension: when in doubt, create a fund*](https://www.euractiv.com/section/emissions-trading-scheme/opinion/ets-extension-when-in-doubt-create-a-fund/)- *by Brook Riley*
5. [*'Making whole' Nord Steam-2's opponents*](https://www.euractiv.com/section/energy/opinion/making-whole-nord-steam-2s-opponents/)- *by Danila Bochkarev*

Upcoming events

**7 JULY. Media Partnership: charting pathways to enable net zero - what role for hydrogen?** With a keynote address from the EU Commissioner for Transport, Adina Valean and chair of the energy committee in the European Parliament, Cristian Busoi, join this debate to look at how hydrogen can help Europe reach its climate goals. Programme and registration [*here*](https://events.euractiv.com/event/info/charting-pathways-to-enable-net-zero-what-role-for-hydrogen). (Organised by Hydrogen4EU)

**22 JULY. #eaGreenEU Twitter chat | Forestry and climate change.** Join EURACTIV's energy and environment journalists for a live discussion on the role of forestry and climate change in the EU. Find more information, including how you can join in, [*here*](https://events.euractiv.com/event/info/eaenergyeu-twitter-chat-forestry-and-climate-change). (Supported by Life Terra)

On our radar

**12 JULY: Third round of negotiations on Aarhus regulation**. Negotiators from the European Parliament and EU Council will meet again with the European Commission to discuss the access to justice legislation, with a looming deadline of October 2021 for Europe to improve its implementation of the international agreement.

**14 JULY: Fit for 55 package**. The Commission is expected to table a huge package of green legislation in July, including a revision of the renewable energy directive, a revision of the ***emissions*** trading scheme and our first glimpse at a carbon border adjustment mechanism.

**Load-Date:** July 7, 2021

**End of Document**



[***Improved management of farmed peatlands could cut 500m tonnes of CO2.***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62HG-58X1-JDG9-Y4FT-00000-00&context=1516831)

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**Body**

London: Bangor University has issued the following news release:

Substantial cuts in global greenhouse gas ***emissions*** could be achieved by raising water levels in ***agricultural*** peatlands, according to a new study in the journal Nature.

(Media release from the Centre for Ecology and Hydrology)Peatlands occupy just three per cent of the world’s ***land*** surface area but store a similar amount of carbon to all terrestrial vegetation, as well as supporting unique biodiversity.In their natural state, they can mitigate climate change by continuously ***removing*** CO2 from the atmosphere and storing it securely under waterlogged conditions for thousands of years. But many peatland areas have been substantially modified by human activity, including drainage for ***agriculture*** and ***forest*** plantationsThis results in the release of the equivalent around 1.5 billion tonnes of carbon dioxide (CO2) into the atmosphere each year – which equates to three per cent of all global greenhouse gas (GHG) ***emissions*** caused by human activities.A team of scientists including from Bangor University’s School of Natural Sciences, led by the UK Centre for Ecology and Hydrology (UKCEH), estimated the potential reduction in ***emissions*** by restoring all global ***agricultural*** peatlands. However, because large populations rely on these areas for their livelihoods, it may not be realistic to expect all ***agricultural*** peatlands to be fully rewetted and returned to their natural condition in the near future.The team therefore also analysed the impact of halving current drainage depths in croplands and grasslands on peat – which cover over 250,000km2 globally – and showed that this could still bring significant benefits for climate change mitigation. The study estimates this could cut ***emissions*** by around 500 million tonnes of CO2 a year, which equates to 1 per cent of all global GHG ***emissions*** caused by human activities.A large proportion of the global greenhouse gases from peatlands are produced in Europe and Southeast Asia, with the total ***land*** area of many countries including the UK now a net source, not a sink, of GHGs due to ***emissions*** from degraded peat. The study’s authors say there is a growing recognition of the significance of peatlands for the global climate system, with efforts to curb ***emissions*** by conservation of undrained peatlands and rewetting of drained sites intensifying.Professor Chris Evans of UKCEH, who led the research, says: “Widespread peatland degradation will need to be addressed if UK and other countries are to achieve their goal of net zero greenhouse gas ***emissions*** by 2050, as part of their contribution to the Paris climate agreement ***targets***.“Concerns over the economic and social consequences of rewetting ***agricultural*** peatlands have prevented large-scale restoration, but our study shows the development of locally appropriate mitigation measures could still deliver substantial reductions in ***emissions***. ”Professor Evans and his fellow authors recognise the practical challenges, for example controlling water levels and storage, as well as cultivating crops suited to the waterlogged conditions of peatlands, known as ‘paludiculture’. Research into wetland-adapted crops is under way but does not yet provide commercially viable large-scale alternatives to conventional farming.However, the scientists point out there is plenty of scope to partially rewet ***agricultural*** peatlands without severely affecting production because many sites are over-drained – sometimes to over two metres – and often when no crop is present.In addition to increased ***emissions***, drainage of peatlands causes ***land*** subsidence and soil compaction, which affects soil health and exposes low-lying areas to increasing flood risk. It also deprives rare wetland-adapted plants, insects and mammals of important habitats.Professor Sue Page of the University of Leicester, a co-author of the study, says: “Our results present a challenge but also a great opportunity. Better water management in peatlands offers a potential ‘win-win’ – lower greenhouse gas ***emissions***, improved soil health, extended ***agricultural*** lifetimes and reduced flood risk. ”The scientists say potential reductions in greenhouse gases from halving the drainage depth in ***agricultural*** peatlands are likely to be greater than estimated, given they did not include changes in ***emissions*** of the GHG nitrous oxide (N2O) which, like levels of CO2, are also likely to be higher in deep-drained ***agricultural*** peatlands.The study in Nature involved authors from UKCEH, the Swedish University of ***Agricultural*** Sciences, the University of Leeds, The James Hutton Institute, Bangor University, Durham University, Queen Mary University of London, University of Birmingham, University of Leicester, Rothamsted Research and Frankfurt University.

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[***A global analysis of the social and environmental outcomes of community forests***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:671W-P2M1-JCWX-C2BV-00000-00&context=1516831)

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**Body**

Main

***Forests*** regulate climate, sequester and store carbon, harbour a large proportion of terrestrial biodiversity and contribute directly to livelihoods of millions of people who live in or close to ***forests***–. The role of ***forests*** in achieving sustainability ***targets*** has been re-emphasized by national and international sustainability agendas, including the Sustainable Development Goals, the Bonn Challenge and the Paris Climate Agreement.

Over the past 40 years, community ***forest*** management (CFM–where ***forest*** users have some role in determining how local ***forests*** are to be managed) has been promoted as a way to merge environmental conservation with economic development and natural resource rights agendas. The rationale underpinning this push rests on the premise that local groups, who have vested interests in maintaining ***forest*** resource flows, can make better use of place- and time-specific information than can more centralized forms of ***forest*** governance, which can lead to more sustainable practices and improved livelihoods. Currently, approximately 14% of ***forests*** worldwide, and approximately 28% of ***forests*** in low- and middle-income countries, are formally owned or managed by Indigenous peoples and local communities. Yet while case studies showing that CFM can promote positive outcomes for ***forests*** and people abound, many initiatives have led to substantial socioeconomic and environmental trade-offs–.

Gaining a deeper insight of such trade-offs is critical to advance understanding of the potential for ***forest*** governance systems to simultaneously address multiple sustainable development objectives. Recent analyses have sought to assess livelihood and ***forest*** outcomes of CFM interventions across a number of case studies or at a national scale–, but these studies provide only partial understandings of the joint outcomes expected of CFM, with few considering equity outcomes. In particular, none of these studies has evaluated changes in resource rights as an outcome of CFM, but rather have assumed that formalization of CFM will increase community rights as part of the intervention. Other studies point to incidents where formal rights were not implemented in practice, or where devolved formal rights were more restrictive than existing customary or de facto resource rights already in existence,,.

Our understanding of these potential trade-offs is currently limited because of a lack of comprehensive global studies that synthesize information on how CFM has contributed to the multiple environmental, livelihood and natural resources rights outcomes it was intended to achieve. We address this knowledge gap by conducting a comprehensive global analysis of environmental, livelihood and natural resource rights outcomes of CFM. We used data on 643 CFM cases in 51 countries, collated from 267 peer-reviewed studies (from an initial pool of 15,879) resulting from a systematic review,, to assess the frequency of joint positive outcomes and trade-offs and how different outcome combinations are influenced by various socioeconomic and biophysical factors.

Trade-offs in outcomes

We generated three separate outcome variables, combining reported information on changes in environmental indicators (***forest*** cover, ***forest*** condition and biodiversity), livelihood indicators (community and household income) and resource access rights indicators (commercial access and subsistence access) following CFM interventions (details in ). While resource rights are often a structural component of CFM interventions (for example, devolving harvest or ***land*** rights to communities), our goal was to assess whether rights to access resources had indeed increased or decreased for some or all resource users following the intervention.

We found that CFM led predominantly to mixed results for ***forests***, livelihoods and rights. Environmental condition improved after CFM in 56% of the 524 cases tracking environmental condition and decreased in 32% of cases. Incomes increased in 68% of the 316 cases reporting on livelihoods, 26% showed no change in incomes and only 6.3% of cases reported decreases in income. Finally, 34% of the 249 cases reporting on resource access rights indicated an increase in resource rights after CFM was implemented, 54% reported decreases in rights and 12% reported no change.

This substantial variation in outcomes is mirrored in our assessment of joint outcomes. Of the 186 cases that studied resource rights and ***forest*** environmental condition, 45% (n = 83) reported trade-offs between outcomes (where one outcome increased and the other decreased), with most trade-offs (82% of these 83 trade-off cases) characterized by increases in environmental conditions and decreases in resource rights (Fig. ). Reductions in resource rights occurred either for all resource users or for those local people who had been left out of the community of rights holders defined in CFM interventions.

Double and triple outcomes of social and environmental outcomes.

a, Environment and rights. b, Income and rights. c, Environment and income. d, Income, environment and rights. Studies examining resource rights and ***forest*** environmental condition outcomes reported joint positive outcomes in 45% of cases (dark purple), and studies examining income and access rights reported joint positive outcomes in 34% of cases. Studies examining income and ***forest*** environmental conditions reported joint positive outcomes in 46% of cases while studies examining all three outcomes reported positive outcomes across all three dimensions in 18% of cases.

Studies examining income and access rights outcomes (n = 169) found both joint increases (34% of these 169 studies) and trade-offs (31%), with increases in income associated with decreases in access rights (Fig. ). In many trade-off cases, ***forest***-based income mostly benefited village elites, while the poor and marginalized (particularly women, youth and minorities) suffered from ***forest*** use restrictions implemented as part of formalized management plans,. In other trade-off cases, individuals participating in newly outlawed activities (for example, hunting or logging) had their rights curtailed, while others not previously involved in these activities saw benefits from alternative income sources (for example, harvesting of non-timber ***forest*** products) or local infrastructure development (for example, school repairs). While these cases would have been coded as ‘increases in income’ in our analysis (the study reported that CFM had brought increases in income), we separately recorded whether a study specifically reported on inequities in benefit sharing: 50% of the 274 cases that reported on benefit sharing indicated that benefit sharing had become less equitable following CFM.

Of the 223 cases examining income and ***forest*** environmental condition outcomes, 46% found simultaneous increases in both outcomes (Fig. ). For example, cases in India and Ethiopia show that community management and livelihood diversification activities improved key indicators of ***forest*** environmental condition and income from both ***forest***-based and non-***forest***-based income streams,.

Finally, of 122 studies analysing three-way outcomes, only 18% reported positive outcomes across the three dimensions. These were located in India (n = 8), Nepal (n = 5), Cameroon (n = 4), Bolivia (n = 2), Burkina Faso (n = 1), Philippines (n = 1) and Saint Lucia (n = 1). However, when additional livelihood measures are taken into consideration, some of these cases also presented mixed CFM outcomes. For example, community forestry in Cameroon resulted in gains in community rights over local ***forests***, with an improvement in ***forest*** condition and generation of community income from the sale of timber, but had yet to show noticeable improvements in living conditions and overall well-being, indicating the need to consider additional livelihood metrics in future assessments. Additional cases reported increases in outcomes across two dimensions, and no change in the third, and thus were not categorized as having positive outcomes across all three dimensions. But a closer examination of some of those cases showed that ‘no change’ was in itself sometimes a desirable outcome. For example, three cases from Mexico reported increases in incomes and ***forest*** condition and no change in rights; but those communities already had substantial subsistence and commercial rights to the ***forest*** for decades before the particular intervention.

Note that while our focus is on trade-offs across outcome categories, we also observed trade-offs within categories in a number of cases. For example, we found six cases reporting the expansion of some rights over resources—formally recognizing the existence of local customary rights—while simultaneously restricting other rights, including curtailing commercialization of ***forest*** resources or hunting rights. Sixteen cases reported increases in community income (in the form of investments in community development infrastructure, for example, schools or wells) while individual or household incomes throughout the community decreased, usually from a loss of access to ***forest*** products. In terms of environmental outcomes, 17 cases reported increases in ***forest*** cover but decreases in ***forest*** biodiversity, or vice versa. While these and other conflicting outcome cases represent only 8% of our sample (and were excluded from the analyses of trade-offs among the principal outcome categories of environment, income and rights presented here; ), these conflicting outcomes illustrate the need for closer examination of more nuanced trade-offs within outcome domains.

Variables associated with double- and triple-positive outcomes

We used information from the 643 case studies on 50 contextual variables to identify factors associated with joint double- and triple-positive outcomes (Fig. ). The 50 variables (Supplementary Table ) were selected after a detailed literature review,. Variables encompass biophysical conditions, local and national-level institutions, market factors, user-group characteristics and CFM intervention characteristics. Our statistical analysis expands the method developed by Oldekop et al. and combines multiple imputation of missing data with variable selection and model averaging to account for the large amount of predictor variables in our statistical models (see for details and robustness checks using simulated data). We discuss the five predictor variables, grouped thematically, explaining most of the variation in our models for each combination of outcomes (defined as the partial weighted pseudo R2).

Mean partial weighted pseudo R2 values for the five most frequently selected variables predicting positive social and environmental outcomes of community forestry across multiple dimensions.

a, Environment and income (n = 223). b, Environment and rights (n = 186). c, Income and rights (n = 169). d, Triple outcomes (n = 122). Most of the variation explaining social and environmental outcomes in our models was explained by a mixture of ***forest*** biophysical characteristics and socioeconomic factors.

Biophysical conditions

***Forest*** type was linked to all double- and triple-positive outcomes (Fig. ), although the type of ***forest*** associated with particular joint outcomes was outcome dependent (Fig. ). Joint positive environment and income outcomes were more likely to occur in tropical/subtropical montane ***forests*** than in any other ***forest*** types (Fig. ), positive environment and resource rights outcomes were more likely to occur in tropical/subtropical humid and montane ***forests*** (Fig. ) and positive income and resource rights outcomes were more likely to occur in temperate montane ***forests*** (Fig. ). While our results show that positive outcomes across two or three dimensions were more likely to occur in mangrove ***forests*** than in other ***forest*** types, the number of mangrove ***forest*** cases in our study was small (9 of the 643 total cases), highlighting a need for further study of community management of mangroves. Elevation was also a key factor in determining joint environment and income outcomes and joint environment and resource rights outcomes. ***Forests*** at low and medium elevations were more strongly associated with positive outcomes than were those at high elevations, where incomes are perhaps lessened due to decreased ***forest*** productivity and difficulties in harvesting and transporting ***forest*** products to market.

Mean regression coefficients of the five most frequently selected variables explaining social and environmental outcomes of community forestry in our models.

a, Environment and income. b, Environment and rights. c, Income and rights. d, Triple outcomes. Error bars represent the standard error of the mean coefficient value. The reference levels are as follows: for ***forest*** type, ‘Temperate dry’; for ***forest*** policy, ‘Co-management’; for rule adherence, ‘Mostly follow’; for elevation, ‘High’; for de facto and de jure rights, ‘Access and withdrawal’; for population size, ‘High’; for migration, ‘In-migration’; for policy years ‘>10 yr’. Governance and HDI are continuous measures and thus do not have reference levels.

Local- and national-level institutions

De facto rights, defined as locally upheld rights regardless of their legal standing, were associated with positive outcomes for all but joint environment and income outcomes. Cases were more likely to report positive outcomes when these informal or customary rights over local management decisions existed before the intervention (Fig. , de facto management rights). Having de facto exclusion rights (the right to decide who has access to the resource) before the intervention was also important for double-positive outcomes across dimensions, and having de facto management rights before the intervention was important for triple-positive outcomes. Notably, cases were less likely to see double- or triple-positive outcomes if the community had only de facto access and withdrawal rights without collective choice rights to make the rules for management (see Schlager and Ostrom for a typology of resource rights). Lack of exclusion rights can make CFM management rights inoperable; assuming that management entails decisions and actions made with the expectation of future benefits, the lack of assurance that benefits will not be lost to others would discourage management investments. Having only de jure access and withdrawal rights before the intervention was associated with positive environment and rights outcomes and income and rights outcomes (Fig. ); this is probably because CFM interventions are often accompanied by an increase in formal rights, so those with a lower baseline of de jure (formal) rights were more likely to record improvements. The relative importance of de facto rights in comparison with de jure rights in our analysis reaffirms studies showing that perceived tenure, as well as customary tenure rights and other informal institutions and their enforcement, are more important conditions than formal property rights for ensuring sustainability–. The probability of positive joint income and environment outcomes was lower when community members did not adhere to local ***forest*** use rules (Fig. ).

The national-level governance score (an aggregate index of six governance indicators obtained for each country from the World Bank data catalogue) was negatively correlated with joint income and resource rights outcomes. Similarly, the Human Development Index (HDI) score (a composite index of income, education and health dimensions) was negatively correlated with joint environment and income outcomes and triple-win outcomes (Fig. ). This may have been due to changes relative to low baselines before the implementation of CFM projects; those starting with low HDI and governance scores may have more readily shown improvements in outcomes.

Intervention characteristics

Co-management approaches other than Joint ***Forest*** Management (JFM, specific programmes and institutional arrangements prevalent in India) and Participatory ***Forest*** Management (PFM, specific programmes prevalent in eastern Africa) were more likely to be associated with positive joint outcomes for environment and income. While JFM and PFM programmes can also be considered types of co-management approaches, we distinguish between the specific JFM and PFM country programmes that have narrower objectives and studies that used the term ‘co-management’ to broadly denote a more equitable sharing of power and responsibility between governments and local user groups. Co-management cases performed better than ‘other’ cases. This result perhaps indicates that where both government and local actors are actively engaged in CFM, and where co-management potentially leads to greater access to additional resources (for example, financial support or extension services), joint environment and income outcomes may result, echoing similar findings in protected area governance. In cases where a CFM policy change had been implemented in addition to the CFM intervention, the length of time since the enactment of the CFM policy seemed to positively influence the achievement of triple outcomes, indicating that improvements following policy changes take time but might be longer lasting. ***Targeted*** interventions in the absence of reported policy changes were more likely to achieve triple-positive outcomes, but we are unable to predict their sustainability. Whether the CFM intervention included commercial timber extraction (an expected income generator and theorized motivator for sustainable practices,) did not emerge as an important predictor of positive joint outcomes.

User-group characteristics

User-group characteristics exhibited lower explanatory power in our models than did other variables. Echoing other studies,, we found that smaller user groups were associated with better joint environment and rights outcomes (Fig. ). Communities with either no migration or marked out-migration were more often associated with positive income and rights outcomes, and triple-positive outcomes, than were communities with marked in-migration (Fig. ). Rural migration to urban areas and other countries is a frequently cited socioeconomic driver of natural reforestation on abandoned ***agricultural*** ***lands***–, and local incomes could increase through remittances,. With a dwindling population, remaining ***forest*** users may also be able to access larger shares of ***forest*** benefits and rights. Communities experiencing in-migration were less likely to report win–win outcomes, perhaps because in-migration can lead to further contestation of rights, increased pressure on ***forest*** resources or exacerbation of existing inequities–. Cases with no migration also fared slightly better relative to cases with out-migration. This may be due to out-migration’s effects on local institutions and traditional practices.

Discussion

We advance existing scholarship on CFM by analysing its multiple social and environmental outcomes, including changes in resource rights, across different contexts. While previous studies show community-based conservation has resulted in more synergies than trade-offs, our results suggest that CFM initiatives might need to be redesigned to ensure positive outcomes across multiple sustainability dimensions. Our global study substantially expands on the rich literature of individual case studies documenting problems with the devolution of resource rights, including difficulties with the decentralization process itself, the nature of the rights given to communities,, and the translation of legal rights into rights in practice and realized benefits–.

Rights are often compromised when examining outcome trade-offs

We show that ***forest*** access and resource rights are often negatively affected by new formal CFM arrangements, countering one of the principal goals of CFM. Community forestry is often promoted as a means to recognize de facto community rights, yet our results highlight the need to carefully examine who in local communities benefits from collective rights, who is left out of the creation of new community-based institutions and who is negatively affected by changes to individual rights,,. Examples from Nepal, Kenya, Cameroon and elsewhere show that the formalization of rights can actually constrain resource access and customary uses,. In some cases, administrative bottlenecks and burdensome regulations restricted the ability of local people to take advantage of newly devolved rights,, limiting potential for livelihood improvements. In other cases, communities were often charged with managing degraded ***forests*** with little commercial value, providing a possible explanation for positive environmental outcomes: starting conditions were so poor that there was room for quick improvement, and reforms tended to prioritize conservation or restoration. It is possible that these cases represent a trade-off where environmental condition has improved explicitly as a result of decreased access rights (keeping people out of the ***forest*** allowed for recovery and regeneration), but causal mechanisms behind such results are difficult to isolate through meta-analyses.

Trade-offs between rights and income—reflected in many cases by increases in incomes and decreases in rights—were particularly striking as we expected the two outcomes to be synergistic in improving livelihoods. It is possible that while a CFM intervention may have constrained a community’s de facto informal ***forest*** rights, having limited but formal rights over some ***forest*** products may still result in increased income—individual or communal—due to the ability to legally commercialize those ***forest*** products. It is also possible that income increases in these cases were experienced by some while others saw their access to the ***forest*** restricted, highlighting distributional asymmetries within communities. A trade-off can be seen in these cases: the formalization of local rights has benefited some in the community by improving their livelihoods, at the expense of others excluded from previously enjoyed access rights. Our results thus suggest that CFM initiatives should pay closer attention to rights in rights-based approaches, not only in devolving rights to communities, but how those rights (and thus benefits) are shared within communities.

Yet despite rights being compromised in more than half the cases reporting resource rights outcomes (134 of 249 cases), we see that, where rights were increased (85 cases), ***forest*** condition and income were generally either maintained or enhanced: of the cases that reported increases in rights, 75% saw improvements in or maintenance of ***forest*** condition, and all saw improvements or no change in incomes. This suggests that even if development and conservation agents are mostly concerned with improving ***forest*** condition, or increasing local incomes, a rights-based approach can be an important predictor of positive outcomes for those goals. This is consistent with studies showing that formal recognition of indigenous rights to traditional ***lands*** has been associated with reduced deforestation relative to other ownership and management arrangements (for example, refs. –). While our analysis is unable to disentangle true causal links, the strong association between positive rights outcomes and other outcomes (but not the converse) warrants further study using research designs that can specifically isolate the effect of resource rights.

What explains joint outcomes?

Our study provides important new insights into the role that biophysical factors and national contexts play in predicting multiple positive outcomes. We also support findings of seminal studies on the importance of community institutions, intervention types and user-group characteristics in predicting positive outcomes (for example, refs. ,). Notably, no market factors emerged as important in predicting joint outcomes, although market factors were some of the least reported variables in the CFM literature (Supplementary Fig. ), despite strong theories of change linking markets to ***land***-use change and ***forest*** community development. Here we highlight three factors that were particularly important in predicting multiple joint outcomes: biophysical conditions, national context and tenure rights. Biophysical factors have often been overlooked as predictors of variation in CFM outcomes or have been omitted in the scholarship on community-based natural resource management,,. We show that ***forest*** type and elevation were key predictors of double-positive and triple-positive outcomes. Similarly, the interactions between the national governance context and national development trajectories in which CFM interventions take place have been less examined at broad scale. While Brooks et al. did not find evidence that national context influenced community-based conservation success, we found that low national-level development and governance indicators were more likely to be associated with positive joint outcomes. Longitudinal analyses, better collection of baseline data and integration of existing datasets, and greater use of causal inference methods should be a key consideration for future research to examine the interactions among these drivers of decentralization and development and outcomes of CFM. Last, community institutional arrangements, particularly the types of tenure rights communities held before the CFM intervention, played an important role in CFM outcomes. Across the different outcomes, our study provides evidence that having de facto management rights before the intervention was positively associated with multiple joint outcomes, highlighting the importance of examining how CFM interventions interact with pre-existing resource rights in communities. Our results broadly suggest that CFM interventions have been more successful where strong community institutions already existed before the intervention. While having management rights entails a variety of institutional arrangements across cases, with varying degrees of decision-making autonomy, our results support studies linking local participation in decision making and management to positive social and environmental outcomes,,.

We acknowledge the limitations, assumptions and biases associated with meta-analyses and systematic reviews, including (1) biases linked to the use of secondary data that are subject to individual authors’ research interests and interpretations, include data from various study designs and may not account for concurrent national trends in development and rights; (2) the simplification of information presented in articles to be able to standardize data recording across studies; and (3) the large amounts of missing data and the need for data imputation. However, given the importance of this topic to both conservation and development agendas globally, being able to draw information from existing literature and synthesize lessons learned is critical, and we encourage further studies that make use of existing literature for evidence-based synthesis and action.

Our global study demonstrates the need to understand the conditions under which CFM can accomplish concurrent ‘wins’ across multiple dimensions. The loss of rights, even under well-intentioned policies, has already been documented in a number of case studies. This meta-analysis amplifies those findings for CFM, highlighting that often either rights are traded off for environmental improvements or distributional asymmetries within communities may result in income gains for some but rights losses for others. Policy makers and development agents may want to consider the best path to achieving positive outcomes for rights, environment and livelihoods by clarifying their theories of change: should rights be delivered first with the expectation of ensuing income and conservation gains; should interventions focus on conservation priorities and alternative livelihoods with the expectation that community empowerment through devolution of ***forest*** rights occur separately; or should all three objectives be included at the policy or project design stage? These decisions would also benefit from a better understanding of how CFM performs in relation to other policy instruments such as protected areas or industrial logging concessions. Specific contexts need to be considered in designing community forestry interventions, but our results indicate that decision makers should consider biophysical conditions, community institutional arrangements and user-group characteristics either as predictors of the ability of CFM to deliver on multiple objectives when prioritizing site selections for new CFM interventions, or as indicators of those communities that may require more assistance to overcome unfavourable starting conditions.

Methods

Our analysis uses data on 643 cases of community ***forests*** from 51 countries in Latin America, Africa and Asia-Pacific regions—where most community ***forests*** are located. These data stem from 267 peer-reviewed articles studying social and/or environmental outcomes of community ***forests***, which we selected by systematic review from an initial pool of 15,874 articles.

Case-study selection

Supplementary Fig. illustrates the various stages of selection that we used to narrow the pool of papers to fit our selection criteria (in addition, see ref. for a published protocol of this review—including criteria used for inclusion of articles—and ref. for a descriptive overview of the data). We defined ‘community forestry’ as ***forest*** use and governance arrangements under which the rights, responsibilities and authority for ***forest*** management rest, at least in part, with local communities. Due to their diverse cultural and institutional contexts, and the differing perspectives of the many development organizations that have supported their emergence, what we refer to today as CFM includes many different types of institutions in which ***forest*** users have been acknowledged to have some role in determining how local ***forests*** are to be managed. We included only peer-reviewed papers published in English. We also included only cases from Latin America, Africa and Asia-Pacific regions, where most community ***forests*** are located. To be included in our sample, papers had to describe at least one case of a community ***forest***, which we defined as a ***forest*** shared by at least three households, and had to report environmental or livelihood indicators of community ***forests*** as well as at least one of 50 key contextual variables. Cases may or may not have had some form of endogenous collective management of ***forests*** before a CFM intervention (32% of reporting cases did). Environmental indicators included measures of environmental change linked to ***forest*** cover, ***forest*** condition and biodiversity, while livelihood indicators included measures of access to ***forest*** resources for commercial or subsistence use and employment, household and community income. Collectively, these indicators represent key aims of community ***forest*** management interventions,. We excluded cases of afforestation (except enrichment planting) and exotic species plantations to ensure that environmental outcomes were comparable across natural ***forests***. The 50 contextual variables represented key potential sources of variation associated with community ***forest*** outcomes. We identified these through a preliminary review of 35 highly cited articles on community ***forests*** and ***forest***-cover change. Our goal was to be comprehensive in our use of theories (and related variables) from multiple bodies of literature, to avoid too narrow a focus on institutions (a historical focus of community forestry literature) that discounts additional contextual factors, such as biophysical factors, that may play a role in ***land***-use change. The 50 contextual variables included user-group socioeconomic and demographic characteristics, ***forest***- and ***agriculture***-related market factors, institutional factors related to ***forest*** management, biophysical factors and factors related to policy changes or specific interventions implemented to support CFM (Supplementary Table ). Papers could describe multiple community ***forests***, which we treated as separate individual cases. To be included, studies had to have some kind of ‘comparator’ in their research design, whether spatial (control–impact or comparative case studies) and/or temporal (before–after). We sought to broaden the case number beyond the ‘gold standard’ impact assessment designs (which represented 8% of our cases) to draw from different disciplinary backgrounds that would otherwise be overlooked but that nevertheless document relevant data, and to increase the geographical representation of the conclusions drawn.

The 267 papers that met our selection criteria provided data on an initial set of 697 cases of community ***forests***. Following ***removal*** of cases with contradictory outcome variables (see the following Outcome variables), this number was reduced to a final set of 643 cases from 51 countries that we used for our analyses.

Variable construction and coding

A team of seven researchers performed all data extraction and developed a simple categorical data extraction protocol to maximize standardization across studies. The team went through six data extraction rounds on a subset of randomly selected studies until an acceptable level of intra-team congruence (κ > 0.6) was reached. With the exception of variables linked to property rights, right bundles (both de jure and de facto rights), input costs and ***forest*** type, all variables where categorized into binary or three-level categorical variables (Supplementary Table ). In several instances (for example, slope elevation, and precipitation), studies reported data as numerical values. In such instances, data were recorded as numerical values and later transformed into categorical values by using tercile values to generate three-level categorical variables that could be combined with data recorded in categorical formats. ***Forest*** classification considered elevation (for example, montane ***forest***), latitude (temperate or tropical) and precipitation (dry or humid). We relied on authors’ descriptions and use of terms to classify variables. For example, for the variable ‘type of CFM policy’, we classified cases as JFM, PFM or co-management depending on the language used by the author(s). While JFM and PFM are types of co-management, we use ‘co-management’ to denote a more equitable sharing of power and responsibility between governments and local user groups. If the author(s) did not mention any of these terms, the case was categorized as ‘other’.

Outcome variables

We generated three separate outcome variables combining information on environmental indicators (***forest*** cover, ***forest*** condition and biodiversity), income indicators (community and household income) and resource access rights indicators (commercial access and subsistence access). In all instances, data on individual indicators were extracted as three-level ordinal variables (decrease, no change, increase) and subsequently combined into single environmental, income and resource rights outcome variables (Supplementary Fig. ). Conflicting cases in which indicators within outcomes variables showed opposing trends (for example, increases in ***forest*** condition and decreases in biodiversity) were excluded from the analysis (n = 54, Supplementary Fig. ) but discussed in the main paper to bring attention to the nuances of trade-offs within outcome categories. Instances in which variables combined no change with increases or decreases were classed as either increases or decreases, respectively. Our final dataset included 223 cases of joint environmental and income outcomes; 186 cases of joint environmental and access right outcomes; 169 cases of income and access rights outcomes; and 122 cases of triple environmental, income and access rights outcomes (with some articles reporting multiple joint outcomes). For our statistical analysis, we generated four separate datasets with no missing data on our outcomes of interest. Joint outcomes were coded as increases in two dimensions; increase in one dimension and no change in the other; no change in either dimension; decrease in one dimension and no change in the other; increase in one dimension and decrease in the other dimension (trade-off); and decreases in both dimensions (Supplementary Fig. ). We use the term outcome ‘trade-off’ broadly and in the same vein as used elsewhere in the community forestry literature (see refs. ,,,) where two potentially linked outcomes have an inverse relationship; we posit theoretical, deterministic relationships between some of these joint trade-off outcomes where relevant.

Statistical analysis

In contrast to meta-analyses of clinical experiments, where study designs among studies are often more comparable, the analysis of systematic review data poses inherent challenges due to difference in study designs and the structure of the extracted dataset. This includes (1) missing data (in our case 53–54% depending on which outcome variable is considered, Supplementary Fig. ) because not all studies collected data for all variables of interest, (2) a large number of variables (columns) relative to the number of cases (rows), and (3) a large number of categorical variables because information is mainly extracted as nominal or ordinal data.

One approach to deal with these issues would be to conduct multiple bi-variate analyses. However, conducting multiple tests sequentially can lead to type I and II statistical errors (false positives and false negatives, respectively), a serious concern for our analysis given the large number of associations. Another approach to deal with missing data is to ***remove*** cases with missing data. However, ***removing*** cases with missing data would ***remove*** considerable amounts of useful information. Conducting either bi-variate analyses or ***removing*** a large number of cases with missing data would also make our analyses susceptible to Simpson’s paradox, where associations between variables in different subsets of the data change once subsets are combined. Potential biases could arise either because bi-variate analyses would assess associations among variables with different patterns of missingness (different data subsets) or by affecting factor-level combinations among variables if substantial amounts of information are removed.

To address the three issues mentioned above, we expand the methods developed by Oldekop et al. and develop a custom analytical algorithm. Our algorithm combines multiple imputations (N = 100)—to generate data subsets with no missing values, with variable selection—to model our joint and triple outcome variables as a function of key subsets of our 50 contextual variables. The variables selected by our algorithm vary in missingness and include both variables with no missing data and variables with large amounts of missingness. The patterns of missingness in our data probably reflect the historical focus of interest of CFM studies. To ensure that our approach is not unduly influenced by this pattern, we conduct a set of robustness checks on a series of simulated datasets that specifically aim to emulate the patterns of missingness in our dataset (see below). Although our algorithm performs well with up to 90% missingness in the predictor with the strongest association to the outcome variable, we chose a conservative cut-off for variable inclusion of lower than 85% in our main analysis.

We generated all computer code and conducted all statistical analyses in R. Our algorithm first generates a randomly selected subsample of our dataset (with replacement), imputes missing data, then selects variables for model inclusion and subsequently runs a multiple ordinal regression for each subsample. In each iteration, we calculated the relative contribution of selected variables to model fit as partial pseudo R2 values, as well as individual regression coefficients. We subsequently averaged partial pseudo R2 values and regression coefficients for the five variables that were most frequently selected in the variable selection step and calculated standard errors for all regression coefficients. We weighted partial pseudo R2 using the proportion of times that individual variables were included in our regression models. We imputed data using the rfImpute and selected variables using randomForest functions of the randomForest package. These are the values presented in our main analysis. This approach combines the strengths of multiple imputation approaches (for example, Multiple Imputation by Chained Equations) and machine-learning algorithms, which perform particularly well for variable selection in instances where datasets contain numerous correlated and interacting predictor variables (see Supplementary Fig. for associations between variables in our dataset). We visually test the proportional odds assumption by adapting Harrell’s visual method. An inspection of the generated graphs (Supplementary Fig. ) shows that while a small number of outcome levels overlap for individual variables, for the most part the levels in the outcome are stratified and display similar distances between levels within predictor levels. We interpret this to signify that the proportional odds assumption is largely met in our analysis.

Robustness checks

Part of our analysis relies on data imputation. We therefore test the performance of our imputation and analysis algorithm using 16 simulated datasets. These datasets differ in the number of predictor variables (11 and 21 variables) and have varying degrees of missingness (no missing data, 10, 25 and 50% missingness), as well as varying degrees of missingness in the predictor variable (Predictor 1) with the strongest statistical association to the dependent variable (50% overall missingness and 25% missingness in Predictor 1; 50% overall missingness and 50% missingness in Predictor 1; 50% overall missingness and 90% missingness in Predictor 1). The missing data maps are shown in Supplementary Figs. and . These datasets contain 500 rows of data and, like our systematic review datasets, contain three-level categorical variables with varying statistical associations to a three-level ordinal response variable (Supplementary Tables and ). Because cases from individual studies in our systematic review data have missing data for the same variables, our simulated datasets also include a 10-level blocking variable, which we use to simulate cases and group data rows. To generate 10, 25 and 50% missingness levels, we first calculate the number of data cells to be removed relative to all data cells within our simulated datasets and then randomly select variables and levels within our blocking variable for ***removal*** (Supplementary Fig. ).

We then use our algorithm to calculate key statistics relevant to our main analysis (averaged regression coefficients and inclusion weights—the proportion of times that individual variables are selected and included in the ordinal logistic regression models). Results from our robustness checks suggest that our algorithm and analysis are moderately to strongly robust. As expected, we find that bootstrapped regression coefficients from a run with no missing data are almost identical to those generated by a simple ordinal logistic regression (Supplementary Tables and ). Critically, we find that averaged coefficients for the top five selected variables for runs with 10, 25 and 50% missing data tend to follow the same direction (correspondence in the direction of coefficient κ = 0.88–1; Supplementary Tables and and Supplementary Fig. ) and have similar relative magnitudes. This same pattern is reflected in analyses run using datasets with 50% overall missingness and varying levels of missingness (up to 90%) in the predictor showing the strongest statistical association with the outcome variable (correspondence in the direction of coefficient κ = 0.64–1; Supplementary Tables and and Supplementary Fig. ).

We also find that variable inclusion weights between runs with no missing data and missing data are highly correlated (r = 0.74–0.97; Supplementary Fig. and Supplementary Fig. ), suggesting a high degree of overlap in the selection of variables that are included in our models.

Reporting Summary

Further information on research design is available in the linked to this article.

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**Notes**

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[***Economic and social constraints on reforestation for climate mitigation in Southeast Asia***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:671W-P2B1-JCWX-C2HM-00000-00&context=1516831)

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**Body**

Main

Despite international efforts, there remain major gaps between existing pledges by signatories of the Paris Climate Agreement to curb greenhouse gas ***emissions*** and the magnitude of ***emissions*** reduction necessary to limit global warming to 1.5 °C (ref. –). At the same time, huge strides are being made in the research and development of carbon capture technologies, renewable energy sources and nature-based climate solutions to help bridge this gap–.

Notably, reforestation—planting trees on deforested or degraded ***land*** that was once ***forested***—is often proposed as a cost-effective nature-based climate solution, especially in the tropics, where biophysical and climatic conditions allow for high primary productivity and carbon sequestration rates in regenerating ***forests***,–. Yet practical reforestation necessitates broadening the focus beyond the biophysical to include financial, ***land*** use and operational constraints that can limit the potential application of reforestation as a climate solution,. For instance, so-called ‘degraded ***land***’ (often identified through satellite-based remote sensing) may in fact contain low densities of smallholder ***agricultural*** operations whose ***removal*** can compromise the livelihoods, food security and ***land*** rights of local communities and ***land*** users–. Additionally, the long-term security of carbon stocks within reforested ***land*** may require constant site maintenance and protection as well as some degree of ecological resilience against anthropogenic and natural threats including illegal logging, tree diebacks and ***forest*** fires,.

To explore the impacts that these constraints may have on reforestation and its efficacy as a climate solution, we model the climate mitigation potential of reforestation across terrestrial, freshwater and mangrove ***forests*** in Southeast Asia from the present until 2030. This region has experienced widespread deforestation due to ***agricultural*** activities such as oil palm plantation expansion,. Crucially, we consider biophysical, financial, ***land***-use and operational constraints to reforestation in our analysis, using representative proxies for each type (for example, smallholder spatial distribution as a proxy for ***land***-use constraint).

First, we mapped the biophysical suitability of ***land*** areas across Southeast Asia for reforestation based on spatially explicit data on above-ground biomass, potential for natural vegetation and ***land*** use/***land*** cover that would preclude reforestation (for example industrial ***agriculture***, urban areas or bare limestone; see Methods),,. We then calculated the climate mitigation potential of these ***land*** areas based on avoided ***emissions*** from ***forest*** degradation and the rates of above-ground carbon sequestration (see Methods). We find that 121 million ha of ***land*** in Southeast Asia are biophysically suitable, the reforestation of which would contribute to climate mitigation at a rate of 3.43 ± 1.29 PgCO2e yr−1 through 2030. (Fig. ; Supplementary Tables and ).

Climate mitigation potential of reforestation in Southeast Asia under biophysical, financial, ***land***-use and operational constraints.

In addition to the biophysical constraints (top left, green), three financial constraints were considered (top right, shades of orange): a low cost estimate (only direct cost), a moderate cost estimate (direct cost as well as the opportunity cost of forgone ***agricultural*** rent weighted by ***agricultural*** development likelihood) and a high cost estimate (direct cost and opportunity cost). Two ***land***-use constraints were considered (bottom left, shades of blue): more permissive (only high-yielding smallholder ***agricultural*** ***land*** excluded) and less permissive (all smallholder ***agricultural*** ***land*** excluded). Four operational constraints that contribute to the long-term viability of reforested areas were also considered (bottom right, shades of pink): DR (deforestation risk), PA (protection status), AM (accessibility for monitoring and management) and SS (proximity to seed sources). The box in the centre shows the mean climate mitigation potential for each scenario (mean ± s.d.).

Second, we applied a financial constraint to reforestation by excluding ***land*** areas where reforestation would cost more than US$100 MgCO2e−1. While reforestation cost is highly dependent on site- and habitat-specific conditions (see Supplementary Table ), we used this overall threshold because it is a commonly considered cost effectiveness threshold for nature-based carbon projects,. We considered three ways of estimating the cost of reforestation: a ‘low cost estimate’, which included only direct costs such as site selection, planting and maintenance; a ‘high cost estimate’, which included the direct costs as well as opportunity costs from forgone ***agricultural*** rent; and a ‘moderate cost estimate’, which also included the direct costs and opportunity costs from forgone ***agricultural*** rent but weighted the latter by the likelihood of ***agricultural*** development (see Methods),,. We find that when these financial constraints are considered in addition to the biophysical constraints, the ***land*** area available for reforestation decreases by 50–87% to ~16–62 million ha, and its climate mitigation potential is reduced to 1.88 ± 1.37 PgCO2e yr−1 for the low estimate, 1.26 ± 1.24 PgCO2e yr−1 for the moderate estimate and 0.60 ± 0.76 PgCO2e yr−1 for the high estimate (Fig. ; Supplementary Table ),.

Third, we accounted for the potential occupancy of reforestable ***land*** by low-density communities engaged in smallholder and/or subsistence ***agriculture***, which may preclude reforestation efforts under certain conditions. Our consideration of these community activities reflects the need for landowners and policymakers to reconcile the competing priorities of food security, livelihoods and climate mitigation,. We do so by imposing additional ***land***-use constraints to reforestation, that is, treating reforestation as an ***agriculture***-displacing activity under two levels of permissiveness: a ‘more permissive’ scenario that excludes only high-yielding smallholder ***agricultural*** ***land*** and a ‘less permissive’ scenario that excludes all smallholder ***agricultural*** ***land*** (see Methods)–. These ***land***-use constraints reduce available ***land*** for reforestation by 17 and 36%, respectively, to 99.4 million ha and 76.4 million ha and decrease the climate mitigation potential of reforestation to 2.8 ± 1.06 PgCO2e yr−1 and 2.19 ± 0.83 PgCO2e yr−1, respectively (Fig. , Supplementary Table ).

Finally, we further considered four alternative operational constraints that may affect the long-term viability of reforested ***land***, including deforestation risk, ***forest*** protection status, site accessibility for monitoring and management and proximity to seed sources,. We found that restricting reforestation to ***land*** areas of low deforestation risk (that is, transition probability <0.5; see Methods) reduces the climate mitigation potential of reforestation to 1.81 ± 0.7 PgCO2e yr−1 (Fig. ). If reforestation is restricted to legally protected areas (International Union for Conservation of Nature (IUCN) categories I–VI), the climate mitigation potential decreases to 0.35 ± 0.14 PgCO2e yr−1 (Fig. ). Separately, if we consider the need for reforestation sites to be relatively accessible to labour input for long-term post-planting site upkeep and maintenance (see Methods),,,, the climate mitigation potential of reforestation is reduced to 0.2 ± 0.07 PgCO2e yr−1 (Fig. ). Finally, if we constrain reforestation sites to areas in relatively close proximity to potential propagule sources such as existing ***forest*** edges (see Methods),, the climate mitigation potential of reforestation becomes limited to 0.88 ± 0.34 PgCO2e yr−1 (Fig. ).

A realistic assessment of the climate mitigation potential of reforestation requires a nuanced consideration of social, economic and operational constraints beyond just the biophysical suitability of the ***land***,,. Our findings suggest that each additional constraint can substantially reduce that mitigation potential. Furthermore, previous studies suggest that the most successful reforestation projects often consider multiple constraints simultaneously,. Our analysis shows that when a combination of financial, ***land***-use and operational constraints are taken into account, only a fraction of the climate mitigation potential of reforestation may be achievable (0.3–18%), (see Supplementary Figs. and ),,.

A wide range of other environmental, social, cultural and political factors not considered in this study could also influence decision-making during different phases of the reforestation process. These include differing rates of soil carbon sequestration across habitat types, as well as planting, post-planting monitoring and the harvesting of propagules, all of which could ultimately affect the climate mitigation potential of reforestation as a nature-based climate solution,,,. Our intent is not to produce precise estimates of the climate mitigation potential of reforestation (other recent studies have done so,,) but rather to illustrate through scenario analysis how this potential can quickly diminish when practical constraints are considered in the Southeast Asian context.

The barriers to reforestation identified here are not insurmountable. With strong government commitment, smart policies and financial support from private industries, a reduction in opportunity costs can be achieved. Even a moderate reduction in opportunity costs would almost double the climate mitigation potential of reforestation efforts (Fig. , Supplementary Figs. and ). Similarly, by involving smallholder farms in reforestation activities such as agroforestry or increased tree planting, a higher climate mitigation potential can be achieved while balancing tradeoffs with food security and local livelihoods,,. Specifically, we find that reforestation in smallholder areas where ***agriculture*** is likely less productive and mainly for subsistence would result in a notable increase of climate mitigation potential (Fig. , Supplementary Figs. and ). Overcoming such barriers enables reforestation to offset up to 39% of the region’s annual CO2 ***emissions***, helping nations to better meet their Nationally Determined Contribution ***targets***. Understanding how these constraints operate also helps inform the prioritization of cost-effective reforestation and investment opportunities,,.

Reforestation is a hugely important nature-based solution, not only for climate mitigation, but also for the multiple co-benefits it provides, including biodiversity conservation, clean air and water and poverty alleviation,,,. Indeed, reforestation is embedded in key international initiatives, including the Sustainable Development Goals, the Bonn Challenge and the Aichi ***Targets***,. Nevertheless, our analysis suggests that a more complete and nuanced consideration of both the potential and the limits of reforestation as a climate solution is needed to inform climate policies and make decisions that are scientifically sound, economically feasible and socially acceptable.

Methods

Overview of methods

In this study, we estimated the climate mitigation potential of reforestation across Southeast Asia to the reference year of 2030. We selected 2030 as the reference year for several key reasons. First, 2030 represents the end-point for the Sustainable Development Goals and the mid-term goals for climate-specific policies. Second, most Southeast Asian countries set their climate mitigation ***targets*** as specified in the existing Nationally Determined Contributions (NDCs) to end in 2030. Third, the benchmark for cost-effective nature-based climate solutions (US$100 MgCO2e−1) was similarly set to 2030 in previous studies,.

In total, we sequentially applied four key constraints to illustrate the effect of biophysical, financial, ***land***-use and operational considerations on the climate mitigation potential of reforestation in the region. This was done for three main ***forest*** types in Southeast Asia (peat-swamp,, mangrove and terrestrial ***forests***). Terrestrial ***forests*** represent a combination of montane and lowland systems that are not covered by peat swamp and mangrove ***forests***. All calculations were based on data spanning 2013–2019 and at a resolution of 0.01° (~1 km). To ensure data standardization, we resampled finer-scaled data using bilinear interpolation where necessary (for example, the ESA-CCI and mangrove layers).

Biophysical constraints

To estimate the effects of biophysical constraints on the climate mitigation potential of reforestation in Southeast Asia, four main steps were taken.

First, we identified degraded areas for all three main ***forest*** types. For terrestrial ***forests***, we assumed areas with low above-ground carbon to be degraded, by applying a maximum threshold of 35 MgC ha−1 (following refs. ,), obtained from a pantropical above-ground carbon layer. For peat-swamp and mangrove ***forests***, however, we utilized existing datasets with predefined delineations of degraded ***forests***. Specifically, degraded peat-swamp ***forests*** in refs. , were defined based on satellite data indicating clear signs of clearings, while degraded mangroves in ref. were based on changes in Landsat pixels that overlap with existing mangrove extents.

Second, we applied a biophysical constraint that limited our focus to degraded areas that should possess ***forest*** in the absence of human influence. To achieve this, we used a potential natural vegetation (PNV) map to identify areas where ‘***forests***’ or ‘woodlands’ overlap with the previously identified degraded areas. This step allowed us to differentiate between areas that are naturally low in biomass due to biophysical settings and areas that are low in biomass due to human influence, as well as to confirm potential ***forests*** within mangrove and peat-swamp areas.

Third, we excluded areas with current ***land*** cover that would preclude reforestation,, such as areas classified as bare ground (for example, bare limestone), industrial ***agriculture***, water and urban,. This allowed us to follow an existing protocol, and also to address some of the major criticisms against more general investigations of reforestation potential,.

Fourth and last, we estimated the climate mitigation potential of each raster cell, specifying it to the biophysical limits of the ***forest*** type within,,,. Within terrestrial ***forests***, we further classified remaining degraded ***forest*** areas into ***forest*** subtypes (see Supplementary Table for classification) according to the PNV map matched to IPCC classifications,. At this point, we also noted that despite being classified as degraded ***forest***, a portion of this ***land*** area may contain areas of smallholder ***agriculture***. To account for this, an additional classification of ‘smallholder ***agriculture***’ was created for areas with ***agricultural*** ***land*** areas less than 2 ha (classified as very small to small by ref. ). For areas identified as degraded ***forests*** that do not possess smallholder ***agriculture***, we calculated the climate mitigation potential as the sum of carbon dioxide likely to be sequestered due to avoided business-as-usual flux and above-ground biomass growth. The former included soil carbon dioxide and methane ***emissions*** as well as continued degradation annualized to 2030 (see Supplementary Table for details and key references). For areas of smallholder ***agriculture***, we assumed a replacement of smallholder ***agriculture*** by ***forests*** and defined the above-ground carbon gain in these areas as the difference between crop-***lands*** and natural ***forests***,.

Together, these four steps produced a layer reflecting carbon mitigation potential limited only by biophysical constraints (Supplementary Figs. –). Steps 1–5 in Supplementary Table summarize this sequence of analyses and provide the sources of data used along with the errors and accuracies native to each dataset.

Financial constraints

To calculate the effect of financial constraints on the climate mitigation potential of reforestation, we began by estimating the cost of reforestation in Southeast Asia. We considered two main components for this.

First, we calculated the direct cost of reforestation (including planning, planting and maintenance) across Southeast Asia, specified by ***forest*** type (see Supplementary Table ),, and adjusted it to each country based on either relative hourly wages or gross domestic product per capita (for countries without reported hourly wages). These estimates, while likely coarse due to the limited spatial scale of the estimation values (based on studies in Indonesia), represent the most regionally relevant and available data that are also reflective of biophysical constraints.

Second, we calculated the opportunity cost based on revenue lost from ***agricultural*** production, as timber production is limited in critically degraded ***forests***. ***Agricultural*** revenue loss was measured based on spatially explicit individual crop rents of the 17 most economically important crops. These were specified to each of the Southeast Asian nations’ ***agricultural*** production in 2017 by only considering crops that were produced in >1% of the country’s ***land*** area. Spatially explicit individual crop rents were formed based on three key cost input types (labour cost, capital cost and transport cost) and rent R was calculated for each crop i in each cell j as follows:where p is the crop price (US$ t−1), y is the crop potential yield (t ha−1), w is the labour wage (US$ d−1) and l is the person-days needed to produce each crop (d ha−1) (see Supplementary Table ). Here, we used tractor cost for ***agricultural*** production as a proxy of capital cost, where r is the tractor price at the time of purchase (US$ tractor−1) (see Supplementary Table ), u is the proportion of the tractor life span accounted for by 1 yr of use, k is the number of tractors in use in ***agricultural*** production (tractor ha−1) and ‘trans’ is the transport cost to transport the crop from the farm to the nearest market (US$ ha−1) (see Supplementary Table ). We assumed a tractor has a life span of 10 yr and annualized the tractor cost based on this. Cost maps were calculated at a 0.25° resolution (due to computational limitations) but resampled to a 0.01° resolution (using bilinear interpolation) to standardize the maps to the rest of the analyses. In each individual, country-specific crop rent map, we selected the maximum crop rent for each cell, reflecting the most profitable crop production per area. Combining these produced a spatially explicit ***agricultural*** rent map for the region, indicating the maximum ***agricultural*** revenue lost due to reforestation. We defined the cost of reforestation as the sum of direct cost and lost ***agricultural*** revenue. All costs were adjusted to 2018 US dollars.

Next, to evaluate the effects of varying cost considerations, we calculated a low cost estimate based on purely direct cost, a moderate cost estimate that includes both direct cost and opportunity cost from forgone ***agricultural*** rent weighted by crop development potential index and a high cost estimate that includes direct cost and full (unweighted) opportunity cost. For each of these three financial constraint scenarios, we then limit reforestation to cost-effective areas, utilizing a maximum threshold of US$100 MgCO2e−1. This value was benchmarked to other nature-based climate solutions determined in earlier studies through literature review,,. Although US$100 MgCO2e−1 is high compared to current carbon prices, it nevertheless represents the upper limit of cost-effective reforestation. In sum, we first calculated the cost of reforestation per tonne of carbon dioxide equivalent mitigated, using the biophysically constrained raster layer (Supplementary Fig. ), and then omitted all areas >US$100 MgCO2e−1 (Supplementary Fig. ) to produce layers limited by each of the three financial constraints (Supplementary Fig. ).

***Land***-use constraints

To account for the existing use of degraded ***land*** by local communities, we applied an additional ***land***-use constraint. Specifically, we considered areas that possessed smallholdings,. As described above and in Step 5 of Supplementary Table , an area with smallholdings was defined as any raster cell that possessed ***agricultural*** ***land*** areas ≤2 ha (these field sizes are categorized as very small and small by ref. ). Exclusion of these areas produced a layer constrained by ***land*** use (Supplementary Fig. ). Here, we calculated two levels of ***land***-use constraints: a more permissive one that only excluded reforestation on smallholder ***agricultural*** ***land*** with high estimated yields and a less permissive one that excluded reforestation on all smallholder ***agricultural*** ***land***.

Operational constraints

Considering the practical considerations that influence the long-term viability of reforested sites, we applied an additional series of four operational constraints. The following considerations, while not being prerequisites for reforestation, do affect the likelihood and viability of reforested sites.

Deforestation risk

We constrained reforestation to areas with acceptable likelihoods of transition to deforested areas. We utilized a spatially explicit map that predicted tree cover loss to 2029, excluding areas with ≥0.5 probability of deforestation (medium to high potential). This formed a map that indicated the climate mitigation potential of reforestation in areas that have acceptable deforestation risk (Supplementary Fig. ).

Protection status

We also constrained reforestation to legally protected areas. Considering all areas with IUCN categories I–VI, we developed an estimate of climate mitigation potential in areas with some form of ***forest*** protection status (Supplementary Fig. ).

Accessibility for monitoring and management

To account for the need for continued monitoring and management associated with post-planting site upkeep, we considered reforestation in sites with greater accessibility to labour,,. Specifically, we limited reforestation to areas within a day’s travelling time to the nearest cities and produced an estimate of climate mitigation potential in these areas (Supplementary Fig. ).

Proximity to seed sources

Accounting for the importance of natural regeneration, a process that requires the presence of propagules, we utilized a 2-km buffer from the nearest existing ***forest*** edge as a proxy for propagule sources,,,. In doing so, we constrained reforestation potential to areas in relatively close proximity to seed sources (Supplementary Fig. ).

Independent and contingent considerations

To assess the impacts of various reforestation strategies and management decisions, we analysed the above constraints under four main scenarios (Supplementary Figs. and ).

Independent constraints scenario: We treated financial, ***land***-use and operational constraints as independent from each other and applied these constraints separately to the biophysical constraints.

Full contingent constraints scenario: We assessed a scenario whereby the most restrictive set of constraints are applied to the biophysical limits of reforestation. With each constraint being contingent on the others, this results in the most conservative climate mitigation potential estimate, corresponding to areas most likely to be reforested. Specifically, we applied the high cost estimate for financial constraints, which includes direct reforestation costs and opportunity cost from forgone ***agricultural*** rent. We also applied the less permissive ***land***-use constraint, excluding all smallholder ***agricultural*** ***land*** from reforestation. Finally, all operational constraints were applied as described above, limiting reforestation to areas that possessed low deforestation risk, were legally protected and were near both cities and seed sources.

Moderate contingent constraints scenario 1: We assessed a contingent constraints scenario where the financial constraint was relaxed. In particular, we considered a scenario where opportunity cost could be reduced via means such as shifts in government policies or private funding that offset and change existing development plans. To this end, we applied the moderate cost estimate for financial constraints, which includes direct reforestation costs and opportunity cost from forgone ***agricultural*** rent weighted by the likelihood for ***agricultural*** development potential, based on an index that adjusts crop production by its feasibility and market demand.

Moderate contingent constraints scenario 2: We evaluated a contingent constraints scenario where the ***land***-use constraint was more permissive. Here, we only excluded reforestation in smallholder ***agricultural*** ***land*** with a higher potential for crop production (>0.5 ***agricultural*** development potential index). This reduces the potential impacts of reforestation on local livelihoods and food security, but also allows smallholders to play a part in reforestation through tree plantings and agroforestry–,.

Accounting for uncertainty

To incorporate uncertainty across our estimations of climate mitigation potential, we utilized the range of values associated with the above-ground carbon gain and business-as-usual flux reported in our literature review (see Supplementary Table for details). The range of values, which were either reported by a single study (for example, refs. ,) or collated across a number of studies (for example, refs. –) were used to calculate the minimum and maximum climate mitigation potentials across each ***forest*** type. The mean, minimum and maximum climate mitigation potentials of each of the constrained reforestation estimates were calculated, producing a total of 111 maps. We then utilized the minima and maxima to estimate the standard deviations (reported in the main text) based on an assumed uniform distribution.

Tabulated and graphical representation of the analyses can be found in Supplementary Table and Supplementary Fig. , respectively. All analyses were performed in R version 3.6.0, utilizing the ‘raster’ package for processing and calculations of raster layers. Map visualizations were formed in QGIS.

Reporting Summary

Further information on research design is available in the linked to this article.

Online content

Any methods, additional references, Nature Research reporting summaries, source data, extended data, supplementary information, acknowledgements, peer review information; details of author contributions and competing interests; and statements of data and code availability are available at [*https://doi.org/10.1038/s41558-020-0856-3*](https://doi.org/10.1038/s41558-020-0856-3).

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**Notes**

Supplementary informationSupplementary information is available for this paper at [*https://doi.org/10.1038/s41558-020-0856-3.Reviewer*](https://doi.org/10.1038/s41558-020-0856-3.Reviewer) recognitionNature Climate Change thanks Robin Chazdon and the other, anonymous, reviewer(s) for their contribution to the peer review of this work.Publisher’s note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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[***How we can use carbon to our advantage in the fight against climate change***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62Y5-R461-F0YC-N4CV-00000-00&context=1516831)

Impact News Service

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**Length:** 1884 words

**Body**

Cologny: World Economic Forum has issued the following press release:

Expert Sebastian Cox believes that viewing climate change from the perspective of trees may help us understand it better. For example, we would benefit from looking at CO2 as a resource we can work with, rather than something that is completely negative. This article explores how we could regeneratively intervene in the carbon cycle to fight climate change. Cox believes that designers have a large influence in this matter, as they 'shape how our built and material culture operates'.

For trees, anthropogenic climate change is a mixed blessing. If they were capable of rational thought, they would surely be enjoying the extra CO2 in the atmosphere, which increases their mass.

Wood is carbohydrate synthesised from CO2; plants thrive in carbon-rich atmospheres unlike mammals, which perform better with greater concentrations of oxygen in every lungful.Have you read?

This bacteria can eat 'electricity' and lock away CO2 These tiny plants and giant animals are helping to store vast amounts of CO2 in our oceans These 2 companies can pull CO2 straight from the air

Some trees may be finding temperate climates heating up beyond their preferred conditions, which would of course be very bad news for them. But running with the idea of tree sentience, our ent-like friends would be wise enough to have appreciated that man's discovery of coal saved millions of acres of temperate ***forest*** since our prime energy source switched from ***land***-hungry wood to buried fossil energy.

'What if we could take a tree's perspective and see the extra CO2 as a resource we can work with?'

Of course, tropical ***forests*** and wildlands suffer today from the developed world’s insatiable appetite. It’s a mixed and messy picture, as all human endeavours seem to be, but viewing it from the point of view of trees might help us understand it better.

Global heating is a threat to life on earth, but pinning all blame on atmospheric carbon dioxide is a narrow view of our problems. We do need to cease burning fuel that should be left in the ground and we should redress the imbalance we have made with carbon in our skies and seas, but carbon itself isn’t the devil. Rather, it is a substance that our hunger for progress put in the wrong place.

We need to switch to renewable energy that isn’t ***land***-hungry, too. Technology has the answers to our energy needs but the solutions for reducing our carbon imbalance are to be found in studying and working with nature’s cycles and systems.

A good way to do this is to try to view our problems from the perspective of organisms or ecosystems: what if we could take a tree's perspective and see the extra CO2 as a resource we can work with?

'Carbon from photosynthesis, not from fossils, should as much as possible constitute the fabric of the things we use and buy.'

Carbon is, after all, essential for life. We are made of it, and it’s worth remembering that without the miracle of the greenhouse effect, our planet would be around minus 18 degrees Celsius. We’ve knocked a natural cycle out of balance, but all parts of that cycle are still important to the miracle that is life on earth.

I believe that carbon can be an ally in a regenerative future if we view it in two ways. Firstly, carbon from photosynthesis, not from fossils, should as much as possible constitute the fabric of the things we use and buy. If we restructure our built and material environment using photosynthesised carbohydrates like wood while re-growing the plants we use, we can regeneratively intervene in the carbon cycle.

There is an important definition between deforestation and forestry: as long as the ***land*** remains woodland or ***forest***, harvesting the trees is not the same as deforestation. But converting the cleared ***land*** to ***agriculture*** is.

Of course, this switch in material culture would have been coupled with a move away from ***emissions***-intense materials like concrete and steel to achieve decarbonisation. The mass-timber buildings being built today show this is possible.

In natural environments, carbon is released when wood rots or burns in ***forest*** fires. This recycles the carbon, making it available for other vegetation to absorb.

'Our buildings are perfect silos for carbon in the form of mass timber.'

By the happy accident of wanting to inhabit dry, warm spaces, humans have created interior environments where dried plant matter, like wood from trees or linen from flax, can be preserved indoors without rotting, thereby retaining its carbon for hundreds of years.

Meanwhile, our buildings, which we’re going to need many more of in this century, are perfect silos for carbon in the form of mass timber. As long as the ***forests*** or crops regrow, carbon is absorbed with each new cycle while the previous crop’s carbon is stored in the object.

This should form a sound base for a regenerative existence, but it won’t solve the problem alone. The vast volume of buildings we’d have to build to balance the CO2 books through sequestration makes the role of architecture and manufacture just one small but very important part of the solution.

It’s important to understand that 95 per cent of the earth’s surface carbon is dissolved in the ocean. As we’ve emitted carbon that was in the ground, the ocean has soaked it up in equilibrium with the sky. As we go beyond net-zero and start to ***remove*** carbon from the atmosphere, the ocean will continue to balance, releasing that excess carbon back to the sky.

'Excess carbon’s impact goes beyond just the heating of our earth.'

Because of this, even with the greatest carbon-negative intentions, it would take several hundred years to return atmospheric carbon to pre-industrial levels. We must still endeavour to rebalance the carbon cycle since a natural cycle that goes off-kilter causes damage elsewhere.

Excess carbon’s impact goes beyond just the heating of our earth. It also acidifies our oceans. So using carbon as a resource at every opportunity is the brief we designers must set ourselves.

This centuries-long journey to correcting the carbon cycle feels like a bleak picture but there is hope here, yet again in the form of plants. This brings me to my second view of carbon as an ally: it is the foundation of a hydrology system that cools the planet.

It is in fact water vapour, not carbon dioxide, that is the most abundant greenhouse gas that exerts the greatest pull on global temperatures. The water cycle provides 95 per cent of the effect on the heat dynamics of our planet, whereas carbon dioxide’s impact is four per cent. To solve the existential threat of global heating, we should be also looking to the water cycle to cool our earth.

So how could we possibly control atmospheric water movement? It can be done via a process called transpiration, which is the movement of water through vegetation. When water travels through a plant, it uses energy from the sun, creating a cooling effect as it transpires, in exactly the same way that our sweat cools us.

It takes about 590 calories of energy to transpire a gram of water. When we’re talking litres of water, that’s a lot of calories. You will have noticed how woodland is a cool retreat on a hot day. The more water we can hold on ***land***, the more vegetation can colonise and transpire, and the cooler our planet becomes.

You may also have noticed how moist a healthy woodland soil can feel, even when periods of drought have parched adjacent fields. For every one gram of extra carbon in soils, eight grams of extra water can be held there too because of the complex hygroscopic structure of soil carbon.

'The double win of locking both carbon and water into soil and plants should be at the forefront of every designer’s mind.'

The more carbon we put in our soils through growing plants in healthy soil, the more water they can hold, leading to more transpiration and eventually more rain. Interestingly, it’s the presence of trees that causes rain in rainforests, not the other way round. The reverse scenario can be true too: ***remove*** the ***forest***, and you ***remove*** the rain, beginning a journey to becoming desert.

To create more climate-cooling transpiration we should, of course, increase vegetation cover at every opportunity and do so with methods that don’t degrade soils. The double win of locking both carbon and water into soil and plants should be at the forefront of every designer’s mind.

And we should develop a nuanced understanding of these core issues. Monoculture maize sown into ploughed earth and reared with chemicals is not going to help hold water or carbon on ***land***. Native woodland, rewilded ***land*** and permanent grassland will.

Walter Jehne, a soil microbiologist and climate scientist who is a leading voice in regenerative ***agriculture***, claims that we’d need to return four per cent of the earth’s degraded ***land*** to healthy ***forest*** to restore temperatures quickly and safely through the water cycle. Given that we’ve degraded 50 per cent of the earth’s ***land*** surface, this seems possible.What’s the World Economic Forum doing about climate change?

Climate change poses an urgent threat demanding decisive action. Communities around the world are already experiencing increased climate impacts, from droughts to floods to rising seas. The World Economic Forum's Global Risks Report continues to rank these environmental threats at the top of the list.

To limit global temperature rise to well below 2°C and as close as possible to 1.5°C above pre-industrial levels, it is essential that businesses, policy-makers, and civil society advance comprehensive near- and long-term climate actions in line with the goals of the Paris Agreement on climate change.Global warming can be beaten thanks to this simple plan

The World Economic Forum's Climate Initiative supports the scaling and acceleration of global climate action through public and private-sector collaboration. The Initiative works across several workstreams to develop and implement inclusive and ambitious solutions.

This includes the Alliance of CEO Climate Leaders, a global network of business leaders from various industries developing cost-effective solutions to transitioning to a low-carbon, climate-resilient economy. CEOs use their position and influence with policy-makers and corporate partners to accelerate the transition and realize the economic benefits of delivering a safer climate.

Contact us to get involved.Mission Possible Platform: Delivering industry pathways t...

If we understand that the hydrological system gives us our largest potential agency over the temperature of our planet, then the way we use our ***land*** is our most important consideration for tackling our climate emergency. We need to absorb carbon and cease the unnatural release of it, but we also need to vegetate and regenerate to cycle water and cool.

As designers, we have even more agency than the wider population as we influence and shape how our built and material culture operates. We should better understand the habitats our materials come from and shape our material world around solutions to our existential problems.

The design community should be leading the material world into an intense period of re-greening and cooling our planet, and it should start by finding ways to make the excess carbon we have in our skies a resource to be used to regenerate our earth.

**Load-Date:** June 18, 2021

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[***Federal Register: National Environmental Policy Act Implementing Procedures for the Bureau of Land Management (516 DM 11) Pages 79517 - 79529 [FR DOC #2020-27159]***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61GV-7HF1-F0YC-N1TB-00000-00&context=1516831)

Impact News Service

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**Body**

Washington: Office of the Federal Register has issued the following notice:DEPARTMENT OF THE INTERIOROffice of the Secretary[LLWO210000.L1610000]National Environmental Policy Act Implementing Procedures for the Bureau of ***Land*** Management (516 DM 11)AGENCY: Office of the Secretary, Interior.ACTION: Notice.-----------------------------------------------------------------------SUMMARY: Through this notice, the Department of the Interior (Department) announces a new categorical exclusion (CX) under the National Environmental Policy Act (NEPA) implementing procedures for the Bureau of ***Land*** Management (BLM) at Chapter 11 of Part 516 of the Departmental Manual relating to the harvest of dead or dying trees impacted by biotic or abiotic disturbances commonly referred to as ``salvage harvest.''DATES: The categorical exclusion takes effect on December 10, 2020.ADDRESSES: The new CX can be found at the web address [*http://www.doi.gov/elips*](http://www.doi.gov/elips)/ at Series 31, Part 516, Chapter 11. The BLM has revised the Verification Report on the results of a Bureau of ***Land*** Management analysis of NEPA records and field verification for salvage harvest of timber (Verification Report) in response to comments received; the public can review the revised Verification Report online at: [*https://go.usa.gov/xvPfT.FOR*](https://go.usa.gov/xvPfT.FOR) FURTHER INFORMATION CONTACT: Heather Bernier, Division Chief, Decision Support, Planning, and NEPA, at 303-239-3635, or [*hbernier@blm.gov*](mailto:hbernier@blm.gov) Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service (FRS) at 1-800-877-8339. The FRS is available 24 hours a day, 7 days a week, to leave a message or question with the above individual. You will receive a reply during normal business hours.SUPPLEMENTARY INFORMATION:Background NEPA requires Federal agencies to consider the potential environmental impacts of their proposed actions before deciding whether and how to proceed. The Council on Environmental Quality (CEQ) encourages Federal agencies to use CXs to protect the environment more efficiently by reducing the resources spent analyzing proposals that normally do not have significant environmental impacts, thereby allowing those resources to be focused on proposals that may have significant environmental impacts. See 40 CFR 1501.4, 1507.3(e)(2)(ii), and 1508.1(d). The appropriate use of CXs allow NEPA compliance, in the absence of extraordinary circumstances that merit further consideration, to be concluded without preparing either an environmental assessment (EA) or an environmental impact statement (EIS) (See 40 CFR 1501.4 and 40 CFR 1508.1(d)). The Department's NEPA procedures were published in the Federal Register on October 15, 2008 (73 FR 61292) and are codified at 43 CFR part 46. These procedures address policy as well as procedure in order to assure compliance with NEPA. Additional Department-wide NEPA policy may be found in the part 516 of the Departmental Manual (516 DM), in chapters 1 through 4. The procedures for the Department's bureaus are published as chapters 7 through 15 of 516 DM. Chapter 11 of 516 DM (516 DM 11) covers the BLM's NEPA procedures. The BLM's NEPA procedures were last updated as announced in the Federal Register on May 1, 2020 (85 FR 25472). The current 516 DM 11 can be found at: [*https://elips.doi.gov/ELIPS/DocView.aspx?id=1721*](https://elips.doi.gov/ELIPS/DocView.aspx?id=1721). The establishment of this new CX would allow the BLM to fulfill NEPA compliance requirements to authorize the harvest of dead or dying trees impacted by biotic or abiotic disturbances commonly referred to as ``salvage harvest.'' Salvage harvest can help to recover economic value from timber, contribute to rural economies,[[Page 79518]]accelerate reestablishment of native resilient ***forest*** tree species, reduce future wildfire fuel loads, and reduce hazards to wildland firefighters, the public, and infrastructure from dead and dying trees.Description of the Change The BLM already relies upon an existing CX (C.8) that addresses salvage harvest not to exceed 250 acres and proposed this additional CX to increase BLM's flexibility to respond to disturbances across larger areas, while keeping the tailored focus of the action. This new CX proposed to address salvage of dead and dying trees not to exceed 1,000 acres for disturbances of 3,000 acres or less. For disturbances greater than 3,000 acres, the CX proposed that harvesting would not exceed \1/3\ of a disturbance area but not exceed 5,000 acres total harvest. In addition, the proposed CX would have authorized no more than 1 mile of permanent road construction to facilitate the covered actions, and other activities generally associated with salvage harvest such as temporary road construction, post-harvest seeding and replanting, and prescribed burning. Moreover, the proposal included a list of project design features such as snag retention and other resource protection measures common to salvage harvest. The BLM's proposed CX and associated Verification Report were available for public review and comment for 30 days, beginning with the publication of a Federal Register notice on Tuesday, June 2, 2020, and ending on Tuesday, July 2, 2020 (85 FR 33697). In response to the comments received, the BLM has revised the text of the CX as follows: Replaced ``harvesting'' with ``salvaging'' at the beginning of the CX. Revised the upper limit of the harvest size from 5,000 acres to 3,000 acres. Revised language at part (b)(i) regarding the wording around permanent road construction limitations to be more consistent with the wording for road limitations in existing BLM CXs for timber harvest. Added ``erosion control, potential sedimentation to streams'' to the list of considerations required for temporary road design in part (b)(iii). Revised language at part (v) to clarify the requirements for project design features to be included consistent with ***land*** use plans (LUPs). Removed ``and retention level of live trees'' from the list of resource uses requiring project design features under part (v). Added ``limitations on road uses'' to the list of resource uses requiring project design features under part (v). The BLM has also revised the Verification Report in response to the comments received to address clarifications, incorporate new literature, and to support discussions to the changes of the CX text. The BLM also has reviewed and revised, as appropriate, the Verification Report for consistency with the updated CEQ regulations at 40 CFR 1500-1508 (2020). 85 FR 43304 (July 16, 2020).Comments on the Proposed CX The BLM received a total of 318 comment submissions. The BLM received comments primarily through the online comment platform, ePlanning, and by mail. Commenters invested considerable time and effort to submit comments on this proposal. Comments were submitted by State and local governments, environmental organizations, members of the timber industry, and private citizens. The BLM received comments both in support of the proposal and against the proposal, with both supportive and non-supportive comments also requesting revisions to the proposal. The BLM has summarized and provided responses to all substantive comments received in this Federal Register notice for public review. The comments fell across six broad categories related to the scope of the CX, the purpose of the CX, incorporation of site-specific considerations of the CX, clarifications on the BLM's use of the CX, adequacy of the analysis and review done to develop the proposed CX, and questioning of the establishment procedures the BLM used to establish the CX. The BLM has considered all comments received and has provided responses to the substantive comments identified, below.Scope of the CX Comment: The BLM received comments requesting that BLM consider expanding the restriction on permanent road construction in the proposed CX from one mile to two miles to ensure a rocked road system capable of supporting log truck traffic during wet season. Commenters stated that proper road location using modern engineering standards would not pose significant impacts to the natural resources of concern and would assist in the timely harvest and utilization of fire-damaged timber. Response: The BLM acknowledges that restricting permanent road construction to no more than one mile to facilitate the covered actions may limit certain sales that require rock road base for wet weather hauling. Road base is typically too costly to use on temporary roads and may result in either delay of harvest due to the need to wait for dry soil conditions or exclusion of some of the harvest area because there is no viable way to harvest without using rock road base. The CX includes no more than one mile of permanent road to facilitate the covered actions. This amount is consistent with, but more conservative than, the scale at which this has occurred with thinning and regeneration harvest projects, for which the BLM has regularly reached findings of no significant impact (FONSIs). The BLM chose a more conservative rate of road length to facilitate the covered actions because the BLM as a general practice strives to optimize the permanent road network through careful planning and in support of LUP implementation. The BLM will maintain the permanent road limit at one mile to facilitate the covered actions for the reasons discussed in the report. Comment: The BLM received comments suggesting that the BLM should not conclude that construction of up to 1 mile of permanent roads to facilitate the covered actions and an unlimited number of temporary roads will have no impacts based on only one environmental analysis that allowed for the construction of 1,000 feet of a permanent road. Commenters stated that the EAs analyzed by the BLM are for green timber sales, not salvage projects, and therefore are not comparable. Commenters claimed that road construction associated with salvage harvest would result in significant impacts. Response: The BLM does not claim that there are no impacts associated with road construction. The Verification Report describes the instances where projects containing road construction resulted in a FONSI and therefore did not require analysis in an EIS. Commenters did not provide, and the BLM has not found, any evidence that the effects of construction and use of a road are different when the road supports haul of salvaged versus green timber. The construction standards for haul roads are the same for salvage and non-salvage timber transportation. Commenters did not provide, and the BLM has not found, any evidence that the effects of salvage harvest in conjunction with road construction inherently result in significant effects. The BLM incorporates project design features related to the road design and erosion prevention to minimize road-related sediments and connection to[[Page 79519]]stream networks as directed by the applicable LUP and appropriate for the site-specific conditions within a project area regardless of the type of wood the road is expected to transport or the level of NEPA review conducted. Comment: The BLM received comments stating that the BLM failed to explain how it arrived at the conclusion that 5,000 acres is an appropriate size from the data in the 18 EAs. Specifically, commenters stated that the EAs reviewed cover projects ranging from 14 to 8,700 acres, with an average of 1,321 acres and that only one project covered an area greater than 5,000 acres. Response: The BLM acknowledges that only one sample EA was greater than 5,000 acres and has decided to reduce the upper limit to 3,000 acres from the proposed 5,000 acres. In response to these comments, the BLM revises the CX to read: ``. . . not to exceed 1,000 acres for disturbances of 3,000 acres or less. For disturbances greater than 3,000 acres, harvesting shall not exceed \1/3\ of a disturbance area but not to exceed 3,000 acres total harvest.'' This means that a 3,000-acre salvage harvest would correspond with at least a 9,000-acre disturbance area with 6,000 acres left untreated to contribute to landscape heterogeneity and post-disturbance habitat. As documented in the Verification Report, the BLM has numerous EAs that have analyzed the effects of implementing salvage harvest at or near 3,000 acres and has reached FONSIs on the effects of these harvests. The BLM has revised the report in Methods section C to further document the support of a 3,000-acre harvest upper limit based on these analyses. Comment: The BLM received comments stating that even though BLM has placed some sideboards on the proposed acreage, noting that it can only be applied to disturbances exceeding 3,000 acres, this limitation does very little: Fires, droughts, and even infestation regularly cover areas far greater than 3,000 acres. Response: The commenter mischaracterizes or misunderstands the acreage limitation included in the report. The acreage limitation would take effect for disturbances affecting 1,000 acres or greater. For disturbance of 1,000 to 3,000 acres, the BLM would be limited to a maximum treatment area of 1,000 acres. For example, a disturbance affecting 2,000 acres of BLM ***land*** would be limited to 1,000 acres of salvage or about 50 percent of the disturbance area. The \1/3\ area limitation would be in effect for disturbances of more than 3,000 acres. Comment: The BLM received comments claiming that the CX violates the Federal ***Land*** Policy and Management Act (43 U.S.C 1701 et seq.) (FLPMA) and BLM's travel management policies because the construction of new roads requires BLM to undergo a travel management planning process under FLPMA. Response: The scope of the CX does not violate FLPMA or BLM travel management procedures. The BLM complies with FLPMA and the associated travel management regulations and policies by designating all BLM managed ***lands*** as open, limited, or closed to off-road vehicles during ***land*** use planning (43 CFR 8342.1). These designations, as well as other LUP decisions pertaining to roads, provide the extent and limitations to which permanent roads can be established as well as any locally specific design criteria. Any permanent road established through this CX must, by policy, conform to those parameters. Neither BLM regulation nor policy requires that the BLM complete implementation-level travel management planning prior to authorizing the construction of a new permanent road.CX Purpose Comment: The BLM received comments noting that the Verification Report cites public and infrastructure safety as reasons why the BLM harvests dead and dying trees from areas impacted by disturbance. However, commenters noted that the BLM's proposed CX contains no limitations on the location or purposes of salvage harvest projects. Response: Public and infrastructure safety are two of several reasons for which the BLM conducts salvage activities. The BLM utilizes salvage to meet multiple ***forest*** and fuels management objectives, economic objectives, as well as to ensure human health and safety. Regardless of the level of NEPA review conducted, the BLM would only be able to implement salvage harvest as allowed for in the applicable LUP. The BLM makes decisions to authorize or preclude salvage harvest as an action or for any purposes on BLM ***lands*** through the identification of objectives and management direction in LUPs. The BLM would utilize this CX to implement actions consistent with those LUP decisions. The BLM did not find a need to limit this CX's use to only those locations that reduce public safety risks in order to determine that the scope of actions proposed for coverage by this CX would not result in significant effects.Site-Specific Considerations Comment: The BLM received comments stating that categorically excluding salvage harvest projects from NEPA review will reduce public participation and will preclude the development of site-specific mitigation measures that may only be developed during the public review and comment process. Commenters also stated that the BLM inclusion of an extensive list of project design features in the text of the CX itself further demonstrates the inappropriateness of its proposal. Response: In reviewing the EAs in the Verification Report, the BLM found that the EAs commonly copied or cited project design feature parameters from the LUP for the specific resource program as incorporated in the proposed action evaluated in the EA. Proposed actions, regardless of their level of NEPA compliance (CX, EA, EIS) must be in conformance with the approved LUP. In implementing actions in conformance with LUPs, the BLM identifies project design features to define the parameters of the project, including any protective measures needed to ensure LUP conformance or to reduce adverse effects based on the site-specific circumstances. If the proposed action is the subject of an EA or an EIS, the EA or EIS evaluates the project including those parameters. If the proposed action designed to meet the requirements of the LUP, including any incorporated resource protective measures, also meets the parameters of the CX, and no extraordinary circumstances are present, the BLM can rely on a CX. Because LUPs are, themselves, region-specific, different LUPs have different objectives, and impose different resource management constraints on actions that can be taken in the area they cover. Therefore, instead of presenting an exhaustive list of project design features that function as parameters for reliance on a CX, only some of which would be applicable in any particular planning area, the proposed CX identified a list of 10 categories of project design features that are required to be included in the CX's parameters to address decisions made in the LUPs. That is, while the proposed CX points to the category of project design feature to include as parameters, the applicable LUPs that would be consulted during project implementation provide regionally appropriate and site-specific design features for resource protection at the individual project site. In this way, the proposed CX ensures site-specific considerations for each project area, by[[Page 79520]]directing BLM staff where to look for the relevant parameters. For the establishment of CXs, the CEQ NEPA regulations require consultation with CEQ and publication of the proposed CX for comment, as the BLM has done here. CEQ does not require any public review of reliance on a CX for a proposed action once the CX is established. See 40 CFR 1507.3(e)(2). Although public involvement is not required to determine a project qualifies for reliance on a CX, the BLM NEPA Handbook does identify that the BLM can elect to involve the public when relying on a CX to support an action. The BLM also notes that many public ***land*** management programs administered by the BLM, such as ***land*** tenure adjustment and public ***land*** grazing management, among others, have their own, independent public involvement requirements. Comment: The BLM received comments suggesting that the BLM's reliance on LUPs in the Verification Report to justify its conclusion that the proposed CX represents a category of actions that will have no impacts is arbitrary and capricious, because relying on LUPs when implementing salvage projects under the proposed CX would not address site-specific impacts nor sufficiently protect resources. Response: The BLM makes decisions to authorize or preclude salvage harvest, like other actions, based on the identification of objectives and management direction in LUPs. In implementing actions in conformance with LUPs, the BLM identifies project design features to define the parameters of the project, including any protective measures needed to ensure LUP conformance or to reduce adverse effects based on the site-specific circumstances. The BLM defines and refines the action proposed regardless of the level of NEPA review, including for projects covered by CXs. The BLM develops LUPs for specific regions of the country in coordination with a public engagement process. These LUPs vary based on the environmental conditions and objectives for the region. Therefore, while the proposed CX points to the category of project design features to include, the LUPs that would be consulted during project implementation provide regionally appropriate and site-specific design features for resource protection for individual projects proposed. The Verification Report identifies that the BLM has evaluated previously implemented actions that incorporated project design features according to management direction in the relevant LUP and found that those projects do not cause significant environmental effects. This compiled evidence in the Verification Report negates the claim that the CX would be arbitrary or capricious if projects were to rely on using the LUPs for implementation. Additionally, comments incorrectly conflate a requirement in the CX for inclusion of project design features pertaining to LUP decisions to mean that the applicable LUP must specifically identify a decision related to each of the resources and resource uses listed in part (v) of the proposed CX. Specifically, part (v) of the CX does not require that the LUP include a decision specific to erosion control measures to take when conducting salvage harvest, for example. The LUP may not include such action-specific instruction but may have instead included decisions regarding erosion control measures to apply to ***forest*** management more broadly, or even erosion control measures to apply for any ground-disturbing activities within specific distances from water or otherwise have decisions which would have reasonable inference to apply to the action proposed. Further, LUPs may not include any specific erosion control measures, but instead provide decisions that instruct for the protection of water resources from erosion control but leave the ultimate erosion control measure to apply to the discretion of the decision-maker when implementing projects. Lastly, in the unlikely circumstance that there are not even generalities for the protection of resources or resource uses to be reasonably inferred to be associated with any of the 10 resources and resource uses in part (v) included in the LUP, the BLM would still need to disclose that the LUP provides no parameters to shape the scope of the proposed action related to that resource or resource use. In this circumstance, the BLM's proposed action would still be defined by the limitations established by the CX and would still require inclusion of project design features as needed to prevent significant impacts and ensure extraordinary circumstances do not preclude application of the CX. The BLM has revised the text of part (v) to clarify the requirement to document how the scope of the project addresses any needed protections when no LUP decisions apply.Use of the CX Comment: The BLM received comments stating that the CX does not restrict CXs from being applied contiguously, resulting in far larger salvage harvest areas than the CX limits when utilizing this CX for NEPA compliance. Commenters further stated that the application of a CX that contains insufficient sideboards or limitations regarding size and that restrict such a significant acreage will result in significant impacts. Response: The BLM has determined the parameters of the CX have been appropriately defined to allow for the use of this CX for NEPA compliance without significant impacts. The BLM has determined it unnecessary to define in the CX a prohibition of the use of this CX for NEPA compliance in any geographical or temporal scope in relation to additional uses of the CX. The use of any CX is subject to review of the Department's extraordinary circumstances in order to determine if any extraordinary circumstances at 43 CFR 46.215 are present that would result in significant effects and, therefore, preclude use of the CX to comply with NEPA. An established CX category of actions do not have significant impacts when projects are designed to the specifications of the category and review of the proposed action determines that there are no extraordinary circumstances present that may result in the project having significant effects. If the proposed action, conducted adjacent to other similar projects, would trigger any of the extraordinary circumstances, the BLM would not be able to rely on the CX for NEPA compliance, absent circumstances that lessen the impacts of other conditions sufficient to avoid significant effects. Comment: The BLM received comments questioning the use of Determinations of NEPA Adequacy (DNAs) to execute projects under the proposed CX. Response: In the Verification Report, the BLM referenced the BLM's prior use of DNAs for site-specific implementation projects of the Hazard ***Removal*** and Vegetation Management Project EA, each of which encompassed a different size (in acres). The BLM provided this information to explain why that EA was not used to substantiate the size (acres) proposed by the CX. The BLM is not proposing to use DNAs to implement projects under the proposed CX. Comment: The BLM received comments related to BLM's ability to consider local government ***land*** use policies when implementing a salvage project under a CX. Response: The CX does not preclude the BLM from considering local government ***land*** use policies when designing a salvage harvest that would rely on this CX to comply with NEPA. ***Forest*** management on BLM managed ***lands***, including salvage harvest, would[[Page 79521]]only occur when in conformance with the applicable LUP decisions. Often, the BLM designs ***forest*** management projects, including salvage harvest, utilizing project design features developed from a variety of sources including State ***forest*** practice standards and project design features. In addition, although reliance on a CX to comply with NEPA does not require a review and comment period, decision-makers have the discretion to solicit comments while developing a salvage harvest project, including solicitation of local government input for consideration of relevant local policies. Comment: The BLM received comments claiming the undertaking of projects under the proposed CX would bypass BLM's obligations to comply with Executive Order 13112 (relating to monitoring and preventing the spread of non-native invasive species), the Endangered Species Act (ESA), the Clean Water Act (CWA), the National Historic Preservation Act (NHPA) (including public participation requirements of the NHPA), and other statutes. Response: The use of a CX is a form of NEPA compliance; it is not an exemption from compliance with any applicable laws or statutes. When relying on CXs, other procedural or substantive statutory or regulatory requirements may still apply, such as Tribal consultation and consultation under the NHPA and the ESA. Comment: The BLM received comments claiming that the BLM failed to describe or constrain the specific types of ***lands*** and ***land*** uses where the CX would be applied. Response: Identification of where actions subject to a CX may take place is only one kind of parameter agencies use to establish a CX. The BLM elected to establish this CX with different kinds of parameters, relevant to the impacts of the actions proposed for categorical exclusion. Because the BLM manages ***land*** under LUPs that set forth the types of ***lands*** and ***land*** uses allowable in a planning area, and the BLM may only act in conformance with the applicable LUP, the LUP, not the level of NEPA review, determines where specific actions can take place. Moreover, as explained in the Verification Report, the BLM has evaluated previously implemented actions that incorporated project design features according to management direction in the relevant LUP and found that those projects do not cause significant environmental effects. Comment: The BLM received comments asking for clarification as to whether the CX would be available to be used for commercial ***removal*** of dead and dying trees. Response: The BLM developed this CX intending the ***removal*** of dead and dying trees to be able to be accomplished commercially. The term ``salvage'' is defined as harvest to recover economic value, and salvage harvest is the purpose for which this CX would be available for use. The BLM has revised the language of the CX to replace the word ``harvesting'' at the beginning of the CX with the word ``salvaging'' to clarify this point and to make the language of this CX more consistent with the language of the BLM's existing salvage harvest CX C.8 Analysis and Review of the CX Comment: The BLM received comments claiming the BLM failed to adequately analyze cumulative effects, both in terms of the combined effects of the projects that would be undertaken through the proposed CX as well as those effects added to existing CXs. Response: Commenters are conflating the analysis required when a CX is established with the analysis required when an agency is considering application of an established CX to a proposed action. CEQ in its updated regulations requires agencies to identify all effects that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action. In evaluating effects for the purpose of establishing the CX, the BLM examined data and evidence consistent with CEQ's regulations and guidance for establishing a new CX, including analyzing previously implemented actions and their observed environmental consequences. In so doing, as documented on pages 9-22 and summarized on pages 24-25 of the Verification Report, based on the effects analyses in the relevant EAs and post-implementation monitoring, no significant impacts were predicted to result from the kinds of activities covered by the CX for salvage harvest, nor were any unanticipated impacts observed after treatments were implemented. Based on the evidence, the specific category of actions described in the CX consistently do not produce significant impacts, and the BLM considered and analyzed potential impacts from timber salvage treatments in the Verification Report. The CEQ regulations for creating new CXs do not call for analysis of the effects of existing CXs. (See 40 CFR 1507.3). Moreover, whether the BLM applied a new or an existing CX, review nevertheless would be appropriate only with respect to the individual action. Comment: The BLM received comments claiming that the Verification Report is inadequate and identified scientific research citing that effects of salvage harvest will vary depending on the site-specific conditions and that each large salvage logging project is unique and should require full NEPA analysis rather than a CX. Response: The BLM's proposed CX is not a proposal for salvage harvesting but is, instead, a proposal for a mechanism by which the BLM would be able to comply with NEPA to implement proposals to salvage harvest that match the scope of the CX. The BLM agrees with the science referenced in comments that site-specific considerations, including the type and size of disturbance and management objectives for the landscape, are necessary to consider in designing post-disturbance actions the BLM would pursue. The use of a CX still requires these site-specific considerations to be part of the project's design and review through evaluation for the presence of extraordinary circumstances. This proposed CX would provide an additional method for complying with NEPA to implement salvage harvest actions when the BLM has determined salvage harvest matching the scope of the CX is appropriate. Comment: The BLM received comments claiming that the analysis of the impacts of roadbuilding for timber salvage projects was inadequate because: descriptions of impacts were overly vague (for example, ``Temporary roads shall be designed to standards appropriate for the intended uses, considering safety, cost of transportation, and impacts on ***land*** and resources.''); the BLM only provided total miles of road construction and not road density, which is a metric commonly used in the scientific literature to assess impacts (generally, greater than 1 mile/square mile; Karr et al. 2004; Reeves et al. 2006); and scientific literature on the impacts of roadbuilding describe effects not covered by the Verification Report (e.g , Forman and Alexander 1998; Ibisch et al. 2016, 2019), including effects of roads on hydrology and water quality (DellaSala et al. 2011). Response: The CX addresses temporary road impacts through the requirement to revegetate the road as soon as practicable after the harvest as well as the requirement to include project design features related to seasonal road use, erosion prevention, and weed prevention from the local LUP. The BLM recognizes that road density is a factor in environmental impact and has added the requirement[[Page 79522]]to include any road density parameters from the local LUP to the CX text. In some cases, LUPs preclude road building in certain areas which would constrain the use of this CX in those areas. The BLM reviewed the literature cited in the comment and acknowledges that roads have varying impacts. Some of the papers cited study roadless protected areas, which in relation to this CX is not relevant because not only is the applicable LUP for a roadless protected area likely to preclude road building, but even if it did allow this action, an extraordinary circumstances review would likely disqualify the use of a CX in certain protected areas such as designated wilderness. Karr et al. 2004 provides recommendations that would improve the condition of watersheds and aquatic ecosystems which are like the project design features that would be documented as either originating in the applicable LUP, or incorporated to address fulfillment of a desired resource condition articulated in the LUP when BLM relies on the CX. Project design features related to roads influence road impacts, and where incorporated in projects evaluated in the EAs examined for this CX demonstrated non-significant impacts. Comment: The BLM received comments stating that the BLM inappropriately relied on smaller-scale EAs and CXs to establish and describe the impacts associated with the logging footprints proposed in the Verification Report. Comments identified that the proposed footprint would represent a twenty-fold increase in scale compared to BLM's current 250-acre CX. Comments claim that this extrapolation and its characterization as ``routine'' is counter to the scientific literature on the impacts of post-fire logging. Response: While the BLM considered projects evaluated in smaller-scale EAs and covered by existing CXs to substantiate the new CX, the BLM does not rely on extrapolation of smaller salvage projects that were approved through the existing 250-acre CX for this CX. The report discussed salvage approved with the current 250-acre CX to demonstrate the routine use and nonsignificant impacts of salvage logging in general and to also acknowledge that some salvage projects have been analyzed through EISs. The report also contrasts the complexity and unique issues of the salvage projects supported by EISs with the types of salvage projects proposed for inclusion under this CX. To substantiate this CX, BLM relies on the fact that these types of salvage projects are routinely supported by EAs and FONSIs, and do not result in significant impacts when implemented. The BLM has reviewed the literature identified in the comments and does not find that it provides evidence related to the scope of the CX proposed. The literature provided in comments discusses ecosystem disturbance dynamics and suggests that ecosystems are adapted to certain disturbance frequencies, intensities, and distributions and can recover from disturbances within those norms, and that compounded disturbances can affect ecosystem recovery (Paine et al. 1999). It also discusses the importance of post-disturbance ***forest*** landscapes and the unique site conditions and biological legacies that occur there (Lindenmayer et al. 2008; Swanson et al. 2011; DellaSala and Hanson 2015). The BLM's report addresses the importance of post-disturbance landscape attributes and the CX design specifically provides for conservation of biological legacies and site conditions through retention of a proportion of the legacies appropriate to the resource area as well as retaining portions of the disturbance area unmanaged. Comment: The BLM received comments stating that the BLM needs to show what habitat features are being provided and in what densities and spatial arrangements to ``minimize the impacts of salvage.'' Response: The BLM agrees with the comments that the densities and spatial arrangements of habitat features, including snags and downed logs, is important to know when implementing a salvage harvest to understand if the proposal is in conformance with the LUP and whether or not extraordinary circumstances prevent reliance on the CX. This is why the CX requires ``inclusion of project design features providing for protections of the following resources and resource uses consistent with the decisions in the applicable LUP in the documentation of the CX: (1) Level of snag and downed wood creation/retention.'' The requirement that the use of this CX to implement a salvage harvest include the project design features pertaining to LUP decisions ensures measures required by the LUP to reduce harvest impacts are defined as part of the project being proposed based on best available science for the local area. Further, the BLM has revised the text of part (v) to clarify the requirement to document how the scope of the project addresses any needed protections when no LUP decisions apply. Comment: The BLM received comments pertaining to the statement about reducing fuels from logging (Peterson et al. 2015) but the BLM does not cite the literature showing the opposite effects (e.g , Donato et al. 2006). Comments also stated that fuel loading related to snags is an exaggerated characterization of deadfall. Response: Donato et al. 2006 measured coarse and fine fuels in plots before and after salvage logging in Douglas fir ***forest*** in southwestern Oregon. This paper finds that both coarse and fine fuels increased one year after salvage logging. The BLM acknowledges that benefits from fuels reduction post-salvage varies temporally. The BLM considered this in the report and cited other papers that show similar results. However, Donato et al. 2006 is limited to only one year of fuels measurement post-salvage, and other findings cited in the BLM report show coarse fuels in unsalvaged areas significantly increasing 10-39 years post-fire (Peterson et al. 2015) when tree survival in reburns is more likely if fuels are low. Less than 10 years post-fire when trees are in seedling and sapling size classes, they are vulnerable to even low intensity fires. Comment: The BLM received comments that the BLM's critique of Thompson et al. 2007 in the Verification Report was unfounded, given the BLM's reliance on similar remote sensing study methods. Response: Thompson et al. 2007 used remote sensing to compare post-fire vegetation survival in an area that had burned 20 years prior and that had both salvaged and unsalvaged areas to compare. The BLM's report acknowledged that the salvaged logged areas did not show reduced fire severity based on vegetation mortality. The BLM did not discount this finding because remote sensing was used; the methodology appears to be sound. The BLM made two points related to this study. First, the study used remote sensing which precluded a look at other severity indicators such as soil impacts. Second, the BLM report prefaced Thompson et al. 2007 by explaining that there are also successional stages, seasonal fuel-moisture conditions, and severity indicators where the reduction in coarse fuels might have little benefit. These two points acknowledge that there are circumstances where salvage logging does not have a fire severity reduction benefit. Nevertheless, as documented in the report with information from the National Interagency Fire Center and scientific literature, there are instances where high densities of snags from prior disturbance and a combination of certain fire-weather conditions can cause severe fire effects and fire behavior.[[Page 79523]] Comment: The BLM received comments which stated that the BLM failed to acknowledge research finding the potential for expanded ***emissions*** to occur as a result of increased logging and road construction under this CX. Response: The BLM reviewed the literature noted by these comments and does not find them to support the claim raised, as they do not relate to carbon ***emissions*** that are specific to salvage harvest and associated road construction. The BLM is aware of and has reviewed scientific research regarding carbon ***emissions*** and salvage harvest and associated road construction in developing this report. The scientific research demonstrates that the carbon ***emissions*** associated with timber harvesting have several components to consider. Since the materials that would be harvested using this CX are already dead or dying, they would be carbon ***emission*** sources regardless of whether they are harvested and converted into wood products. There has been general support for the benefits of sustainably managing ***forests*** for carbon mitigation as expressed by the Intergovernmental Panel on Climate Change in 2007. However, there are many integrated carbon pools involved, which has led to conflicting implications for best practices and policy. For instance, sustainable management of ***forests*** for products produces substantially different impacts than a focus on a single stand or on specific carbon pools with each contributing to different policy implications (Lippke et al. 2011). Studies examining life cycle ***emissions*** of ***forest*** products and the energy used to process the materials are complex and depend on the how the material is used. The carbon ***emissions*** created by harvesting materials is generally small relative to the total processing ***emissions***: ``***Removal*** of merchantable wood contributes only approximately 7% to processing energy requirements, and their carbon equivalent ***emissions*** as little as 1% of the total carbon stored in the wood removed'' (Lippke et al 2011). How salvaged wood might be used and thus its carbon storage life cycle is too speculative for the BLM to include in this analysis as well any other site-specific analysis. Furthermore, the length of time that unharvested materials left after disturbance decay and emit carbon would also require speculation on decay rates, which are affected by factors such as future temperature, moisture, and fire probability. The exact disposition of the dead and dying wood might not matter in terms of carbon ***emissions***: ``By not ***removing*** more wood than is grown on a ***forest*** landscape basis, the ***forest*** carbon alone does not change and becomes of minor importance to the way the wood is used to reduce fossil ***emissions***,'' (Lippke et al 2011). The BLM practices sustainable ***forest*** management (does not ***remove*** more than is grown) under FLPMA (43 U.S.C 1701 et seq.) and Oregon and California Revested ***Lands*** Act (43 U.S.C 2601). Comment: The BLM received comments that tree mortality was overemphasized without providing any documentation that it is outside of the natural range of variation. Comments further claimed that, in ***forests*** with high tree mortality, most of the fire-killed trees are small diameter and that there remains an overall deficit of large dead trees (snags) and downed logs, especially on industrial ***lands*** that are lacking in these complex structures. Comments identified research from the ***Forest*** Service (2012) showing beetle-killed large trees play a critical role in retaining soil moisture and nutrient cycling when the needles fall. Response: The background section of the BLM report presented empirical data on tree mortality from both insect epidemics and wildfire. The BLM did not report on whether insect-induced mortality is outside the natural range of variation. The comment does not point out a deficiency based on a lack of this discussion. Potter (2017) was cited and highlights the distribution of ***forest*** mortality during the 2013 to 2015 California drought, but the relevance of the findings in this paper was not explained by the comments. Dunn and Bailey (2016) found that tree mortality varies based by species and tree size after mixed severity fire. Although this influences the number of snags on the landscape as identified in the comment, the comment does not explain how the CX should be changed based on these findings. As explained in the report, the CX includes snag retention and coarse woody debris parameters to be addressed and documented that ensure these features are maintained for habitat during salvage harvest. Comment: The BLM received comments arguing that the BLM has overvalued the economic returns of these timber salvage projects by overestimating the revenue generated from the timber as well as the jobs created by these projects. Similarly, comments claim that the BLM has not considered the actual costs of these timber sale projects to the environment and the costs of implementing large-scale salvaging logging. One comment cited a U.S Government Accountability Office (GAO) report, GAO-06-097, Biscuit Fire Recovery Project: Analysis of Project Development, Salvage Sales, and Other Activities, Highlights (2006) to support these claims. Response: The BLM did not estimate revenue as part of the evaluation criteria in the report. The BLM considers economic factors when evaluating whether to initiate a salvage project but also considers ecological and restoration goals and whether there are sufficient resources to carry out the project planning and implementation. Evaluating whether potential revenue exceeds project costs is not a prerequisite for treatment. The referenced paper examines the cost of silvicultural activities post-fire. The study examined an area with low wood value which affected its evaluation of the total economics of treatment. The BLM's CX includes large portions of what the referenced research calls non-intervention type reforestation by excluding up to \2/3\ of an affected area from treatment. Reforestation practices examined in the Spanish study differ from U.S practices (use of potted trees and hole digging). The author acknowledges that costs are context dependent and salvage is performed for other reasons than to facilitate reforestation. The comment misrepresents the GAO finding. The GAO evaluated the Biscuit Fire salvage work done by the ***Forest*** Service. The GAO's review stated it was premature to evaluate the Biscuit Fire because ``incomplete sales and a lack of comparable economic data, among other things, make comparing the financial and economic results with the agency's initial estimates difficult.'' \1\ Also, the Biscuit Fire was unique in that ``several unique circumstances affected the time taken and the alternatives it included. For example, the size of the burned area--and, subsequently, the size of the Project--complicated the environmental analysis and increased the time needed to complete and review it.'' \2\ The Biscuit Fire EIS was addressed in the report and the BLM provided several reasons why the EIS does not reflect common management scenarios on BLM ***lands***.--------------------------------------------------------------------------- \1\ U.S Gov't Accountability Office, GAO-06-097, Biscuit Fire Recovery Project: Analysis of Project Development, Salvage Sales, and Other Activities, Highlights (2006), [*https://www.gao.gov/new.items/d06967.pdf*](https://www.gao.gov/new.items/d06967.pdf). \2\ Id.--------------------------------------------------------------------------- Comment: The BLM received comments stating that the characterization of disturbance events like wildfire and insects was problematic throughout the Verification Report, and that the BLM has failed to consider the ecological benefits of such[[Page 79524]]disturbance events in order to justify salvage logging. Response: The BLM acknowledges in the report that disturbances provide unique habitat which is why the CX has a design parameter limiting harvest to a proportion of the disturbance area for projects greater than 1,000 acres. The claim that the CX and report did not consider the benefits of disturbances is unfounded. The comment further suggests that the salvage harvest contemplated with this CX would negate the ecological benefits of disturbance and impair early successional ***forest*** ecosystems. However, in Swanson et al. (2011), which was cited in this comment, the management recommendation for areas where the ***land*** management direction is salvaging damaged timber is ``retention of snags, logs, live trees, and other structures through harvest can maintain structural complexity in logged areas.'' This recommendation from the literature is in line with the CX as designed. The comment also suggests the BLM report makes a false or weakly supported relationship between increasing wildfire severity and disturbance and provides several research papers that show the opposite. The BLM report does not make an overarching statement that there is a positive correlation with disturbances and subsequent wildfire severity. The BLM provides examples where empirical evidence showed negative impacts to soil and vegetation attributes from wildfire in areas with high concentrations of dead trees. In addition, the BLM report cites documents from the National Interagency Fire Center reporting extreme fire behavior with severe effects in high density snags after beetle-caused mortality. The BLM acknowledges that post-disturbance tree mortality does not assure subsequent high severity fire. Other factors, such as 1,000-hour fuel moisture, also determines intensity and severity. The BLM reviewed the citations included in the comment and acknowledges that under some conditions post-disturbance tree mortality does not increase fire severity. Nevertheless, listing fuels reduction as a potential benefit of salvage is still valid and supported by evidence. Comment: The BLM received comments claiming that the proposal to plant and salvage in the Verification Report is unjustified and a pretense to increase salvage logging given that research shows conifer establishment post-fire has been shown to be abundant, achieving densities even greater than typically planted by federal agencies. Comments cited studies showing that replanting interrupts natural successional processes associated with complex early seral ***forests*** and either had no effect at reducing fuels or increased fuel loads. Response: The CX included tree planting as a covered action for several reasons even though tree planting is already covered in another BLM CX. The scientific literature contains many examples where high severity fire across large areas has resulted in long-term conifer absence (Chambers et al. 2016; Welch et al. 2016). Some studies have documented higher conifer regeneration in salvage harvest and replanted landscapes compared to adjacent unmanaged areas where severe fire impacted the site's ability to naturally regenerate trees (Collins and Roller 2013; Zhang et al. 2008). The BLM relies on natural regeneration where fire severity is sufficiently low for live seed trees to have survived or the soil seed bank is still viable. In areas where post-disturbance natural regeneration is not expected or competition from non-tree species is expected to be high, the BLM uses tree planting to restore ***forest*** cover. The BLM believes replanting is necessary to restore native conifer ***forest*** after certain high severity events which is supported by the scientific literature (Zhang et al. 2008). Comments claim that replanting interrupts natural successional processes associated with complex early seral ***forests***. The literature cited to support this claim describes a set of conditions that affect complex early seral ***forest*** including clear-cut salvage logging (harvest all live and dead trees with no retention of biological legacies), application of pre-emergent herbicide to suppress competition for tree seedlings, and dense tree planting to establish fully stocked ***forest***. This description does not describe the nature of salvage harvest that would occur under the CX. Herbicide use is not part of the covered actions and the CX requires retention of a proportion of the biological legacies. Planting levels under the CX can include full stocking and are often driven by LUP management direction, however planting is costly and full stocking is often not pursued unless the LUP requires it. In many cases, the BLM's planting strategy is to augment natural recovery in places where regeneration may be problematic. The CX design (e.g , limit to a portion of affected area) incorporates ways to address the concerns raised in this comment. Comment: The BLM received comments claiming that, in characterizing current fire intensity trends in western conifer ***forests*** as low to mixed severity and outside of their historic range of variability, the BLM has ignored literature showing contrary evidence of fire intensity trends. Response: The BLM acknowledges that some western ***forests*** have not experienced a departure from their historical fire regimes as documented in the citations included in the comments. For some ***forest*** ecosystems, such as high elevation spruce in the Rocky Mountains, fire frequency is in the hundreds of years between events and fires are typically high severity in terms of tree mortality but such ecosystems are still able to recover. Research has shown that modern fire suppression has not necessarily affected certain fire regimes such as high elevation spruce ***forest*** like it has with other historically more frequent regimes. The BLM report does not suggest all fires or disturbances are outside the natural range of variability. The BLM does not use departure from the natural fire regime as a justification for establishing the CX, and the comment does not explain what relevance the cited papers have to the establishment of this CX. Comment: The BLM received comments claiming that the BLM failed to incorporate studies regarding nest site abandonment of northern spotted owls caused in part by post-fire logging. Commenters claim that the BLM's failure to incorporate these studies demonstrate that the BLM has not fully considered the impacts of salvage harvest. Response: The BLM is aware of and has reviewed the studies regarding the impacts of post-fire logging on northern spotted owls, including the two studies specifically raised by comments. The studies documented that northern spotted owl and California spotted owl both show strong fidelity to their home ranges after wildfire. In addition, Clark et al. (2011) showed that although owls remained in the post-fire landscape about one-third of them died noting starvation as a likely cause. In Anthony and Clark (2008), the post-fire management recommendation is to avoid ``clearcut salvage logging'' and to retain live trees, snags, and riparian buffers. These are all project design features that receive emphasis in the CX. In addition to having considered the scientific research directly, the BLM notes the requirement that actions covered by the proposed CX must conform with the approved LUP. This coupled with the direction to document in the CX the project design features needed to ensure such conformance with a LUP ensure relevant protections[[Page 79525]]are implemented. Specific to the northern spotted owl, most BLM-administered ***lands*** that constitute the range of the northern spotted owl are under the management of the LUPs for western Oregon (2016 Southwestern Oregon RMP and Northwestern and Coastal Oregon RMP). Additionally, the Department's list of extraordinary circumstances provide that if a normally excluded action would have ``significant impacts on species listed, or proposed to be listed, on the List of Endangered or Threatened Species or have significant impacts on designated Critical Habitat for these species,'' then further analysis and documentation would be required. 43 CFR 46.215(h) Comment: The BLM received comments regarding the revegetation of temporary roads stating the requirements were vague and inadequate, because the measures identified do not include the need to obliterate temporary roads. The comments claimed that the BLM must use road ripping techniques and native plant seed sources to contain weed spread and cited scientific research identifying detrimental impacts to water quality and invasive species persistence when appropriate project design features are not applied. Response: In ***forest*** management, the primary driver of erosion and sedimentation in streams is bare soil exposure. A temporary road exposes soil and can channel the runoff in ditches and on the road surface if not properly designed. Features such as outsloping and water barring ensure that water is diverted from the road surface before gaining volume and velocity. The CX requires proper design which includes erosion control features. Since bare soil is the source of erosion and sedimentation regardless of recontouring, projects that would rely on the CX would be required to ``reestablish vegetative cover as soon as practicable'' after termination of the contract to prevent erosion. The BLM allows up to 10 years for revegetation in arid regions where revegetation can be delayed by drought but where precipitation is such that erosion is less of an issue and streams are often not present. The BLM has modified the CX by requiring design standards for temporary road construction to consider erosion control and potential sedimentation to streams. The BLM reviewed the scientific research provided by the comments and found limited applicability of this research to the proposed CX. Lewis et al. (2018) studied an area dominated by logging on private ***land*** with the use of pre-emergent herbicide after harvest to prevent revegetation before tree seedling planting. This along with other practices are not part of the actions covered in the BLM CX and are not suitable for comparison. The BLM reviewed Beyers (2004) and notes that the study examined broadcast from aircraft of nonnative grasses and straw to establish cover post-fire. This technique is an emergency soil stabilization measure that is not part of the actions covered by this CX. The BLM reviewed Balch et al. (2017) and Gelbard and Harrison (2003), which find that the existence of roads increases the probability of human-caused fires and the spread of weeds. These findings are not relevant for temporary roads which are restricted to logging use while open and closed to all travel and revegetated after completion of activities. Comment: The BLM received comments suggesting that the definition of a ``dying tree'' in the Verification Report was vague, arbitrary, and not verifiable. A dying tree is defined in the report as ``a standing tree that has been severely damaged by forces such as fire, wind, ice, insects, or disease, and that in the judgement of an experienced ***forest*** professional or someone technically trained for the work, is likely to die within a few years.'' However, the commenter identified tree mortality monitoring studies that have shown high error rates in classifying trees as dead after severe crown scorch when in fact many scorched pines flush new needles in the following spring. Response: The BLM acknowledges that conifers can flush needles after high initial crown scorch, and notes that other studies have shown that flushing does not necessarily mean survival longer term such as five years post-fire (Hood et al. 2010). Other indicators have been developed that are more accurate than percent crown scorch such as crown kill which can be observed soon after the fire without having to wait for potential flushing. The BLM acknowledges that errors may occur when trees that appear to be dead or dying but may in fact be alive and capable of flushing are harvested as part of the salvage activity. It is not practicable for the BLM to ensure that every apparently dead or dying tree is not capable of potential survival other than by relying on various indicators. The research shows that survival rates of trees with significant damage are low relative to ones that would die, and that tree mortality can be predicted with low error rates. Given the low rates of misidentification, the harvest of a few misidentified trees would not rise to the level of a significant impact. As discussed, projects that would rely on the CX require retention of snags which may result in the retention of live trees if flushing and long-term survival occurs. Comment: The BLM received comments that challenged the claim that trees killed by beetles increase the risk of high-severity wildfire events and, in turn, impaired stream functions. Comments identified and cited scientific literature claiming to purport the contrary, that severe wildfire increases aquatic ecosystem activity post-fire, and impairments to ecosystem resilience and stream function originate from chronic disturbance events like road building and logging. Response: The cited material does not specifically refer to salvage harvest but rather to the generalized phenomenon resulting in changes to ecosystem species assemblages resulting from repeated disturbances and exacerbated by invasive species and trends attributed to climate change. The text of the Verification Report specifically identified in the comments is in reference to the discussion of the Gunnison EA (SW Gunnison Bark Beetle Salvage Final Environmental Assessment). That EA looked at a large area of beetle-killed trees in Colorado. The EA found that high concentrations of beetle killed trees had potential, if burned, to impair stream function through erosion and excessive sedimentation. Comment: The BLM received comments stating that the BLM's assessment that completely ***removing*** trees in high severity burn patches would have no impact on soil erosion is counter to scientific literature. Response: The BLM makes no claim in the Verification Report that complete ***removal*** of trees in high severity burn patches would have no impact to soil erosion. Comments appear to be referring to the BLM review of the French Fire where the BLM evaluated post-salvage conditions several years after salvage was completed and where the BLM found no significant impact to soil erosion which was verified and documented in post-harvest monitoring reports, as had been expected in the project analysis. The BLM is aware of the literature presented in comments, which recommends the areas susceptible to surface runoff and erosion after high severity [filig]res and disturbed by ground-based logging employ additional project design features to reduce erosion. The CX requires the BLM to include project design features developed to address LUP decisions pertaining to limit ground disturbance and erosion. In fact, each of the items listed in part (v) of the[[Page 79526]]CX have a connection to erosion prevention. As such, the scientific research provided by the commenter supports the BLM's inclusion of a requirement that BLM staff relying on the CX document how design features address ground disturbance and erosion are an effective means at reducing erosion potential. Further, the BLM has revised the text of part (v) to clarify the requirement to document how the scope of the project addresses any needed protections when no LUP decisions apply. Comment: The BLM received comments stating that the BLM ignored the effects identified in scientific research of how logging and climate change contribute to uncharacteristic fires, as well as the finding that fuels under certain conditions are not a predictor of fire intensity. Response: The BLM has reviewed the scientific research identified in the comments related to how logging and climate change can contribute to uncharacteristic fires as well as the finding that fuels under certain conditions are not a predictor of fire intensity and did not find that the research provided was directly applicable to salvage harvest as conducted by the BLM. The comments suggest that implementing salvage in reliance on the CX may contribute to fire severity because studies have shown that intensively managed ***forests*** that are logged exhibit higher severity fires (though it should be noted not all fire effects are included in the studies). Intensive ***forest*** management in Zald and Dunn (2018) is defined as intensive plantation forestry characterized by young ***forests*** and spatially homogenized fuels. This study contrasted ***forests*** impacted by the Douglas Fire managed by the BLM and intensively managed private industrial ***forest***. The study found that the BLM-managed ***forest*** exhibited lower fire severity than the private ***forest*** ***lands***. In some ways, this validates that the BLM's approach to ***forest*** management that incorporates factors that address environmental consequences. The BLM has discussed in other responses the fact that by design the CX would not produce conditions described as intensively managed ***forest***. The comments also suggest that conducting salvage harvest to reduce fire severity is not valid because some studies have found that fuels are not a predictor of fire severity. As explained in other responses, fuels reduction benefits from salvage depend on many factors but are still valid. Comment: The BLM received comments suggesting that the BLM improperly used mitigated FONSIs to support the proposed CX and that not all project design features contained in the reference EAs were included in the proposed CX. Response: Consistent with CEQ's guidance, Establishing, Applying, and Revising Categorical Exclusions under the National Environmental Policy Act (Nov. 23, 2010), mitigated FONSIs can support development of a CX when measures are included as part of the CX. The actions included in the BLM Report to support the CX were selected based on BLM's review of EAs and FONSIs that incorporate project design features developed to ensure conformance with LUPs and reduce adverse effects, which has been shown to be an effective process of developing salvage harvest projects that have no significant impacts. As explained in the Verification Report, none of the EAs relied on in support of the establishment of the CX required mitigation to reach a FONSI in order to support decisionmaking. To the extent to which the BLM regularly incorporates design features in its projects to ensure conformance with applicable LUPs, the documentation requirements of the CX will ensure this incorporation is transparent. Comment: The BLM received comments related to the use of EAs but not EISs in the Verification Report that questioned why the potentially significant effects identified in the EISs would not apply to projects that could be supported by the proposed CX. Response: The BLM reviewed two EISs that included salvage harvest in the Verification Report (see report section Methods (4) for extensive description of the actions proposed under the EISs). The BLM notes in the report the complexity of the actions and issues included in the EISs that led to the analysis of those projects through an EIS are readily distinguishable from the routine salvage harvest projects that would be able to occur utilizing this CX. The BLM believes the actions proposed in the EISs clearly differ in terms of magnitude and degree of effects of the action. Comment: The BLM received a comment related to monitoring policies claiming that the BLM lacks sufficient monitoring data to support the CX. The comment suggested that the BLM must show that predictions from past EAs/FONSIs have been reliable and that the projects have in fact had no significant impacts on the ground. Response: The Verification Report (pages 18-19) noted that the BLM conducts contract inspections for all timber sales. Sale administration requires the BLM to regularly visit active sales to ensure implementation of the sale is occurring as required under the contract and to inspect key aspects of the implementation, such as adequacy of road construction, retention of snags of the required sizes, count, and distribution, and application of protective measures. Because of this ongoing and real-time inspection, all timber sales, including salvage, are monitored for impacts. This evidence shows that predictions from past EAs (FONSIs) have been reliable and that the projects have not had significant impacts on the ground, as summarized in the Verification Report Findings on pages 24-25. Comment: The BLM received comment that some of the EAs evaluated in the Verification Report only reached FONSIs because the project areas included untreated areas and that since the proposed CX does not require inclusion of untreated areas, the BLM has not justified the claim that treatments can be supported by the proposed CX. Response: The CX requires retention of untreated areas for disturbances of 1,000 acres and greater. For disturbances that cover 3,000 acres or more, the CX requires the retention of untreated areas of at least 66% and increasing as the disturbance acreage rises. The BLM examined the varying levels of retention in the EAs included in the report which showed a pattern of increasing proportion of retention as the disturbance acreage increased. The BLM believes the record supports the untreated retention parameter as being adequate to maintain the impacts below the threshold of significance by reducing the degree of the effects of the action. Comment: The BLM received comments that categorical exclusion of salvage harvesting is not appropriate because salvage logging will set back vegetative recovery that has already started and thereby delay attainment of riparian and aquatic management objectives. Response: The BLM examined scientific literature included in comments that found that post-fire salvage can damage tree regeneration (Donato et al. 2006). These findings showed that naturally regenerated tree seedlings were reduced one year after logging citing soil disturbance and physical burial by woody material. However, the salvage logging was delayed for two years after the fire in part due to how long it took to prepare the NEPA analysis. Other studies have indicated that delaying salvage after fire can delay recovery--particularly where[[Page 79527]]artificial regeneration (tree planting) is needed to restore ***forest*** cover (Sessions et al. 2004). In the case of Sessions et al. 2004, the management direction for the study area was maintenance of mature conifer ***forest*** for species habitat under the Northwest ***Forest*** Plan. These findings support the conclusion that if salvage is going to occur it is more beneficial in terms of vegetation recovery if the harvest happens as soon after the disturbance as possible. In addition, the findings of the BLM report showed that EAs that reached FONSIs relied on project design features already developed and widely used and not new design features developed based on findings from environmental analysis. Through the establishment of the CX, the reduction of the time taken to reach a decision supports the vegetation recovery described here. A similar effect to vegetation recovery is likely for understory vegetation that germinates from seed post-fire and is subsequently damaged by equipment. Compaction in fine textured soils can also impede vegetation establishment. These effects were noted in the EAs in the report, but effects were limited and determined to be non-significant. Reasons for non-significance include the fact that compaction in coarse textured soil can positively influence vegetation establishment and the fact that logging equipment in the harvest area typically disturbs less than 20 percent of the ***forest*** floor. Comment: The BLM received comments claiming that before the BLM can establish a new larger salvage CX, the BLM must prove its current 250-acre salvage CX has not incurred significant impacts and gather new data to support a larger treatment area. Response: CXs are developed for a category of actions that have been shown through repeated environmental analysis or on the basis of other evidence to not have significant impacts. The BLM's existing 250-acre salvage CX was developed consistent with the CEQ NEPA regulations and guidance for CXs. The BLM has met its obligation under the law for the existing CX. Promulgation of a new salvage CX requires a new analysis of past actions, substantiation of non-significance, and consideration of scientific literature, which the BLM has conducted. Comment: The BLM received comments claiming that the BLM improperly benchmarks to the CXs contained in Healthy ***Forest*** Restoration Act because these Congressionally established CXs intentionally excluded the BLM's use. Response: The Verification Report benchmarks to the CXs included in the Healthy ***Forest*** Restoration Act appropriately. The BLM is not claiming that those CXs should be expanded to the agency's jurisdiction or trying to apply those CXs for the BLM's use in any way. The BLM developed the proposed CX based on the current management needs of the BLM and by evaluating the type, scope, and intensity of salvage projects that the BLM has routinely analyzed and conducted with no evidence of significant impacts, as described on pages 11-16 of the Verification Report. The Verification Report benchmarks, or cross-references, other CXs only to compare the general intent and scope, not to justify the promulgation of the new CX. Benchmarking actions that are comparable to the actions proposed for a new CX is one of the approaches identified by CEQ for demonstrating support of an action for categorical exclusion. The BLM has appropriately incorporated discussions of these Congressionally established CXs as required by CEQ in benchmarking in the Verification Report by noting the similarities of the: (1) Characteristics of the actions; (2) methods of implementing the actions; (3) frequency of the actions; (4) applicable standard operating procedures or implementing guidance (including extraordinary circumstances); and (5) timing and context, including the environmental settings in which the actions take place.CX Establishment Procedures Comment: The BLM received comments stating that while the BLM discusses a recent proposal by the U.S ***Forest*** Service to establish a CX for ``ecosystem restoration or resilience activities,'' it ignores the fact that the U.S ***Forest*** Service has a CX for salvage harvest similar to BLM's existing CX, which the U.S ***Forest*** Service has not proposed to change. Response: The BLM has reviewed the ***Forest*** Service Federal Register notice to establish a CX for ecosystem restoration and resilience. The BLM notes that this proposed CX does not include salvage harvest in its covered actions. The BLM has reviewed the U.S ***Forest*** Service report and referenced it in the BLM report to highlight that they had six EAs that covered salvage harvest in their report. This information was cited to indicate that another agency has conducted environmental analysis on salvage harvest in similar ***forest*** ecosystem across the west and has found no significant impacts. Nevertheless, the BLM does not rely on this for validation of its CX. Comment: The BLM received comments stating that the BLM is wrong to conclude that Congress intended to extend the authority established in the CXs established by Congress in the ***Agricultural*** Act of 2014 (Pub. L. 113-79), and the Consolidated Appropriations Act of 2018 (Pub. L. 115-141) to BLM. Response: The BLM does not interpret the laws cited in these comments to apply to the BLM. The BLM does not rely on the CXs established by Congress for the U.S ***Forest*** Service to use that directly or indirectly relate to fire risk reduction to validate this CX. The BLM highlighted these legislative CXs because of their similarity to the covered actions in the CX and because Congress has excluded like activities of equal size (3,000 acres) from further environmental analysis. Comment: The BLM received comments stating that the scope of the CXs established by Congress in the ***Agricultural*** Act of 2014 (Pub. L. 113-79) and the Consolidated Appropriations Act of 2018 (Pub. L. 115-141) do not support this proposed CX because the public laws established CX parameters different from what the BLM is proposing. Response: The Congressionally established CXs are independent of this CX even though there is some overlap in scope. The BLM does not rely on the CXs established by Congress to substantiate this CX; the BLM instead used the data presented in the Verification Report. The BLM notes the following similarities and differences between the Congressionally established CXs and the BLM established CX: (1) The legislative CXs apply to ***forests*** with substantially increased tree mortality due to insect or disease infestation or dieback due to infestation or defoliation by insects or disease; however the BLM CX has broader applicability; (2) the legislative CXs cover treatment of areas up to 3,000 acres; however, the BLM CX has different conditions; (3) the legislative CXs allow temporary road construction with decommissioning within 3 years, whereas the BLM CX assumes decommissioning and further requires revegetation as soon as practicable but within 10 years; and (4) the legislative CXs are restricted to wildland-urban interface or Condition Classes 2 or 3 in Fire Regime Groups I, II, or III, outside the wildland-urban interface. The BLM notes that a significant portion of BLM ***forests*** fall in these categories, but this type of group selection was not a factor in the BLM CX. Comment: The BLM received comments claiming that the establishment of a new CX requires a rulemaking, is a major Federal action[[Page 79528]]requiring analysis in an EA or EIS, is subject to the Administrative Procedure Act (APA), and subject to the Congressional Review Act (CRA). Comments expressed various requirements the BLM must undertake or remedy relative to these purported requirements before establishing this CX. Response: The CEQ regulations do not require agencies to issue their implementing procedures as a rulemaking, and it is the Department's longstanding practice to implement NEPA in its DM. The establishment of a CX as a part of an agency's NEPA procedures is largely administrative, and distinct from the analysis required for a proposed major Federal action. Heartwood, Inc. v. United States ***Forest*** Service, 230 F.3d 947, 954 (7th Cir. 2000) (***Forest*** Service is not required to prepare an EA or EIS prior to promulgating a CX). In establishing the proposed CX, the Department is following CEQ's procedural regulations, which include publishing the notice of the proposed CX in the Federal Register for public review and comment, considering public comments, and consulting with the CEQ to obtain CEQ's written determination of conformity with NEPA and the CEQ regulations. (See 40 CFR 1507.3(b)(2)) To substantiate the proposed CX as a category of actions that do not normally have a significant effect on the human environment, the BLM also has developed the Verification Report, an administrative record to support the category of actions to be covered by the CX. This analysis includes a review of multiple environmental documents in which actions that would fall under the proposed CX have been found not to have a significant effect on the human environment. Comment: The BLM received comments that promulgation of the CX requires consultation with the U.S Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS). Response: To the extent that establishment of a NEPA procedure such as the proposed CX is subject to the requirements of section 7 of the Endangered Species Act, the action has no effect on listed species or critical habitat. Projects the BLM may pursue in reliance on this CX to implement salvage harvest would be subject to review under Section 7 of ESA and, if the parameters of the proposed action and site-specific conditions require, appropriate consultation with the FWS and NMFS would occur. Comment: The BLM received a comment that the CX violates the APA because it is changing an existing CX (salvage on up to 250 acres) without justifying the need for the change and the circumstances allowing for the acreage expansion. Response: The BLM is not proposing to change the existing CX (C.8), the BLM is proposing the establishment of an entirely new CX that would be available for BLM in addition to the existing 250-acre CX. The BLM has prepared a Verification Report that extensively explains the justification for the new CX and the circumstances associated with ***land*** management warranting the identification of this new category's establishment.Categorical Exclusion The Department and the BLM find the category of actions described in the CX does not normally have a significant effect on the quality of the human environment. This finding is based on the analysis presented in the Verification Report to establish this CX. In addition to the BLM's review of projects evaluated through EAs, and consideration of these projects following implementation, the BLM's review of the available scientific literature demonstrates that the activities covered by this CX would not normally cause significant environmental effects. As discussed in detail in the Verification Report Methods section, the research provides evidence for both the need for the CX to facilitate the timely authorization of projects that can realize the long-term benefits of salvage harvest and provide effective project design features to minimize adverse impacts. As discussed in the Methods section of the Verification Report, the BLM currently implements timber salvage sales supported by EAs, EISs, and since 2007 has relied upon the existing timber salvage CX (C.8), and conducts post-harvest monitoring on all sales. The BLM has implemented salvage sales in response to insects and disease, windthrow, drought, and wildfires through commercial harvest using helicopter, cable yarding, and ground-based methods. The BLM evaluated NEPA documents for previously implemented salvage harvest to determine the scope of environmental consequences anticipated to result from the proposed actions. In the EAs reviewed, no significant impacts were predicted to result from the kinds of activities covered by this CX for salvage harvest, nor were any unanticipated impacts observed after treatments were implemented. Actual impacts were the same as predicted impacts in all cases. There were no instances where any of the projects evaluated in the EAs reviewed would have resulted in a need to complete an EIS. The BLM has implemented elements of the salvage actions included as part of this new CX under the current salvage CX and has not found significant impacts or instances where the presence of extraordinary circumstances prevented reliance on the existing salvage CX. In the two circumstances where the BLM completed EISs for salvage harvest, the specific combination of actions proposed, and the scale of the proposals warranted analysis through EISs. The scale and scope of the actions proposed for CX here are readily distinguishable from those evaluated in the EISs. All proposed actions and alternatives evaluated in the EAs reviewed included project design features that minimize environmental consequences. Often, through application of locally appropriate design elements, environmental effects were minimized to the level of non-significant, whereby resource issues were eliminated from further analysis due to application of these elements incorporated into project design. The intent of this CX is to improve the efficiency of the environmental review process for the harvest of dead, dying, or damaged trees impacted by biotic or abiotic disturbances. Each proposed action must be reviewed for extraordinary circumstances that would preclude the use of this CX. The Department's list of extraordinary circumstances under which a normally excluded action would require further analysis and documentation to determine whether the preparation of an EA or EIS is necessary is found at 43 CFR 46.215 If a timber salvage project is within the activity described in this CX, then these ``extraordinary circumstances'' will be considered in the context of the proposed project to determine if there are circumstances that lessen the impacts or other conditions sufficient to avoid significant effects, or they indicate the potential for effects that merit additional consideration in an EA or EIS. If any of the extraordinary circumstances indicate such potential, the CX would not be used, and an EA or EIS would be prepared.Amended Text for the Departmental Manual 516 DM 11 at Section. 11.9 C. (10) Forestry: (10) Salvaging dead and dying trees resulting from fire, insects, disease, drought, or other disturbances not to exceed 1,000 acres for disturbances of 3,000 acres or less. For disturbances greater than 3,000 acres, harvesting shall[[Page 79529]]not exceed \1/3\ of a disturbance area but not to exceed 3,000 acres total harvest. (a) Covered actions: (i) Cutting, yarding, and ***removal*** of dead or dying trees and live trees needed for ***landings***, skid trails, and road clearing. Includes chipping/grinding and ***removal*** of residual slash. (ii) Jackpot burning, pile burning, or underburning. (iii) Seeding or planting necessary to accelerate native species re-establishment. (b) Such actions: (i) Shall not require more than 1 mile of permanent road construction to facilitate the covered actions. Permanent roads are routes intended to be part of the BLM's permanent transportation system. (ii) If a permanent road is constructed to facilitate the covered actions, the segments shall conform to all applicable ***land*** use planning decisions for permanent road construction in the ***land*** use plan; and if travel management planning has been completed, the route specific designations related to the new segments shall be disclosed. (iii) May include temporary roads, which are defined as roads authorized by contract, permit, lease, other written authorization, or emergency operation not intended to be part of the BLM's permanent transportation system and not necessary for long-term resource management. Temporary roads shall be designed to standards appropriate for the intended uses, considering safety, cost of transportation, erosion control, potential sedimentation to streams, and impacts on ***land*** and resources. (iv) Shall require the treatment of temporary roads constructed or used so as to permit the reestablishment, by artificial or natural means, of vegetative cover on the roadway and areas where the vegetative cover was disturbed by the construction or use of the road, as necessary to minimize erosion from the disturbed area. Such treatment shall be designed to reestablish vegetative cover as soon as practicable, but at least within 10 years after the termination of the contract. (v) Shall require inclusion of project design features providing for protections of the following resources and resource uses consistent with the decisions in the applicable ***land*** use plan in the documentation of the categorical exclusion. If no ***land*** use plan decisions apply, documentation of the categorical exclusion shall identify how the following resources and resource uses are to be appropriately addressed: (1) Level of snag and downed wood creation/retention; (2) Specifications for erosion control features such as water bars, dispersed slash; (3) Criteria for minimizing or remedying soil compaction; (4) Types and extents of logging system constraints (e.g , seasonal, location, extent, etc.); (5) Extent and purpose of seasonal operating constraints or restrictions; (6) Criteria to limit spread of weeds; (7) Size of riparian buffers and/or riparian zone operating restrictions; (8) Operating constraints and restrictions for underburning or pile burning; (9) Revegetation standards for temporary roads; and (10) Limitations on road densities. (c) For this CX, a dying tree is defined as a standing tree that has been severely damaged by forces such as fire, wind, ice, insects, or disease, and that in the judgement of an experienced ***forest*** professional or someone technically trained for the work, is likely to die within a few years. Examples include, but are not limited to: (i) Harvesting a portion of a stand damaged by a wind or ice event. (ii) Harvesting fire damaged trees. Authority: NEPA, the National Environmental Policy Act of 1969, as amended (42 U.S.C 4321 et seq.); E.O 11514, March 5, 1970, as amended by E.O 11991, May 24, 1977; and CEQ regulations (40 CFR 1500-1508).Stephen G. Tryon,Director, Office of Environmental Policy and Compliance.[FR Doc. 2020-27159 Filed 12-9-20; 8:45 am]BILLING CODE 4331-84-P

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[***Back from the brink***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:621J-VWH1-DY5K-Y1XR-00000-00&context=1516831)

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**Byline:** Adam Vaughan

**Adam Vaughan** is chief reporter at *New Scientist*

**Highlight:** Stories of species brought back from near-extinction show we can help nature turn the corner, says Adam Vaughan

**Body**

LOOK at how we [*missed all 20 of the past decade's biodiversity* ***targets***](https://www.newscientist.com/article/2254460-massive-failure-the-world-has-missed-all-its-biodiversity-targets/), or shocking graphs of animals threatened with extinction, and it is easy to be disheartened about the fate of the natural world. "There's lots of doom and gloom stories around about [*biodiversity*](https://www.newscientist.com/article-topic/biodiversity/)," says Stuart Butchart at the conservation body BirdLife International. "It would be easy to feel conservation was a pointless exercise and there's nothing we can do to slow the juggernaut down."

Butchart's work suggests that isn't the full picture, however. He was part of a team that recently estimated that [*conservation initiatives had prevented up to 32 bird and 16 mammal extinctions*](https://conbio.onlinelibrary.wiley.com/doi/full/10.1111/conl.12762) since 1993. Given that 10 bird and five mammal species are known to have gone extinct in that time, the researchers concluded that extinction rates would have been up to four times higher without action. "I think that's a positive message. It's not all bad news, always," says Friederike Bolam at Newcastle University, UK, the study's lead author.

Many of the most successful conservation efforts involve big "charismatic" species, such as the giant panda, that readily attract attention and funding. But Bolam and Butchart's team identified a number of recurring and widely applicable themes in successful conservation work: ***removal*** of invasive species, management of hunting and protection of important habitats. "Broadly speaking, we have the tools, we just need much greater resource and political will," says Butchart.

Even so, ***targeted*** actions won't turn the tide alone. Stemming [*biodiversity loss*](https://www.newscientist.com/round-up/biodiversity/) will also require more fundamental changes to how we value nature – and whether those will be forthcoming is the trillion-dollar question (see page 34). For now, here are 10 conservation success stories from around the globe that give some idea of what works.

CALIFORNIA CONDOR *(Gymnogyps californianus)*

International Union for Conservation of Nature (IUCN) Red List status: [*Critically endangered*](https://www.iucnredlist.org/species/22697636/181151405)

Numbers of the largest North American ***land*** bird declined so steeply in the 20th century that only 27 were left by 1987, at which point all were taken into captivity to try to save the species. "They are basically a vulture. They feed on carcasses and ingest fragments of lead shot, and because they live for decades, that can accumulate over time. It's incredibly poisonous," says Butchart. Other pressures included chicks ingesting rubbish including glass, collisions with electricity pylons and the insecticide DDT – banned in the US since 1972 – which thinned the species' eggs.

Following a successful captive breeding programme, the condors were reintroduced into the wild starting in 1991. There are now 93 mature individuals in a population of 300 birds in the wild. If numbers continue to increase, their status could be improved to "endangered" on the IUCN Red List by 2024. Lead shot used by hunters to kill animals that the birds scavenge is still a problem, although lobbying led California to ban it in 2019. For now, affected birds are recaptured so dialysis can ***remove*** lead from their blood. "They are by no means saved entirely," says Butchart.

BLACK STILT *(Himantopus novaezelandiae)*

[*Status: Critically endangered*](https://www.iucnredlist.org/species/22693690/129560535)

Regarded as a "living treasure" by the Maori in its native New Zealand, this wading bird came close to being an ex-treasure, largely because of predator species introduced to the country such as cats, stoats and rats. Likewise, non-native animals were the top threat to the 32 bird species Bolam's team identified as saved from extinction.

Loss of habitat to ***agriculture*** and hydroelectric schemes also contributed to black stilt numbers plummeting to just 23 in 1981, when the New Zealand government intervened with an intensive programme of captive breeding and pest control.

Numbers had recovered to 106 in 2017, but predator pressure remains: every four to five years, a bumper release of seeds from southern beech trees causes a boom in rats that prey on this bird's eggs. In 2016, New Zealand set an [*ambitious* ***target*** *to eradicate invasive predators by 2050*](https://www.newscientist.com/article/mg23331110-600-how-new-zealand-hopes-to-get-rid-of-its-pests/).

We have the tools to stem biodiversity loss – we need the will

TIGER *(Panthera tigris)*

[*Status: Endangered*](https://www.iucnredlist.org/species/15955/50659951)

"The story of tigers is a story of decline of one of Earth's largest predators," says Stuart Chapman at conservation body WWF-UK. During the 20th century, this carnivore dwindled across its historical range from India to Indonesia, east Asia and the Russian far east. Habitat loss, poaching and retaliation for conflict with people and livestock were the drivers, says Elizabeth Bennett at the US-based Wildlife Conservation Society. Loss of prey contributed too: one tiger needs to eat a deer-sized animal a week. From an estimated 100,000 a century before, tiger numbers fell to 3200 by 2010.

That year, the international TX2 initiative was agreed with the aim of doubling tiger numbers by 2022 through initiatives such as protected areas, ***removal*** of snares and "tiger underpasses" beneath roads. Official estimates are due next year, but numbers are now thought to be up in India, Nepal, Bhutan, China and Russia – while tigers have vanished entirely from Cambodia, Laos and Vietnam.

"There has been a mixed bag," says Chapman. "Without conservation interventions, they will disappear, no doubt." A major tiger summit in St Petersburg, Russia, in October 2022 is due to take stock and look to a brighter future, including reintroductions.

MOUNTAIN GORILLA *(Gorilla beringei beringei)*

[*Status: Endangered*](https://www.iucnredlist.org/species/39999/176396749)

The first case of gorillas contracting covid-19 – announced by San Diego Zoo in California on 11 January – raises a worrying new risk for the mountain gorilla. This subspecies of the eastern gorilla, the largest living primate, survives in two populations split across rainforest on extinct volcanoes in Rwanda, Uganda and the Democratic Republic of the Congo. It is a poster child for conservation rooted in ecotourism that brings people to their habitat.

Poaching and ***forest*** felling for ***agriculture*** reduced mountain gorilla numbers to around 250 in 1981. After earlier attempts to establish protected areas antagonised some local communities, ecotourism took off and made gorillas more valuable alive than dead – permits to see the animals can cost $1500 each, says Bennett.

Numbers now stand at a minimum of 1063 – the only great ape that is on the up. Continuing threats include disease and snares set to poach other animals, says Cath Lawson at WWF-UK. "We consider it to be a conservation success story, but it's not a done deal," she says. Rwanda and Uganda are now resuming tourist visits, and these will include steps to minimise covid-19 risk, after a pandemic-induced hiatus.

INDUS RIVER DOLPHIN *(Platanista gangetica minor)*

[*Status: Endangered*](https://www.iucnredlist.org/species/41758/151913336)

This river dolphin, a subspecies of the South Asian river dolphin that relies on echolocation, is found only in the Indus river basin, mostly in Pakistan. In 1923, British colonial authorities built the first of 19 barrages across the Indus to divert water for irrigating crops, fragmenting the dolphins' habitat. Once found throughout the 3000-kilometre-long Indus, their range shrank to 1300 kilometres. By 2001, numbers had dropped to 1200.

Satellite tracking in 2009 showed that the dolphins can sometimes pass through the barrages, but they often strand and die in the irrigation canals that run off them. Fishing nets pose a further problem. The barrages can't simply be removed, says Uzma Khan at WWF-Pakistan. Acoustic devices help deter the dolphins from entering the canals, but educating fishing communities and recruiting local people for ecotourism and monitoring has been the key to an uptick to some 1800 animals, says Khan. "I initially saw it all as a scientist," she says. "I learned you cannot do anything without communities."

The blue whale recovery shows what humans can do if they leave things alone

ANTARCTIC BLUE WHALE *(Balaenoptera musculus intermedia)*

[*Status: Critically endangered*](https://www.iucnredlist.org/species/41713/50226962)

"The world used to run on whales," says Jennifer Jackson at the British Antarctic Survey. Hunted mainly for their oily blubber, the Antarctic subspecies of the largest whale was particularly desirable. From an estimated 239,000 before the advent of industrial whaling in the early 20th century, by the early 1970s, whaling had whittled them down to just 360.

The species was given legal protection in the 1960s, but Soviet whalers continued hunting in the Southern Ocean regardless. "They just hoovered up the remaining whales," says Jackson. An international moratorium on whaling signed in 1986 had global scope and adherence – though it was only agreed when it was clear there were precious few whales left to catch.

Preliminary estimates show that Antarctic blue whales recovered to some 4500 individuals by 2015, says Jackson, though that number won't be formally confirmed until later this year. It will take centuries for them to revive fully, but "the blue whale recovery is symbolic of what humans can do if they just leave things alone", says Jackson. Rod Downie at WWF-UK says the biggest threat to the species today is climate change, especially changes to sea ice that affects nurseries of krill, the tiny crustaceans that nourish the largest animal to have existed on Earth.

EUROPEAN BISON *(Bison bonasus)*

[*Status: Near-threatened*](https://www.iucnredlist.org/species/2814/45156279)

Nearly 2 metres tall and weighing up to a tonne, Europe's largest ***land*** mammal once ranged from Spain to the Caucasus. It has staged a remarkable comeback since the last wild one was killed in Poland's Białowieża ***Forest*** in 1927, the victim of hunting and habitat destruction and fragmentation.

The bison's reintroduction across Eastern Europe from the final 54 left in captivity has been an "incredible story", says Paul de Ornellas at WWF-UK. "One of the lessons is that successful reintroductions require a lot of effort, coordination and people," he says.

The IUCN relaxed the bison's status from vulnerable to near-threatened last December, after numbers rose from 1800 in 2003 to 6200 in 2019. There are now 47 free-ranging herds in countries including Germany, Poland and Romania, although only eight are considered big enough and genetically diverse enough to be self-sustaining. Action is now focused on growing the small groups and helping herds connect.

JAVAN RHINOCEROS *(Rhinoceros sondaicus)*

[*Status: Critically endangered*](https://www.iucnredlist.org/species/19495/18493900)

In 2010, the last of these ***forest*** rhinos on the Asian mainland was found dead in Vietnam, apparently perishing months after being shot. Poaching and habitat loss – to ***agriculture***, including palm oil plantations, and growing human settlements – had been its nemesis.

Fortunately, around 50 survived in the Ujung Kulon National Park in the west of the densely populated Indonesian island of Java. There are now 74 in the park, says Bibhab Talukdar at the IUCN, thanks to efforts led by the Indonesian government. These included making their home a protected area and managing the invasive palm *Arenga obtusifolia*. This plant rapidly crowds out others once it gets a toehold, says CeCe Sieffert at the International Rhino Foundation. "Other plant species cannot compete with it and it's inedible to Javan rhino," she says.

Her group hires local people to cut the palm down by hand. But with the only home for these rhinos at risk from tsunamis, volcanic eruptions and disease, suitable sites must be found for reintroductions. "It's so we don't have all the eggs in one basket," says Talukdar.

GIANT PANDA *(Ailuropoda melanoleuca)*

[*Status: Vulnerable*](https://www.iucnredlist.org/species/712/121745669)

Logging, expanding cities, tourism and roads carving up its ***forest*** home drove what Qiang Xu at WWF-China calls a "very rapid decline" in the giant panda in the 20th century. Surveys between 1985 and 1988 found just 1114 animals, down from the 2459 detected between 1974 and 1977.

Political will and protected areas turned the story around. China has created 67 giant panda reserves since the 1960s, and in 1988 banned logging entirely in their habitats. "The determination and investment of the Chinese government is the key," says Xu. The fourth national survey of the animals in 2015 found 1864 of them. A year later, their official conservation status was altered to reflect this, going from "endangered" to "vulnerable".

But the surviving 20 populations remain fragmented. The recently declared Giant Panda National Park, which extends across more than 27,000 square kilometres in the Chinese provinces of Sichuan, Shaanxi and Gansu, is a major attempt to fix that. Time will tell if it works.

HAINAN GIBBON *(Nomascus hainanus)*

[*Status: Critically endangered*](https://www.iucnredlist.org/species/41643/17969392)

The world's most endangered primate, endemic to the Chinese island of the same name, shrank from 2000 individuals to around nine by the 1980s. Hunting and rainforest clearance confined them to just one block of ***forest*** called Bawangling.

Monitoring by conservationists and local people since 2005 has deterred poaching, and hands-on interventions, such as a canopy bridge built after a typhoon to help gibbons cross a gap in the ***forest*** made by a landslide, [*are helping too*](https://www.newscientist.com/article/mg23130810-300-too-cute-to-lose-saving-the-rarest-mammal-from-extinction/). "They are slowly but steadily increasing," says Bosco Chan at Kadoorie Farm and Botanic Garden in Hong Kong. Last year, a fifth group of the primates was identified, and there are now believed to be around 33 individuals.

Pengfei Fan at Sun Yat-Sen University in Guangzhou, China, says that while the numbers are "still very, very small", there is commitment to their protection. Regional and central government upped investment last year, patrols are increasing and one village near their habitat may even be moved, says Fan. "It shows, even with the most doomed species, there is always hope," says Bosco.

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[***Britain will use its financial and diplomatic power to help save the planet***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60XX-TYG1-DY4H-K1DF-00000-00&context=1516831)

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**Section:** NEWS; Version:1

**Length:** 692 words

**Byline:** By Zac Goldsmith

**Highlight:** Factory farming and deforestation are to be tackled by the UK government

**Body**

The Covid pandemic has exposed our vulnerabilities, on multiple levels. But with any luck, it will also serve as a wakeup call.

Grubbing out whole ecosystems and perpetuating the grim illegal wildlife trade - not to mention the worst excesses of factory farming - all contribute to dislodging and facilitating deadly new diseases. And at the same time, our routine misuse of antibiotics has compromised our capacity to cope.

The science couldn't be clearer; this crisis will be dwarfed by others if we continue destroying the natural environment and destabilising our fragile climate.

This month, the Living Planet Index showed that populations of key species have declined by 68 per cent in little more than my lifetime - an evolutionary nanosecond. Hundreds of thousands of species face extinction, from marine leviathans to chameleons small enough to balance on the head of a match.

Every minute, the world loses thirty football pitches worth of ***forests***, making deforestation the second leading cause of climate change.

It is the Lorax writ large - a tragedy. And it is a human tragedy too. A billion people depend on the ***forests*** for their livelihood. Roughly the same number of people depend on fish for their survival. When nature's free services fail, it is the poorest who suffer first.

Turning this around is surely the principle challenge of our age. We can do it, if Governments step up.

As co-hosts of the next Climate COP, the UK is in pole-position to galvanise global action. On ***emissions***, the market is thankfully racing ahead of the politics, with investment in renewable energy now exceeding investment in fossil fuels. But technology alone cannot prevent climate change.

Nature-based solutions, like protecting and restoring mangroves, ***forests*** and peatlands could provide a third of the cost-effective climate change mitigation we need, while helping turn the tide on the extinction crisis. Despite this, they attract a measly 3 per cent of global climate funding. It makes no sense at all.

So the UK will use our Presidency of COP26 to persuade other countries to put nature at the heart of their climate response.

At last year's UN General Assembly, the Prime Minister committed to doubling our international climate funding to £11.6 billion, and to investing much of that in nature.

We are rolling out ambitious programmes - a new £100 million Biodiverse Landscapes Fund to connect critically important landscapes, and the £500 million Blue Planet Fund to restore marine ecosystems. Our Blue Belt initiative is on course to protect an area the size of India around our Overseas Territories, and we are leading the global campaign to protect at least 30 per cent of the ocean by 2030.

Money alone won't solve the problem, but governments hold powerful levers to make markets value nature and attach a cost to environmental destruction.

Globally, ***agriculture*** causes 80 per cent of deforestation, mostly for growing commodities like palm oil, soya, and cocoa. If the top fifty food producing countries follow our lead in replacing their ***land*** use subsidies with a system that rewards farmers for environmental stewardship, $700 billion a year - around four times the world's aid budget - would shift to support nature.

And we have launched a world-leading consultation on a due diligence requirement on big companies to ***remove*** deforestation from their supply chains. If we can persuade other countries too, this could flip the market to make ***forests*** worth more alive than dead.

Today at the UN, our Prime Minister will sign a 'Leader's Pledge for Nature' that the UK has played a leading role in crafting. An ambitious call to action, it recognises the failure of so many previous declarations, and invites every generation to judge leaders on whether they honour their word.

As governments map out their economic recoveries we have a choice. We can prop up the status quo, locking in decades of carbon ***emissions*** and environmental destruction. Or we can choose this moment to profoundly reset our relationship with the natural world.

Lord Goldsmith is the International Environment minister.

**Load-Date:** September 27, 2020

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[***Biodiversity–productivity relationships are key to nature-based climate solutions***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:671W-P2B1-JCWX-C2SG-00000-00&context=1516831)

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**Body**

Main

Climate change and biodiversity loss are two major environmental challenges in this era of global change. Although the tight linkages between them have been recognized,, the vast majority of attention has been paid to one unidirectional relationship—climate change as a cause and biodiversity loss as a consequence. Climate change is projected to become an increasingly important driver of biodiversity loss, and its interaction with other major drivers such as ***land***-use change will indirectly accelerate its impacts on biodiversity further. For example, in terrestrial systems, most species ranges are predicted to shrink dramatically, even for a rise in global temperature below 2 °C,. Besides, some ***land***-based measures of climate change mitigation have detrimental side-effects on ecosystems,, because of substantial ***land*** conversions such as large-scale bioenergy crop production and afforestation with monocultures. There is now recognition of the need for nature-based solutions, which involve working with nature to address societal challenges such as climate change–. Better management and restoration of natural ecosystems, such as ***forests***, coastal ***lands*** and peatlands, could produce multiple benefits to society including the conservation of biodiversity and sequestration of carbon,,–. In response, the United Nations (UN) has declared the present decade (2021–2030) the Decade on Ecosystem Restoration ([*www.decadeonrestoration.org*](http://www.decadeonrestoration.org)) to ensure ecosystem services are sustained, such as the ***removal*** of carbon from the atmosphere.

However, natural climate solutions are currently missing biodiversity as part of the equation: that is, although biodiversity is often seen as a ***target*** for conservation, it is not yet widely appreciated as a powerful contributor to climate stabilization,,.

***Forest*** productivity is often higher in species-rich ***forests***, which absorb more carbon than species-poor ***forests*** such as tree monocultures–. Moreover, communities with more species are better able to sustain their productivity in the face of global environmental change, indicating a synergistic interaction between biodiversity and climate change. Thus, conserving biodiversity, and particularly the diversity of tree species, may have a previously unquantified contribution to global climate change mitigation. Biodiversity loss is increasingly recognized as a driver that can amplify climate risks and the associated economic risks. However, it is still challenging to quantitatively incorporate the effects of diversity change on carbon storage—which often arise from local scale species interactions—into global scale models, that assess how ***land***-use changes and vegetation dynamics will drive future climate change. Here, we assess how biodiversity effects on climate change—the ecological and marginal economic benefits of having more species in an ecosystem—might accumulate on larger scales relevant to policy,.

We assess how efforts to mitigate climate change can reduce climate impacts on the diversity of woody plant species (hereafter, tree diversity), which, in turn, can safeguard the ability of ***forests*** to store carbon (Fig. ). To assess this potential on the global scale, we quantified future shifts in species richness on the local scale (that is, 30 arcsec, total number of grids ≈ 115 million; Fig. ) by combining multiple methods of ecological modelling (). We combined these local scale estimates of species richness changes with local scale estimates of proportional changes in primary productivity in response to richness changes—a parameter estimated within ***forests***, which reflects the strength of local tree diversity effects on productivity after accounting for climate and soil covariates. Then, by further multiplying these estimates by net primary productivity (NPP; Pg C yr−1) derived from Moderate Resolution Imaging Spectroradiometer (MODIS) imagery, we quantified how proportional changes in local species richness could affect changes in biomass production (that is, tree diversity-dependent productivity) on the local scale. Finally, we aggregated these changes in local productivity to produce large-scale estimates of changes in productivity (due to changes in tree diversity resulting from climate change) on biome, national and regional scales (Figs. –). Note that, among many primary producer species, we especially focused on tree and shrub species (hereafter jointly referred to as trees) in different biomes. As some of them are present also in non-***forested*** biomes, our global analyses extend to woody species in all terrestrial biomes (all 14 biomes defined by the World Wildlife Fund; [*www.worldwildlife.org/biomes*](http://www.worldwildlife.org/biomes)). On a regional scale, we focused on the subregion categories of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES: ipbes.net/regional-assessments).

Schematic diagram of a possible pathway to biodiversity-based climate solutions.

There is much emphasis on the undesirable feedbacks where climate change drives biodiversity loss (magenta arrows feedback). Here, we highlight the contribution of an underutilized positive feedback in which biodiversity-dependent productivity could contribute to climate change mitigation (green arrows feedback). The conservation and restoration of tree diversity could enhance this feedback and promote the desirable pathway whereby ***forest*** biodiversity contributes to climate change mitigation.

Biome-level projections in alleviating the loss of tree diversity from 2005 to the 2070s.

a, Map of biomes where trees are present and the distribution of coarse grids (on the spatial scale of 30 arcmin) within each biome along temperature and precipitation gradients (annual means for the period 1970–2000). Colours of the points of each biome correspond to those shown in b. b, Ridge density plots showing the effect sizes of an effective climate change mitigation policy on ΔSR, calculated as mean α diversity change within each of the coarse grids between 2005 and the 2070s (n = 32,670 grids). Results are shown for the five SSPs. Ensembled results across the three GCMs are shown; the points and horizontal bars indicate means and their 95% confidence intervals, respectively. When the effect sizes in each biome were converted into percentage changes, the consequences of mitigation efforts corresponded to approximately 3.0–61.3% reductions in local tree species loss compared with the respective baseline scenario. Outliers are not shown for density plots. Results for each GCM are shown in Extended Data Fig. . Numbers after biome names correspond to those used in Figs. and , and Extended Data Figs. , and .

Biome-level projections in the effect of a climate change mitigation to alleviate the loss of tree diversity-dependent ΔP from 2005 to the 2070s.

The effect sizes of ΔP were calculated on the local scale (on the spatial scale of 30 arcsec) in 14 biomes that include trees (n = ~115 million grids). Results are shown for the five SSPs. Ensembled results for the effect size across the three GCMs are shown; the points and vertical bars indicate means and their 95% confidence intervals, respectively. Colours of the points and numbers of each biome correspond to those shown in Fig. . When the effect sizes in each biome were converted into percentage changes, the consequences of mitigation efforts corresponded to approximately 8.8–38.9% reductions in productivity loss compared with the respective baseline scenario. Results for each GCM are shown in Extended Data Fig. . Insets show the relations of the effect sizes with climate (annual mean temperature (temp.; °C) and precipitation (precip.; mm)); all significant at P < 0.001. Small maps are to visualize the effect sizes of each biome. Maps of the effect sizes on the coarse grid scale are shown in Extended Data Fig. .

Biome-level sums in the effect of a climate change mitigation to alleviate the loss of tree diversity-dependent ΔP from 2005 to the 2070s.

Radar charts showing the proportional contribution of productivity loss resulting from species loss in each biome to global productivity loss under the mitigation (top) and baseline (bottom) scenarios (%). Colours and numbers of each biome correspond to those shown in Fig. . The order of biomes in each radar chart is based on the per-area productivity loss of each biome (clockwise; from small to large loss), which is indicated by the black dotted arrow. Mean values across the three GCMs are shown for the five SSPs. Results of ΔP in each biome for each GCM are shown in Extended Data Fig. .

Subregion-level projections in the effect of a climate change mitigation to alleviate the loss of tree diversity-dependent ΔP from 2005 to the 2070s.

The effect sizes of ΔP were calculated on the local scale (on the spatial scale of 30 arcsec cells; n = ~115 million grids) for 17 subregions (based on the IPBES). Results are shown for the five SSPs. Ensembled results across the three GCMs are shown; the points and horizonal bars indicate means and their 95% confidence intervals, respectively. Vertical black bars indicate zero values of the effect size in each subregion (see scale at the bottom left). Results for each GCM are shown in Extended Data Fig. .

Our analyses used five Shared Socioeconomic Pathways (SSPs) reflecting different plausible projections of ***land***-use change. The underlying allocation scheme, based on an integrated assessment model, implements climate change mitigation in the form of a globally uniform carbon tax on GHG ***emissions*** from the ***agriculture***, ***land***-use and energy sectors. Using a scenario matrix architecture, we compared two future scenarios: high-***emission*** baseline versus mitigation scenario. The mitigation scenario assumes levels of GHG ***emissions*** will stabilize the global mean temperature rise relative to preindustrial times to less than 2 °C by the end of the twenty-first century. The baseline scenario assumes a continued increase in GHG ***emissions***, and thus also the global mean surface temperature continues to rise. We relied on three general circulation models (GCMs) to consider two different representative concentration pathways (RCPs) in each of the five SSPs. Thus, we considered a wide range of future ***land*** allocation and climate conditions. We quantified how efforts to mitigate climate change could alleviate species loss (ΔSR) and thereby avoid biodiversity-dependent productivity loss (ΔP) on the local scale as log ratios, with zero corresponding to the true absence of the effect ().

We found that, in many biomes, climate change mitigation could substantially reduce the global loss of tree diversity that would otherwise be expected to result from an unabated continuation of climate change (Fig. ). This, in turn, is expected to reduce the loss of productivity that would otherwise be expected to result from biodiversity loss (Fig. ). Climate change mitigation is estimated to curtail productivity losses by approximately 9–39% compared with the baseline scenario of unabated warming (Fig. ). The alleviated loss of tree diversity and the resultant conservation of biodiversity-dependent productivity are especially substantial in colder and drier biomes compared with warmer and wetter biomes, probably because species in these biomes are often close to the edge of their climatic niche. Losing one species may have a disproportionate impact in ecosystems where only a limited number of species are filling niche space and functional redundancy is thus low. Among these biomes, cold areas in particular are expected to gain species in a warmer future, due to the poleward migration of species. However, the poor dispersal ability of trees (coupled with the pace of climate change and ***land***-use change) generally makes it difficult for species to track their environmental optimum under anthropogenic warming,. Further, warming could alter the strength of the diversity–productivity relationship, though this has not yet been well studied in ***forests***. A possibility is that, if conditions become less limiting due to climatic warming, the productivity of individual trees might increase, potentially offsetting the negative impacts of species decline on primary productivity. Owing to these and other possibilities, the responses of tree diversity and associated productivity in a changing climate can vary by region. Variable responses among biomes are also seen for the absolute impacts of losing diversity in different biomes of the world. While the per-area loss of biodiversity-dependent productivity tended to be small in warmer biomes such as tropical and subtropical ***forests***, their gross contribution to global productivity loss was considerable due to their high absolute productivity and the extent of these biomes (Fig. ). The analysis conducted on the IPBES subregional scale also illustrates the spatially heterogeneous effectiveness of climate change mitigation efforts in safeguarding ***forest*** productivity (Fig. ). This heterogeneity in the responses among regions is partly due to variation in the extent to which biodiversity is conserved when climate change is mitigated (Fig. and Extended Data Figs. –). Furthermore, substantial ***land***-use changes may be required for stringent mitigation efforts, especially under the scenarios of high demand for bioenergy consumption, which could have detrimental effects on biodiversity in some regions,. Overall, although the estimations were variable among GCMs and SSPs (Extended Data Figs. –), tree diversity in most biomes and subregions would benefit from additional efforts to reduce GHG ***emissions***. Overall, climate change mitigation efforts conserve the diversity of woody plant species and primary productivity, which contributes to carbon storage in terrestrial ecosystems.

To gain further insights at the national level, the scale on which many policy decisions are made, we aggregated the regional heterogeneity into country-level estimates and considered how tree diversity effects on productivity at the country level relate to the economic value of avoiding carbon ***emissions***. Here, we obtained the absolute country-wide estimate of reductions in productivity loss due to climate mitigation efforts. We compared these estimates with the country-level social cost of carbon (CSCC; US$ (t CO2)−1), which is the marginal damage expected to occur in a particular country as a consequence of additional CO2 ***emissions*** produced anywhere in the world. We found that countries with a high CSCC, which have the greatest incentive to mitigate climate change to avoid its economic damages, also tend to be the countries where climate change mitigation could greatly help maintain primary productivity by safeguarding tree diversity, regardless of model and scenario (Fig. and Extended Data Fig. ). Thus, countries with both large CSCC and productivity conservation potential, which especially include but are not limited to those with a large ***land*** area (Fig. and Extended Data Fig. ), have a great incentive to focus their efforts on stabilizing climate by safeguarding tree diversity as a potent nature-based climate solution, in addition to reducing the ***emissions*** from industry and the energy sector. For instance, the United States and China—the two biggest emitters of carbon—are estimated to experience some of the biggest economic damages due to anthropogenic global warming, indicating a great responsibility and opportunity to mitigate ***emissions*** by maintaining tree diversity. Brazil has the largest potential to benefit in multiple ways from climate mitigation efforts (outliers in Fig. ; also see Extended Data Fig. ). In contrast, Canada and Russia are expected to experience only small economic damages or may even benefit from climatic warming. Nonetheless, as the largest ***forested*** countries in the world, their contributions are a vital part in considering biodiversity-dependent productivity as a nature-based solution, particularly as they also have experienced the largest loss of tree cover in recent years. Moreover, India and Indonesia—which bear some of the greatest social costs of carbon pollution even though they are not among the top emitters of carbon—have pledged to restore large areas of natural ***forests***. Such efforts offer opportunities for the international community to internalize the global climate externality and help achieve global pathways to stabilize climate while also conserving biodiversity. Although restoring natural ***forests*** and their biodiversity will not fully compensate for GHG ***emissions***, this strategy could be developed to form clear national and international ***targets***.

Country-level outcomes of a climate change mitigation to conserve tree diversity-dependent productivity.

a, The relationship between the CSCC, which is the marginal damages expected to occur in a particular country as a consequence of additional CO2 ***emissions***, and the country-level conservation of biodiversity-dependent productivity (CCBP; the differences in local productivity changes, ΔP, between the two scenarios aggregated for each country). The largest value (outlier) of CCBP is Brazil for all SSPs. Results for each GCM are shown in Extended Data Fig. . b,c, The relationships of the terrestrial area analysed for each country with the CCBP (b) and the CSCC (c). The lines and shaded areas are the estimates based on a generalized additive mixed model and their 95% confidence intervals, respectively. Results are shown for the five SSPs. d, The sum of productivity conservation across countries for the five SSPs (mean ± standard error across three GCMs). These estimates corresponded to 4.9–6.7% of total NPP in the terrestrial areas analysed.

We estimate that the possible conservation of biodiversity-dependent annual productivity by means of climate change mitigation corresponds to approximately 4.9–6.7% of the present total NPP in the terrestrial areas analysed (Fig. ). This substantial contribution emphasizes that biodiversity conservation is not only a ***target*** in and of itself, but can also be a critical part of the solution to the ongoing climate crisis. Our results indicate that ambitious efforts to mitigate climate change—at both the national and global levels—have a substantial potential to help societies reduce the externalized cost of carbon. Although decarbonizing the economy and relying on nature for carbon storage are both seen as important but parallel options, our results quantitatively show that they are tightly connected. Still, many reforestation programmes and policies focus on monocultures,, which misses the potential contribution of tree diversity to carbon sequestration we highlight here. We stress the value of restoring and conserving diverse natural ***forests***, which harbour great plant, animal and microbial biodiversity, provide a variety of ecosystem services, and contribute to climate stabilization,. Carbon-based ***forest*** management has been suggested as a way forward, but an estimated 45% of national level commitments to restore ***forests*** propose monocultures of trees profitable for businesses. Planting vast expanses of monocultures will preclude the opportunity for a triple win for nature, climate and society that can arise by fostering tree biodiversity (Fig. ).

Sustainable ***forest*** management has been emphasized in many policy contexts, including UN frameworks–, and can provide a natural climate solution pathway. While sustainable ***forest*** management emphasizes the importance of biodiversity conservation as an objective,, climate policy has, to date, largely ignored the dependence of primary productivity on biodiversity and the contribution of tree diversity to carbon storage,,. Despite this gap, reports produced by the UN Convention on Biological Diversity have repeatedly supported the use of biodiversity and ecosystem services as part of an overall strategy to help mitigate climate change and the associated risks to society,. Since 2009, this UN framework has mentioned the potential of increasing biodiversity in ***forests***, emphasizing the positive effects on ecosystem productivity and carbon storage. Yet most strategies so far have focused on avoiding further ***land*** conversion and expanding ***forested*** areas. In addition to considering the spatial extent of ***forests***, their status and quality—for example, in an extreme comparison, whether they are mono-species plantation or species-diverse old-growth stands—deserves further consideration,,,. A dual focus on both the quantity (area) and the quality (biodiversity) of ***forest*** ecosystems could help support climate stabilization. We therefore emphasize the great value of biologically diverse ***forests***,,,, both planted and restored.

The projections we make contain several sources of uncertainty, which future research could help resolve. For example, we focus on a limited subset of woody species to represent the tree diversity in the ***forests*** around the globe (Extended Data Fig. ). Most species on Earth are still poorly described, which makes estimating their present and future ranges challenging. Our estimates are thus probably conservative because they are based on well-documented species, whereas poorly described species, which often have narrow geographical ranges and small population sizes, are more prone to climate-driven extinction. Given the disproportionately large contributions by some rare species to ecosystem functioning, our approximation of biodiversity-dependent productivity could be seen as a lower bound estimate. Although modelling the spatial distributions of rare species, which generally have a limited number of occurrence data, is challenging, analytical approaches are developing rapidly to foster the conservation of poorly described species. These emerging methods will help to improve future estimates of biodiversity change and its consequences for the supply of ecosystem services.

Another source of uncertainty is that new combinations of species are likely to emerge under a changing climate, which may alter interactions between species and probably influence the magnitude of diversity–productivity relationships. Although the dispersal ability of each tree species is explicitly considered in our analysis, it is highly likely that novel combinations of species will emerge in the future, resulting from idiosyncratic events (for example, exceptional long-distance dispersal) and human influences (for example, climate-suitable planting and assisted migration,). Furthermore, our results should be interpreted with care because responses at the biome level were not necessarily consistent across socioeconomic pathways (Fig. ). This was especially true when summarized on large scales such as at the level of the IPBES subregions (Fig. ): large variability was especially identified in Western/Central Asian and West African subregions, where the outcomes of climate change mitigation policy ranged from negative to positive. In this study, we did not separate the individual influences of different climate mitigation practices (for example, reforestation, bioenergy production and low-carbon energy use) on biodiversity and primary productivity, but doing so could help identify drivers underlying such inconsistent responses in the future. For example, if mitigation goals were achieved by afforestation in formerly non-***forested*** ***lands*** such as peatlands and grasslands, then this could have unintended negative impacts on biodiversity and the productivity of these ecosystems. Another consideration is that the ability of ***forests*** to increase the uptake of carbon in the short term (for example, over the next decade) cannot be linearly translated into the ability of ***forests*** to halt climate warming over a 50–100-year time horizon. This is because complex biogeochemical and biophysical processes—for instance, surface exchange of energy and water vapour and sensible heat flux, resulting from compositional and structural changes in ***forests***—might not directly parallel the effects of carbon uptake rates on climate,. Carbon storage in deadwood and soil—critical drivers of terrestrial carbon dynamics,—was also not considered in this study. Finally, in our estimates of the change in social cost from conserving species and productivity (Fig. ), we did not fully account for management and opportunity costs. Nonetheless, our estimates provide a first global assessment of the contribution of biodiversity in ***forests*** to climate change mitigation on which future refinements can build.

We advocate for the protection and restoration of biologically diverse ***forests*** because they can make a substantial contribution to climate change mitigation,, helping to avoid irreversible change to the Earth system. Nature-based solutions are among the fastest and most cost-effective policy options,. As such, there is an enthusiasm for relying on trees and ***forests*** to recapture carbon. Now, it is urgently necessary to accurately assess this potential to guide the ongoing efforts such as the Intergovernmental Panel on Climate Change. Here we identify an important backbone for these considerations—tree diversity—as a missing piece of the nature-based climate solution puzzle. By buying time, climate mitigation efforts are essential to help both people and biodiversity adapt to climate change. Our emphasis on biodiversity-dependent climate change mitigation is thus also important for ecosystem-based adaptation. However, a nature-based approach is only one option, along with others that are necessary, including substantial reductions in energy ***emissions*** and the transition to renewable sources of energy. Although challenging, reducing the adverse impacts of climate change on species in ecosystems is important (Fig. ), as they serve as a massive sink and storehouse of carbon (Figs. –), thereby contributing to climate stabilization (the desirable pathway to stabilizing feedback between climate change mitigation and biodiversity conservation in Fig. ). Solving one environmental problem may help address the other, whereas failing to address either problem may lead to the further deterioration of both biodiversity and climate crises. Here we show an opportunity to create a triple win for climate, nature and society by simultaneously protecting and leveraging the ecosystem benefits contributed by the biodiversity of the world’s ***forests***.

Methods

Our workflow of how to estimate proportional changes in species richness and ***forest*** productivity as well as absolute changes in NPP on the local scale is visualized in Supplementary Figs. and . We refer to the for a full description of the methods, and provide only a succinct summary of our approach here.

Species distribution modelling

Spatially explicit observations of tree and shrub species (hereafter referred to as trees) were available from a previous study. Also see Supplementary Table for the protocol of our species distribution modelling, which relied on climate and ***land***-use variables. Note that the modelling was previously conducted at a spatial resolution of 30 arcmin (hereafter, coarse grids). Here we extended the modelling to a resolution of 30 arcsec (hereafter, fine grids) to improve our approximation of biodiversity-dependent productivity (see below). However, the modelling for species distributions on the fine scale was possible only for the present period, because future ***land***-use variables were available only on the scale of coarse grids. We sampled one occurrence record per grid for all species at both spatial resolutions. To avoid the effect of model inaccuracy from small sample size, we limited our analysis to species that had occurrence records of 30 and more. These resulted in 1,755 and 934 ***target*** tree species at a spatial resolution of fine and coarse grids, respectively. See Supplementary Data for the list of these ***target*** species.

For the present period, we obtained a dataset of 19 bioclimatic variables, calculated from monthly minimum temperature, maximum temperature and precipitation at the resolution of fine grids downloaded from the WorldClim 1.4 ([*www.worldclim.org*](http://www.worldclim.org)). Then, we obtained ***land***-use variables at a resolution of fine grids from the MODIS ***land*** cover type for the year 2005 (glcf.umd.edu/data/lc; accessed April 2018). We used ***land*** cover classes from the global vegetation classification scheme of the International Geosphere-Biosphere Programme ([*www.igbp.net*](http://www.igbp.net)) as a categorical variable in our models of species distribution. One of the five ***land***-use types (cropland, pasture, ***forest***, other natural ***lands*** and settled ***land***) was assigned to each of the fine grids. For future scenarios, we focused on a mitigation scenario and a high-***emission*** baseline scenario based on the RCPs: the mitigation scenario aimed to stabilize climate change by the end of the twenty-first century, whereas the baseline scenario assumed increasing GHG ***emissions*** and thus climate change over time. We set the ***target*** period for analyses as the 2070s. We used future climatic variables based on three GCMs included in the Coupled Model Intercomparison Project Phase 5 experiment: MIROC-ESM-CHEM, HadGEM2-ES, and GFDL-CM3 (ref. ), downloaded from the WorldClim 1.4 ([*www.worldclim.org*](http://www.worldclim.org)). All 19 bioclimatic variables for the future were calculated using the same method as for the current climate. We estimated changes in future ***land*** use under the mitigation and baseline scenarios with AIM/CGE, a computable general equilibrium model representing the entire global economy. AIM/CGE implements climate change mitigation in the form of a global uniform carbon tax on GHG ***emissions*** from the ***agriculture***, ***land***-use and energy sectors. The allocation of ***land*** by sector for 17 regions is formulated as a multinomial logit function to reflect differences in substitutability across ***land*** rent, and regional ***land*** use is further downscaled to the scale of coarse grids based on spatially explicit attainable yields. In this study, we relied on the SSPs framework. The SSPs are based on five narratives describing how socioeconomic factors may change over the next century, considering changes in population, gross domestic product, energy, ***emissions*** and ***land*** use: challenges to adaptation and mitigation are both low (SSP1: sustainability) or both high (SSP3: regional rivalry); low challenges to mitigation are combined with high challenges to adaptation (SSP4: inequality); high challenges to mitigation are combined with low challenges to adaptation (SSP5: fossil-fuelled development); intermediate challenges exist for both adaptation and mitigation (SSP2: middle-of-the-road). Also, refer to Supplementary Table for these narratives. The SSPs employ a concept called scenario matrix architecture, which has a two-dimensional space comprising combinations of socioeconomic patterns, represented by the SSPs, and climate change mitigation levels, represented by RCPs. For our mitigation scenarios, we used each SSP, combined with the RCP with the lowest radiative forcing level. SSPs 1, 2, 4 and 5 were combined with RCP2.6. SSP3 was combined with RCP3.4 because the SSP3–RCP2.6 combination was found to be incompatible. We used the high-***emission*** baseline condition in each SSP for the baseline scenario, assuming the absence of additional climate policy and efforts. Given that ***land***-use scenarios explicitly incorporated areas for bioenergy crops and afforestation for GHG mitigation activity, which did not exist in ***land***-use data in the current condition, bioenergy crops and afforestation were merged into cropland and ***forests***, respectively.

Using these variables, we employed Maxent v3.3 (ref. ) for predicting the current and future probability of occurrence of ***target*** species. First, by using the five ***land***-use and 19 bioclimatic variables, we generated all possible combinations of these explanatory variables. We then excluded explanatory variables showing collinearity. We selected the most parsimonious combination of explanatory variables based on the corrected Akaike information criterion. Among the final models developed for all species, we discarded those with poor performance for subsequent analyses based on tenfold cross-validation, as follows. We used models with Boyce index >0 based on the 95% confidence interval for the subsequent analyses. To obtain a map of suitable habitat for each species under the current conditions, the average value of the relative probability of occurrence calculated by the tenfold cross-validation was converted into a binary map. We applied the average of the 90% sensitivity threshold to minimize the false-negative fractions and to avoid underestimating the suitable habitat area. For future scenarios, we explicitly included a species’ ability to disperse and track the shifting climate by considering dispersal traits. Here dispersal distance per generation was estimated from the formula based on earlier work. Based on this approach, we obtained habitat maps for individual species. The possible changes in areas hospitable to species under different future scenarios were described earlier: briefly, the losses of suitable habitats due to the combined effects of climate and ***land*** use were estimated to be smaller in the mitigation scenario than in the baseline scenario (for example, approximately 17–28% and 22–36% for the mitigation and baseline scenario, respectively, across a wide range of organism groups).

Species richness and productivity estimation

We projected spatial distributions of individual species for the year 2005 and the 2070s at a spatial resolution of 30 arcmin (coarse grids; n = 32,670). For both estimates, we obtained the total number of species present in each coarse grid (γ diversity). For the former year, we also projected spatial distributions of individual species at the spatial resolution of 30 arcsec (fine grids; n = 115,426,714). Based on these projections, we calculated changes in species richness on the scale of fine grids (α diversity) from 2005 to the 2070s for different scenarios of climate and ***land***-use change. We first obtained species–area and endemics–area relationships (SARs and EARs, respectively) for 2005 that were unique to each of the coarse grids. If all fine grids were ***forested***, a coarse grid had 3,600 fine grids. These relationships were used to estimate α diversity in the year 2005 (n = 32,670 grids; each coarse grid had a unique mean value of α diversity). Note that it was infeasible to directly estimate the temporal changes in γ diversity because future spatial distributions were estimated only for a subset of species present in the 2005 data (that is, widespread common species). Instead, we used the number of these common species that went extinct from or immigrated into a given coarse grid by the 2070s for estimating the number of other subordinate species (which were excluded in the Maxent analysis for the period of 2070s because of limited occurrence on the scale of 30 arcmin) that went co-extinct or co-immigrated.

To implement this, we first ran two spatially explicit simulations for species co-extinction and co-immigration. In an artificial landscape with 3,600 homogeneous grids, we randomly drew between 5 and 80 species with total occurrence between 500 and 180,000 individuals, based on a lognormal species abundance distribution with randomly assigned parameters μ and σ of species abundance distributions reported in different biomes–. To consider many possibilities of spatial patterns of tree individuals in different biomes, we randomly assigned individuals of each species to each of the 3,600 grids. For each of these artificial meta-communities, we calculated mean α diversity (number of species per grid), γ diversity (number of species per landscape), Whittaker’s multiplicative β diversity and Shannon’s evenness (across the grids). We also constructed SARs for estimating species richness on the smallest spatial scale. Here we defined common species as abundant species that had an abundance rank of 25% and above. For co-extinction simulation, we randomly made some (up to half) of these common species extinct from a meta-community. Other rare species that were present in the same grid with these extinct common species were also forced to extinction, assuming that these grids became no longer habitable for any species. For co-immigration simulations, we assumed that an artificial meta-community resulted from additional immigration of both common and rare species. We again randomly assigned some (up to half) of the species as common and removed them from the meta-community to construct a pre-immigration meta-community. We also removed individuals of other species that were present in the same grid with these common species, assuming that these grids became newly hospitable in a post-immigration meta-community. We repeated the above co-extinction and co-immigration simulations 25,000 times each. Based on the results from these artificial landscapes, we used extreme gradient boosting (XGBoost) to obtain machine learning regressions for predicting the number of species co-extinct and co-immigrated based on other information described above.

We applied these regressions to the results of species distribution modelling (see Supplementary Fig. for a schematic diagram). By comparing the number of widespread common species in each coarse grid between the 2005 and the 2070s, we obtained the number of common species extinct or immigrated. This information was combined with our XGBoost regressions to obtain the potential number of subordinate species co-extinct and co-immigrated in each coarse grid. When we observed extinctions of some species for the 2070s in a given coarse grid, we converted this total number of species lost into a proportion of habitats that was required for losing these species based on the unique EAR. When we observed immigration by some species for the 2070s in a coarse grid, then we converted this total number of species gained into a proportion of habitat that was required to gain these species based on the unique SAR. By multiplying these proportional changes in the habitable area for the period of the 2070s with species richness values on the scale of fine grids, which were derived from the unique SARs in the year 2005, we obtained the values of α diversity in the 2070s. In some coarse grids, it was not possible to obtain unique SARs or EARs for reasons such as low γ diversity. In such a case, we assumed that proportional changes in the habitable areas between the two periods were estimated by relying on an empirical SAR with the slope value of 0.3 in log–log space,. Based on the changes in γ diversity, we estimated the values of α diversity in the 2070s. Note that, like the year 2005, each of the coarse grids in the period of the 2070s also had a single unique value of α diversity (n = 32,670).

We calculated proportional changes in α diversity from the year 2005 to the period of the 2070s (%) and converted them into proportional changes in ***forest*** productivity (%) based on parameters of the elasticity of substitution (θ), which we estimated for ***forest*** biomes worldwide. The elasticity of substitution can be used to estimate ***forest*** productivity based on proportional changes in tree species richness (that is, α diversity). The values of the elasticity of substitution were originally estimated based on ***forest*** inventory datasets collected on the local spatial scale. For avoiding a potential mismatch due to scaling issues,, we estimated the changes in productivity on the scale of fine grids. We used an NPP dataset estimated using the MODIS imagery for the year 2005 (note, in the terrestrial biomes analysed here, total NPP was approximately 43.78 Pg C yr−1). We obtained NPP values on the scale of fine grids. Here we assumed that all fine grids in a given coarse grid showed the equivalent changes in productivity on a proportional scale, reflecting the mean change in α diversity expected to occur in that coarse grid. Based on these estimations, we have obtained absolute changes in ***forest*** productivity (kg C m−2 yr−1) for different scenarios of climate/***land***-use change on the scale of fine grids. Note that our analyses for tree diversity and productivity changes were conducted for the grids where tree species were observed in the present period and θ values were available (resulting in the analysis of ~115 million fine grids); thus, the results are also shown for non-***forested*** biomes.

Data analyses

We summarized our results on different spatial scales from local to global. Here, the fine grids are defined as the local scale. We also focused on the scales of countries and biomes. Terrestrial biome categories are based on the 14 terrestrial ecoregions used by the World Wildlife Fund ([*www.worldwildlife.org*](http://www.worldwildlife.org)). We have obtained information for areas and names of individual countries from Natural Earth ([*www.naturalearthdata.com*](http://www.naturalearthdata.com)). To be relevant for global policy, we have summarized results also on the scale of the subregion used in the IPBES ([*www.ipbes.net/regional-assessments*](http://www.ipbes.net/regional-assessments)). For some territories and nations that are not explicitly classified into regional categories, we assigned their subregions based on their geographical locations.

To quantify the effect sizes of mitigation efforts on conservation of species and productivity, we calculated the reductions in local scale ΔSR and ΔP as a log ratio scale, which assumes that zero corresponds to no difference between the two scenarios. Estimates based on the baseline and mitigation scenarios were used for the denominator (control; ΔSRbaseline and ΔPbaseline) and numerator (treatment; ΔSRmitigation and ΔPmitigation), respectively. To facilitate interpretation, we multiplied −1 by the effect sizes and thereby positive and negative values, respectively, indicate a more and less effective climate change mitigation policy in reducing species loss and the associated productivity loss (see a schematic diagram in Supplementary Fig. ). To ensemble results across the three GCMs, we obtained global means and the associated 95% confidence intervals for each SSP scenario. We repeated the above calculations at the biome, IPBES subregion and countryscale. For biome-level analyses, we used a mixed-effects meta-regression with the effect size as a response variable, the GCMs as a random effect and climate conditions (mean annual temperature or precipitation of biomes) as a moderator.

Then, we focused on the relationship between the CSCC (US$ (t CO2)−1 (ref. ), estimated for each of the SSPs) and the country-level reduction in ***forest*** productivity loss under a given SSP. Here we were interested in the country-level loss of productivity (absolute changes within each country), instead of the productivity loss per area that can give the average estimates of local productivity changes within a focal area (for example, proportional changes within each country). We thus summed up the differences between ΔPbaseline and ΔPmitigation within each country and multiplied these values by the area of each country (Pg C yr−1). For each of the individual combinations of SSPs and GCMs, we relied on a generalized additive model with the CSCC as an explanatory variable. To ensemble results across the GCMs, we used a generalized additive mixed model with the GCMs as a random effect and the CSCC as an explanatory variable. We additionally checked if the results were affected by ***land*** area, using the generalized additive mixed models. Lastly, we summed up the reduction in productivity loss across all countries, under each of the SSPs and GCMs. This gave us the estimate of global productivity conservation, corresponding to the value, global ∑ (ΔPbaseline – ΔPmitigation).

Reporting Summary

Further information on research design is available in the linked to this article.

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Any methods, additional references, Nature Research reporting summaries, source data, extended data, supplementary information, acknowledgements, peer review information; details of author contributions and competing interests; and statements of data and code availability are available at [*https://doi.org/10.1038/s41558-021-01062-1*](https://doi.org/10.1038/s41558-021-01062-1).

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**Notes**

Extended datais available for this paper at [*https://doi.org/10.1038/s41558-021-01062-1.Supplementary*](https://doi.org/10.1038/s41558-021-01062-1.Supplementary) informationThe online version contains supplementary material available at [*https://doi.org/10.1038/s41558-021-01062-1.Peer*](https://doi.org/10.1038/s41558-021-01062-1.Peer) review informationNature ClimateChange thanks Christian Ammer, Louis Iverson, Jacqueline Oehri and the other, anonymous, reviewer(s) for their contribution to the peer review of this work.Publisher’s note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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**Graham Lawton** is a feature writer for *New Scientist*

**Highlight:** If a far-off future generation writes a complete history of human civilisation, the century from 1950 to 2050 will loom large. This was the era of the Great Acceleration, a rapacious, unrestrained plundering of Earth's natural support systems. But it was also the era of the Great Restoration, when humanity learned again how to live sustainably and in harmony with nature.That second part hasn't happened yet. Whether this history is ever written depends on what happens now: on decisions to be made this year as the world emerges from the covid-19 pandemic, and on our actions in the coming decade. Graham Lawton kicks off a special report on Earth's ecosystems and biodiversity at a critical juncture by asking: how can we deliver a rescue plan for nature that is also a rescue plan for us?

**Body**

WE HAVE repeatedly been pressing the snooze button on the issue, but [*covid-19*](https://www.newscientist.com/article-topic/covid-19/) has provided perhaps the final wake-up call. "2021 must be the year to reconcile humanity with nature," said António Guterres, the UN secretary general, in an address to the [*One Planet Summit*](https://www.oneplanetsummit.fr/en) of global leaders in Paris last month. "Until now, we have been destroying our planet. We have been abusing it as if we have a spare one."

The numbers are stark, whichever ones you choose. More than 70 per cent of ice-free ***land*** is now under human control and increasingly degraded. The mass of [*human-made infrastructure exceeds all biomass*](https://www.newscientist.com/article/mg23931932-600-biodiversity-in-crisis-earths-giant-construction-projects-mapped-out/). Humans and domesticated animals make up more than 90 per cent of the mammalian mass on the planet. Our actions [*threaten about a million species*](https://www.newscientist.com/article/mg23931880-200-is-life-on-earth-really-at-risk-the-truth-about-the-extinction-crisis/) – 1 in 8 – with extinction (see "Biodiversity: A status report", overleaf).

All that has happened in a blink of an eye, geologically speaking. "If you compare Earth's history to a calendar year, we have used one-third of its natural resources in the last 0.2 seconds," Guterres said in Paris.

Following a lost decade, and a year-long pandemic-induced delay to negotiations, a new international agreement to conserve the world's [*biodiversity*](https://www.newscientist.com/article-topic/biodiversity/) is due to be signed later this year, with many other initiatives also starting up. The signs are that covid-19, a scourge caused by our dismissive regard for nature, might finally have focused minds. The question is, what needs to be done – and can we do enough in time?

Our relationship with nature started to sour around the start of the industrial revolution, but only really veered off the rails as the [*Great Acceleration*](http://www.igbp.net/globalchange/greatacceleration.4.1b8ae20512db692f2a680001630.html) kicked in after the second world war. In this period, booming [*population*](https://www.newscientist.com/article/mg24833080-800-the-population-debate-are-there-too-many-people-on-the-planet/) and trade and higher levels of prosperity led to an exponential growth of pretty much every measure of humanity's planetary impact: resource extraction, ***agricultural*** production, [*infrastructure development*](https://www.newscientist.com/article/mg23931932-500-special-report-the-new-megaprojects-changing-the-face-of-our-planet/), pollution, and habitat and biodiversity loss.

This plundering was a gamble that has long since ceased paying out. Degraded ***land*** already adversely affects the well-being of 3.2 billion people and costs more than 10 per cent of annual GDP in lost yields, poorer health and other negative impacts. Those are only going to increase. In a [*recent paper*](https://dx.doi.org/10.3389/fcosc.2020.615419) in the journal *Frontiers in Conservation Science*, an international group of scientists warn that the planet is facing a "ghastly future of mass extinction, declining health, and climate-disruption upheavals… this century".

"The world is facing three major crises today: the loss of biodiversity, climate change and the pandemic," says biologist Cristián Samper at the [*Wildlife Conservation Society*](https://www.wcs.org/) in New York. "They are all interrelated, with many of the same causes and solutions."

"The science is so dramatic," says Johan Rockström at the Potsdam Institute for Climate Impact Research in Germany. In 2009, he and his colleagues developed the [*"planetary boundaries" concept*](https://www.newscientist.com/article/mg20527491-200-from-ocean-to-ozone-earths-nine-life-support-systems), which aimed to delineate a safe operating space for humanity, and quantify how we were overstepping it. In a 10th anniversary update in 2019, they suggested that we have [*already crossed four of nine boundaries*](https://www.newscientist.com/article/mg24332470-600-planet-earth-has-9-safety-limits-and-weve-already-exceeded-4-of-them/) – including, crucially, in our impact on biodiversity. "For the first time, we have to consider the real risk of destabilising the entire planet," says Rockström.

"If we fail to act now, future generations will ask, why did we not act to save the Earth given all of the scientific evidence we have?" says Bob Watson, former chair of the Intergovernmental Panel on Climate Change and the [*Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES),*](http://www.unesco.org/new/en/natural-sciences/special-themes/biodiversity/biodiversity-science-and-policy/ipbes/) a UN-mandated body that assesses the latest research on biodiversity.

It isn't that we have lacked good intentions in the past. In 2010, the [*Convention on Biological Diversity*](https://www.cbd.int/) – one of three UN bodies to emerge from the 1992 Rio Earth Summit, along with the Framework Convention on Climate Change and the Convention to Combat Desertification – met in Aichi, Japan. It agreed [*20 biodiversity* ***targets*** *to be met by 2020*](https://www.cbd.int/sp/targets/), from phasing out subsidies for activities that harm biodiversity to ensuring the genetic diversity of farmed and wild plant and animal species. Come 2020, and the final score was [*biodiversity nil, environmental destruction 20*](https://www.newscientist.com/article/2254460-massive-failure-the-world-has-missed-all-its-biodiversity-targets/).

Take a key ***target*** on the amount of ***land*** to be given over to nature. It mandated protection for 17 per cent of ***land*** and fresh water and 10 per cent of the oceans by the end of 2020. Some progress was made, says Samper, but neither goal was reached, with the current numbers being about 15 per cent and just over 7.5 per cent. Those areas that are protected are [*often poorly managed*](https://www.newscientist.com/article/2169186-a-third-of-protected-nature-zones-are-quietly-being-ruined/), too small and don't cover the full richness of Earth's environments: only some 42 per cent of 867 distinct types of ecosystem so far categorised are thought to be well-protected.

"Science tells us that we must expand protected areas to cover at least 30 per cent of the ***land*** and sea by 2030," Samper told the Paris summit. A new group, the [*High Ambition Coalition for Nature and People*](https://www.hacfornatureandpeople.org/), comprising more than 50 countries co-chaired by France, Costa Rica and the UK, is now aiming to secure international agreement for this "30 by 30" pledge.

Beyond conservation

In parallel, on 5 June – World Environment Day – the UN will launch its [*Decade on Ecosystem Restoration.*](https://www.decadeonrestoration.org/) "The main aim is to prevent, halt and reverse the degradation of ecosystems worldwide," says Tim Christophersen at the UN Environment Programme (UNEP), who will be coordinating the initiative. "Nothing more, nothing less. A little bit of a daunting task."

Daunting in particular because in one sense it is already too late. "It's cheaper, of course, to conserve ecosystems, or make sure they don't degrade," says Christophersen. "But we're at a stage now where conservation is no longer enough. We also need to heavily invest in restoration."

Ecosystem restoration will be the key to success or failure over the coming decades. It takes many forms, depending on the ecosystem and how badly degraded it is. At one end of the spectrum is passive [*rewilding*](https://www.newscientist.com/article/mg24031990-100-rewilding-can-we-really-restore-ravaged-nature-to-a-pristine-state/), which simply means getting out of the way and letting nature do its thing. "It's amazing, the capacity that nature has to heal itself," says ecologist Paul Leadley at the University of Paris-Saclay in France, who was a co-author of the 2019 IPBES [*global assessment report*](https://ipbes.net/global-assessment) on biodiversity and ecosystem services.

Small-scale rewilding projects such as at Oostvaardersplassen in the Netherlands, where an area of reclaimed polder ***land*** has been given over to nature, have shown the way, but the ambition must grow – and is growing. In Europe, the biggest project aims to [*leave some 35,000 square kilometres of Lapland*](https://rewildingeurope.com/rew-project/lapland-rewilding-area/) in northern Sweden and Norway to rewild. In North America, the [*Wildlands Network*](https://wildlandsnetwork.org/) aims to link up protected areas in "wildways" in which animals can freely roam spanning Canada, the US and Mexico.

Every dollar spent on ecosystem restoration accrues between $3 and $75 in return

At the other end of the restoration spectrum is active engineering of entire landscapes with [*mass tree planting*](https://www.newscientist.com/article/mg24532640-800-planting-a-trillion-trees-really-can-help-us-fight-climate-change/), ***removal*** of alien species and damaging infrastructure such as dams, and reintroductions of species. This can be done. South Korea adopted an active reforestation policy in the 1950s following the Korean War. The total volume of wood in the country's ***forests*** increased from [*some 64 million cubic metres in 1967 to 925 million cubic metres in 2015,*](https://www.undp.org/content/seoul_policy_center/en/home/presscenter/articles/2019/Sustainable_forestry.html) and ***forests*** now cover some two-thirds of the country. The Green Belt Movement founded in Kenya by Nobel peace laureate Wangari Maathai has planted tens of millions of trees across Africa, and inspired many similar projects.

But while very possible, active restoration brings risks if done unscientifically, says Bernardo Strassburg at the International Institute for Sustainability in Rio de Janeiro, Brazil. "Any scaled-up restoration needs to be ecologically sound," he says. "It is not just planting trees everywhere, particularly in places where trees didn't belong in the first place, like grasslands or wetland. That will be detrimental to biodiversity." Different solutions are needed in different places (see "How to restore an ecosystem", overleaf).

Christophersen thinks the theory and practice of ecological restoration are up to the job. "We have decades of experience with restoration. We know enough. We don't know everything, and we will find out more as we go along. But we know enough to get started. It's one of those situations where you can't let the perfect be the enemy of the good."

The headline ***target*** of the UNEP initiative is to restore 3.5 million square kilometres of ***land*** over the coming decade – slightly more than the size of India, or just over 2 per cent of the world's ***land*** surface. That is "incredibly ambitious", says Strassburg. "If we were to achieve that, it will be the fastest reshaping of [Earth's] surface caused by us." It won't come cheap. According to UNEP, the upfront cost is about $1 trillion, no small change in a post-pandemic recession, although it is an investment with a high rate of return (see "What do ecosystems do for us?", left).

On paper, at least, it is already in the bag. Annelies Sewell at the Netherlands Environmental Assessment Agency in The Hague and her colleagues [*totted up commitments to existing restoration projects*](https://www.pbl.nl/sites/default/files/downloads/pbl-2020-goals-and-commitments-for-the-restoration-decade-3906.pdf) in 115 countries, encompassing plans to increase protected areas, restore and improve ***forests***, croplands and grasslands, and more. They found that this adds up to about 10 million square kilometres, roughly the size of China or just under 7 per cent of world ***land*** surface area. "There's more than we expected," says Sewell. "But that doesn't mean that there's enough."

Crunch time

***Land*** conservation and restoration can help solve multiple environmental challenges, but "it won't fix them on its own", says Sewell. Hence a second pillar of 2021: the negotiation of a new suite of biodiversity ***targets***, replacing the Aichi ***targets***, to run alongside the Decade on Ecosystem Restoration. Together these mean the 2020s will be make-or-break time. "This is the decisive decade for humanity's future on Earth," says Rockström.

These ***targets*** are due to be thrashed out at a pandemic-delayed crunch meeting of the Convention for Biological Diversity (CBD), now to be held later this year in Kunming, China. According to Elizabeth Mrema, executive secretary of the CBD, lessons have been learned from Aichi, and an international coalition of interests is now invested in making new ***targets*** work (see "We have to be optimistic", page 43). The upfront costs will be more than $700 billion, says Mrema – but, as with ecosystem restoration, they come with a huge pay-off. "Every dollar spent will accrue between $3 and $75 of economic benefits from ecosystem goods and services," she says.

Despite Aichi's overall failure, another lesson of the past decade is that, where governments and other groups commit to protecting biodiversity, change can happen (see "Back from the brink", page 42). "I don't want to sugar-coat this because this was not a great result," David Cooper, deputy executive secretary of the CBD, told the [*World Biodiversity Forum*](https://www.worldbiodiversityforum.org/de/virtual-world-biodiversity-forum-2021) 2021 in January. "But where serious actions have been taken, for example to reduce the rate of deforestation, to improve the state of fisheries, to prevent extinctions where we know the cause, significant progress has been made."

Ultimately, success or failure will depend on progress in another key area: [*climate change.*](https://www.newscientist.com/article-topic/climate-change/) This year is crunch time here too, and another big, delayed UN summit to forge a way forward is to be held, pandemic permitting, this November in Glasgow, UK. Success or failure in Glasgow and Kunming will be interlinked. "Without addressing climate change, it's not possible to bend the curve of biodiversity loss: all bets would be off," says Cooper.

But that works two ways: conserving biodiversity and restoring ecosystems will have positive knock-on effects for the climate. "Restoration is one of the most cost-effective tools to mitigate climate change," says Strassburg: ***land***-use change and increased plant cover can deliver up to a third of the reduction in greenhouse gases that we need.

Ultimately, says Mrema, the next decade needs to be about synergy, with biodiversity initiatives, efforts to combat climate change and other international programmes such as the UN Sustainable Development Goals converging on the ultimate ***target***: harmony with nature by 2050.

There are still huge obstacles. "We know that the changes that are needed to move to sustainability are huge, they are not going to be easy," says Cooper. But at least the right noises are being made. In Paris, luminaries including the leaders of Germany, Canada and the UK, Chinese vice-premier Han Zheng and the presidents of the World Bank and the European Central Bank lined up to swear fidelity to the cause of conserving nature. Emmanuel Macron, president of France and convener of the summit, said: "The agenda is now mature and we are ready to act."

Crucially, there is still time, just, to manage the pivot from the Great Acceleration to the Great Restoration. "Things are in dire straits and action is really, really needed now, but we're not in a catastrophic situation – yet," says Leadley. "If we go towards sustainable consumption and production, set out enough protected areas and handle climate change, there's no reason why biodiversity can't have a positive outlook. We're not beyond the point of no return."

Biodiversity: A status report

If we are to begin to rebalance our relationship with nature, we must first establish how out of kilter things are. But ecosystems are complex and no single measure can capture all the changes human activities have caused.Nevertheless, there are various ways of auditing biodiversity and humanity's impact on it, from extinctions and species richness to ***land*** use and how much of the planet is set aside for nature. Almost all of them paint a worrying picturePerhaps the most eye-catching metric of humanity's impact is in our acceleration of the rate of extinctions.The background or natural rate is 0.1 to 2 extinctions per million species per year. Data from the International Union for Conservation of Nature's [*Red List of Threatened Species*](https://www.iucnredlist.org/) suggests a rate of 34 extinctions per million species per year now. It documents at least 680 extinctions and a further 750 possible extinctions among 112,400 species in the past 500 years, with mammals and amphibians hardest hit among vertebrates.In recent years, warming, acidifying oceans have caused a drop in coral species. Looking at how many species are considered vulnerable or endangered, the group under the most pressure is the cycads, a group of tropical palm-like plants. Two other plant groups, dicots and conifers, are also up there.The Red List covers fewer than 5 per cent of the world's known species. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) says that a further half a million terrestrial species of animals and plants may already be doomed to extinction.There are many taxonomic groups for which no firm conclusions can be drawn due to insufficient data. One is insects. A recent [*review concluded*](https://dx.doi.org/10.1073/pnas.2023989118) that, "Although a flurry of reports has drawn attention to declines in insect abundance, biomass, species richness, and range sizes, whether the rates of declines for insects are on par with or exceed those for other groups remains unknown."***LAND* USE**A less granular measure of humanity's impact is given by various measures of the extent to which we control Earth's surface.Infrastructure and intensively managed cropland, pasture and ***forest*** occupies more than half of Earth's ice-free ***land*** surface, with much of the remaining ***land*** also highly modified. Human use now directly affects more than 70 per cent of Earth's ice-free surface, with wilderness largely confined to a few areas of the Arctic, the Amazon rainforest, the Sahara desert and the Australian interior.Over 25 per cent of ***forests*** have been permanently cleared and more than half of the original 12.6 million square kilometres of wetlands have been drained. Of the approximately 16 million km2 of tropical rainforest that originally existed, less than 9 million km2 remain. The current rate of deforestation is 160,000 km2 per year, a loss of approximately 1 per cent of original ***forest*** a year.In intensively farmed areas of the world, the amount of biomass human activities extract from the ***land*** amounts to up to 100 per cent of what natural conditions would allow to grow. One result has been a decline in soil organic carbon, a measure of soil fertility, in many parts of the world. The decline in species richness is also most marked in these regions.None of these metrics account for the oceans, which cover some 70 per cent of Earth's surface. Here our impacts are less easily quantifiable, but the effects of overfishing and pollution are such that only some 3 per cent of the world's oceans are considered true wilderness.**ECOSYSTEM INTACTNESS**Extinction rates tell us about the fates of individual species, but they don't capture the effects of humanity's ***land*** grab on functional diversity, a measure of overall ecosystem health. One attempt to do so is the [*Living Planet Index*](https://www.livingplanetindex.org/home/index), produced by the WWF in association with the Zoological Society of London. It is computed using the size of 20,811 populations of 4392 species of mammals, birds, fishes, reptiles and amphibians from terrestrial, freshwater and marine habitats around the world. The 2020 update shows that, since 1970, the global abundance of vertebrates has declined by 68 per cent.The Biodiversity Intactness Index is an alternative measure of how much of pre-industrial biodiversity remains. This is seen as severely damaged if the number is below 90 per cent (in other words, a loss of more than 10 per cent of biodiversity). The global figure is currently 79 per cent, and falling.**PROTECTED AREAS**One success story is the proportion of ***land*** important for biodiversity that has some form of protection. This has been growing across the world. The Netherlands Environmental Assessment Agency added up existing commitments to restoration projects in 115 countries and found that they come to about 10 million square kilometres, roughly the size of China, or just under 7 per cent of total world ***land*** surface area. How that squares with reality on the ground is another question.

HOW TO RESTORE AN ECOSYSTEM

How ecosystems are degraded by human activity varies – and ways to restore them differ too***FORESTS*Degraders**: Clearance for infrastructure, ***agriculture*** and grazing; logging for firewood; pollution, invasive pests and wildfires **Restorers**: Replanting native trees; conservation of plants and animals; rewilding**FRESH WATERDegraders**: Water extraction for irrigation, industry and homes; sand and gravel mining; dams, canalisation and drainage for ***agriculture***; pollution from chemicals, plastics and sewage **Restorers**: Controls on water extraction, fishing and mining; dam ***removal*** or redesign, restoring water flows to wetlands; wastewater treatment**OCEANS AND COASTSDegraders**: Overfishing and coastal clearance for aquaculture; plastic and nutrient pollution; wastewater discharge **Restorers**: Sustainable fishing, wastewater treatment, pollution control, management and restoration of coral reefs, mangroves and seagrasses**GRASSLANDS AND SAVANNAHDegraders**: Conversion to cropland and pasture; overgrazing and soil erosion; unsustainable resource extraction; invasive species **Restorers**: Active clearance of woody vegetation; reseeding native grasses and replanting native shrubs and trees; reintroduction and protection of native fauna**MOUNTAINSDegraders**: ***Forest*** clearance for ***agriculture***, dams and roads; soil erosion; natural disasters such as avalanches, landslides and floods **Restorers**: Tree planting, better planning of infrastructure, use of low-impact farming techniques such as agroforestry**PEATLANDDegraders**: Peat extraction; drainage for ***agriculture***, infrastructure, mining and fossil fuel exploration; fire, overgrazing, pollution **Restorers**: Re-wetting, conservation**FARMLANDDegraders**: Overgrazing and soil erosion; monocultures; ***removal*** of hedges and trees; pollution from fertilisers and pesticides **Restorers**: Crop rotation with more diverse crops, including trees and livestock grazing on cropland after harvest; use of natural fertilisers and pest control**CITIESDegraders**: Urban sprawl; waste and ***emissions*** from industry, traffic and homes **Restorers**: Stricter planning laws; clean-up of waterways and former industrial sites; tree planting and creation of green space and urban wetlands

What do ecosystems do for us?

Far from being a luxury that cash-strapped economies can ill afford, spending money on restoring and preserving ecosystems is a sound investment. On average, every $1 spent on ecosystem restoration gives a [*return of around $10 in ecosystem goods and services*](https://pubmed.ncbi.nlm.nih.gov/24112105/).Some of that is direct monetary returns, such as from sustainable wood, improved ***agricultural*** yields and ecotourism revenues. But the greater part is freebies that society would otherwise have to shell out for, such as clean air and water, pollination, pest control, nutrient recycling, carbon sequestration, fewer animal-transmitted diseases and greater resilience to extreme weather and natural disasters.Think of it as being like building roads and bridges – they don't generate returns themselves, but lay the groundwork for increased economic activity. "It makes sound economic sense with benefits far exceeding the costs," says environmental scientist and diplomat Bob Watson.

About this feature

This is the first in a series of five features produced in association with the United Nations Environment Programme and UNEP partner agency GRID-Arendal. *New Scientist* retains full editorial control over, and responsibility for, the content. Part two of the series, on 6 March, will look at the part our abuse of nature played in unleashing the covid-19 pandemic

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[***National Environmental Policy Act Compliance (Updated on 19-11-2020)***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61C8-TNH1-JDG9-Y3XF-00000-00&context=1516831)

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**Body**

Washington, DC: This Rule document was issued by the ***Forest*** Service (FS)

Action

Final rule.Summary

The U.S Department of ***Agriculture***, ***Forest*** Service (Agency) is adopting a final rule amending its National Environmental Policy Act (NEPA) regulations. The final rule establishes new and revised categorical exclusions (pertaining to certain special use authorizations, infrastructure management activities, and restoration and resilience activities) and adds the determination of NEPA adequacy provision to the Agency's NEPA regulations. These amendments will increase efficiency in the Agency's environmental analysis and decision-making while meeting NEPA's requirements and fully honoring the Agency's environmental stewardship responsibilities. Public comment has informed and improved the final rule.Dates

This rule is effective November 19, 2020.Addresses

Additional information is available online at [*https://www.fs.fed.us/emc/nepa/revisions/index.shtml*](https://www.fs.fed.us/emc/nepa/revisions/index.shtml) For Further Information Contact

Christine Dawe; Director, Ecosystem Management Coordination; 406-370-8865. Individuals who use telecommunication devices for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 1-800-877-8339 between 8:00 a.m and 8:00 p.m , Eastern Standard Time, Monday through Friday.Supplementary InformationBackground

The mission of the ***Forest*** Service is to sustain the health, diversity, and productivity of the Nation's ***forests*** and grasslands to meet the needs of present and future generations. The National Environmental Policy Act (NEPA) has twin goals of requiring Federal agencies (1) to consider the significant environmental impacts of their proposed actions and (2) to inform the public that environmental concerns were considered in the decision-making process. These goals are not only complementary to the Agency's mission, but such informed decision-making is essential to its achievement. The Agency devotes considerable financial and personnel resources to NEPA analyses and documentation, completing on average 1,588 categorical exclusion (CE) determinations, 266 environmental assessments (EAs), and 39 environmental impact statements (EISs) annually (based on Fiscal Years 2014-2019). The Agency is amending its NEPA regulations as described in this final rule to make more efficient use of those resources to fulfill NEPA's requirements and, in turn, its mission. The final rule is consistent with the Council on Environmental Quality's (CEQ's) intent to ensure that Federal agencies conduct environmental reviews in a coordinated, consistent, predictable, and timely manner, and to reduce unnecessary burdens and delays (40 CFR 1500.1).

An increasing percentage of the Agency's resources have been spent each year to provide for wildfire suppression, resulting in fewer resources available for other management activities, such as restoration. In 1995, wildland fire management funding made up 16 percent of the ***Forest*** Service's annual spending, compared to 57 percent in 2018. Along with a shift in funding, there has also been a corresponding shift in staff from non-fire to fire programs, with a 39 percent reduction in all non-fire personnel since 1995.

The Consolidated Appropriations Act of 2018 (2018 Omnibus Bill) included new budget authority for fighting wildfires, in addition to regular appropriations. While this budget stability is welcome, the trends discussed above make it imperative that the Agency makes the most efficient use of available funding and resources consistent with its statutory authorities to fulfill its environmental analysis and decision-making responsibilities.

On January 3, 2018, the Agency published an Advance Notice of Proposed Rulemaking (ANPR) (83 FR 302) announcing its intent to revise its NEPA procedures with the goal of increasing the efficiency of environmental analysis. The Agency received 34,674 comments in response to the ANPR, of which 1,229 were unique. Most of the unique comments expressed support for the Agency's effort to identify efficiencies in the NEPA process. The unique comments in support of the ANPR all generally acknowledged that there is room for increased efficiency in the Agency's NEPA process. Some of these comments expressed unqualified support for increasing efficiency; other comments supported the Agency's goals but included caveats that these gains should not come at a cost to public involvement or conservation of natural resources.

On June 13, 2019, the Agency published a proposed rule (84 FR 27544) proposing revisions to its NEPA procedures. Following an initial 60-day comment period that was extended for 14 days in response to requests from the public, the Agency received roughly 103,000 comments. Roughly 6,200 comments were unique, individual comments; the remainder were organized response campaign comments (form letters). A detailed summary of comments on the proposed rule and the Agency's response follows below.

After the ***Forest*** Service rulemaking process had begun, CEQ published an advance notice of proposed rulemaking on June 20, 2018, announcing that it was “considering updating its implementing regulations for the procedural provisions of the National Environmental Policy Act” (83 FR 28591). On January 10, 2020, after publication of the ***Forest*** Service's proposed rule, CEQ published a proposed rule to revise its regulations at 40 CFR parts 1500-1508 (85 FR 1684). On July 16, 2020, CEQ published a final rule revising its regulations (85 FR 43304).

The Council on Environmental Quality's revised regulations took effect on September 14, 2020 (40 CFR 1506.13). Where existing ***Forest*** Service NEPA procedures are inconsistent with CEQ's revised regulations, CEQ's revised regulations shall apply, unless there is a clear and fundamental conflict with the requirements of another statute (40 CFR 1507.3(a)). Per CEQ's revised regulations, the ***Forest*** Service shall develop, as necessary, proposed procedures to implement the CEQ's revised regulations no more than 12 months after September 14, 2020, including to eliminate any inconsistencies with CEQ's revised regulations (40 CFR 1507.3(b)).

In light of CEQ's revised regulations, the ***Forest*** Service's final rule is of limited scope. The ***Forest*** Service is amending its NEPA regulations to add only the new and expanded CEs and a Determination of NEPA Adequacy provision as described in more detail below. Other changes to the ***Forest*** Service's NEPA regulations that were included in the proposed rule, along with associated comments, will be reconsidered in association with the Agency's review of its NEPA procedures as directed by CEQ's revised regulations. These changes include, but are not limited to, revisions to the Agency's scoping and public engagement requirements, schedule of proposed actions, condition-based management, classes of actions that normally require an EIS, procedures associated with CE determinations, and use of other agency CEs.Summary of the Final Rule

The amendments in the final rule will increase efficiency in the Agency's environmental analysis and decision-making while meeting NEPA's requirements and fully honoring the Agency's environmental stewardship responsibilities. The final rule adds a Determination of NEPA Adequacy provision, which outlines a process for determining whether a previously completed ***Forest*** Service NEPA analysis can satisfy NEPA's requirements for a subsequently proposed action. The final rule also establishes six new CEs, consolidates two existing CEs into one, and expands two existing CEs. The six new CEs include activities related to recreation special uses, administrative sites, recreation sites, and restoration and resilience projects, along with two CEs for certain road management projects. Two existing CEs are consolidated into one covering clerical modification or reauthorization of existing special uses. The two expanded CEs cover (1) approval, modification, or continuation of special use authorizations on up to 20 acres of NFS ***lands*** and (2) decommissioning of both unauthorized roads and trails and National ***Forest*** System roads and trails. These CEs are described in greater detail in the comment responses below and in the document titled, “Supporting Statement: Categorical Exclusions For Certain Special Uses, Infrastructure, and Restoration Projects,” available at [*https://www.fs.fed.us/emc/nepa/revisions/index.shtml*](https://www.fs.fed.us/emc/nepa/revisions/index.shtml)

Additionally, to avoid public confusion the final rule includes a technical amendment to ***remove*** and reserve paragraph § 220.6(e)(10), which was enjoined in Sierra Club v. Bosworth, 510 F.3d 1016 (9th Cir. 2007).

The proposed rule would have reordered the content of §§ 220.5, 220.6 , and 220.7 to align with the levels of NEPA documentation (CE, EA, EIS). The final rule does not reorder the content of these sections.Comments on the Proposal/Section by Section Description of the Final RuleGeneral Comments

Comments expressed a wide range of opinions—both strongly for and against—the proposed rule. Comments expressing support for the proposed rule stated that it was a means to improve the Agency's NEPA processes. Other comments, however, opposed various provisions of the proposed rule, expressing concern that the revisions could: (1) Diminish social, economic, or environmental outcomes and lead to abuse; (2) result in inadequate environmental analysis and undermine the ***Forest*** Service's mission; (3) reduce the opportunity for public comment and environmental review of projects; (4) and erode public trust, violate existing laws and regulations, and increase potential litigation.

Response: The Agency notes the general comments in support of or in opposition to the rule. The Agency has carefully considered the input from the public, other government entities, and Tribes and has made several adjustments to the final rule to address the concerns described above. These changes are described in more detail below and include, for example, not moving forward with some of the proposed CEs and adding additional limitations to other CEs. Throughout the rulemaking process, the Agency's goal has been to develop a final rule that enables the Agency to efficiently deliver environmental analysis to decision-makers that is scientifically based, is of high quality, and honors environmental stewardship responsibilities. The final rule achieves this goal and will facilitate decision-making that fulfills the Agency's mission of sustaining the health, diversity, and productivity of the Nation's ***forests*** and grasslands to meet the needs of present and future generations.

The Agency will make diligent efforts to involve the public in implementing its NEPA procedures as required by CEQ's revised NEPA regulations at 40 CFR 1506.6 The Agency's final rule does not address or reduce existing Agency public involvement practices concerning CEs. Scoping and public engagement requirements will be assessed during the development of revised Agency NEPA procedures required by CEQ's revised NEPA regulations. Further, the Agency will continue to comply with the requirements of all applicable laws and regulations, such as the National Environmental Policy Act, National ***Forest*** Management Act, Endangered Species Act, and National Historic Preservation Act.

Comment: Some commenters suggest that there is insufficient justification to support the need for the proposed rule as described in the Federal Register notice or indicate, in opposing the proposed rule, that the regulations it would amend are relied upon by the commenters and other stakeholders.

Response: The CEQ regulations state that agencies shall reduce excessive paperwork and delay by using CEs and, for efficiency, shall identify CEs in their agency NEPA procedures (40 CFR 1500.4(a), 1500.5(a), and 1501.4(a)). The final rule reduces paperwork and delay by adding the Determination of NEPA Adequacy provision and establishing new and expanded categorical exclusions based on Agency experience and expertise. The CEQ NEPA regulations at 40 CFR parts 1500-1508 encourage agencies to continue to review their NEPA policies and procedures and to revise them as necessary. To the extent commenters raise concerns about reliance rights, the ***Forest*** Service further notes that rules implementing NEPA, such as this one and its predecessor, are purely procedural. They simply direct the actions of public officials. They therefore do not engender specific, reasonable, and detrimental reliance by individuals and groups outside the government.

Comment: Commenters suggested a need to prepare an EIS to assess the potential impacts from implementation of the proposed rule; in particular, comments request that the ***Forest*** Service evaluate proposed rule impacts to social, cultural, and economic conditions of affected communities and user groups; climate change and carbon stores; scenic integrity; National Scenic and Historic Trails; and caves and karst resources.

Response: The CEQ regulations do not require agencies to prepare a NEPA analysis before establishing or updating agency NEPA procedures. See, e.g , Heartwood, Inc. v. U.S ***Forest*** Service, 230 F.3d 947, 954-55 (7th Cir. 2000). Agency NEPA regulations establish the procedures for fulfilling their responsibilities under NEPA but are not the Agency's final determination of what level of NEPA analysis is required for a particular proposed action. This rule does not authorize any activity or commit resources to a project that may affect the environment. This rule does not have any reasonably foreseeable impact on the environment, nor does the rule authorize or prohibit any action that would have any effect on the environment.

Comment: After CEQ published a notice of proposed rulemaking to revise its regulations for implementing NEPA on January 10, 2020 (85 FR 1684), the ***Forest*** Service received a request from several organizations that it abandon or suspend its rulemaking effort pending the outcome of CEQ's rulemaking effort.

Response: The ***Forest*** Service has coordinated with CEQ throughout the ***Forest*** Service's rulemaking process. Partially as a result of CEQ's revised regulations, the ***Forest*** Service's final rule is of limited scope and amends its regulations to add only new and expanded CEs and the DNA provision. On November 10, 2020, CEQ issued a letter stating that CEQ has reviewed this rule and has found it to be in conformity with NEPA and CEQ regulations (per 40 CFR 1507.3). Where existing Agency NEPA procedures are inconsistent with CEQ's revised regulations, CEQ's revised regulations shall apply (see 40 CFR 1507.3(a)). As explained above, the ***Forest*** Service will review its NEPA regulations and initiate another rulemaking process as required by CEQ's revised regulations. (1)

Comment: Commenters disagreed with the discussion of costs and benefits of the proposed rule in its accompanying Federal Register notice and stated that the determination did not consider all potential costs. Commenters contend that faster decision-making, especially if it eliminates some opportunities for public input, will often result in worse decisions. This, in turn, will increase the overall amount of time spent on projects due to delays from litigation or re-analysis. Comments suggest that spending more time on NEPA analysis will ensure the analysis is of higher quality. Additionally, some commenters argue that there are no efficiencies to be gained in completing a project under a CE instead of an EA, and that CEs take less time only because projects analyzed under a CE are generally of smaller size than those analyzed in an EA.

Response: The amendments in the final rule are more limited in scope than the ***Forest*** Service's proposed rule. The Agency has updated the discussion of cost and benefits of the final rule consistent with these changes (see the Executive Order 12866 section). The final rule does not address existing Agency public involvement practices concerning CEs.

The notion that CEs are no more efficient than EAs runs counter to the Agency's experience that less-detailed NEPA documentation takes less time to complete than more-detailed NEPA documentation. Indeed, this claim by commenters similarly runs contrary to the whole design of the NEPA regulations since their inception and continuing up through the 2020 CEQ NEPA regulations. Specifically, there are three levels of NEPA review, each of which requires successively more documentation and analysis than the prior level: Determination of whether a CE applies, completion of an EA, and completion of an EIS. See 40 CFR 1501.3(a) (describing these three levels); see also 40 CFR 1501.4(a) (2019) (noting how these three levels interrelate).

Nevertheless, the Agency compared the days from project initiation to decision for the 68 sample EAs used to develop the restoration CE to the 140 projects completed under the CE in Section 603 of the Healthy ***Forests*** Restoration Act since its establishment. The Section 603 CE, like the restoration CE, has a maximum project size in the thousands of acres and covers an array of activities, including several similar activities. Using the 68-EA sample, the median time to complete an EA per 1000 acres was 186 days. Conversely, the median time to complete a decision memo using the Section 603 CE per 1000 acres was 111 days. This analysis supports the Agency's premise that CEs represent a more timely and efficient form of NEPA compliance.

Comment: Comments suggest that the ***Forest*** Service should focus on addressing causes of agency inefficiency in environmental decision-making (e.g , funding, staffing, training, internal policies and consistency, and agency culture).

Response: The Agency recognizes that factors outside of its NEPA regulations also contribute to inefficiency in environmental analysis and decision-making. In late 2017, the Agency announced its Environmental Analysis and Decision-Making change effort, which intends to reduce the time and cost of environmental analysis and decision-making processes to produce efficient, effective, and high-quality ***land*** management decisions. The scope of this change effort includes and extends beyond revising the Agency's NEPA regulations. The Environmental Analysis and Decision-Making change effort includes, for example: A new, national NEPA training program; formation of National Historic Preservation Act and Endangered Species Act task forces to identify and implement efficiencies; compliance performance metrics for leadership; production of an environmental analysis and decision-making information library and network sharing platform; and development of a contracting center of excellence.Section 220.4 General Requirements (Determination of NEPA Adequacy)

Comment: Some commenters stated that use of Determinations of NEPA Adequacy (DNAs) would curtail effective analysis and public input by relying on non-site-specific, potentially outdated information, and that the Bureau of ***Land*** Management (BLM) model is not appropriate for the Agency. Commenters requested the concept be eliminated or that additional sideboards be applied to ensure it is applied correctly. Commenters also requested that the ***Forest*** Service provide more details for when a previous NEPA analysis can satisfy NEPA requirements for a subsequent action, such as geographical considerations (e.g , location, scale); temporal considerations (e.g , previous decision date); and current and desired conditions considerations. Comments also stated that DNAs should require public input and documentation. Alternatively, comments expressed support for the use of DNAs to expedite agency action by reducing redundant analyses of substantially similar proposed actions with substantially similar impacts. Some comments also urged that the proposed rule should more closely follow BLM guidance and language for DNAs.

Response: Section 220.4(i) of the proposed rule added the DNA provision, which outlines a process for determining whether a previously completed ***Forest*** Service NEPA analysis can satisfy NEPA's requirements for a subsequently proposed action. The proposed DNA review process required consideration of the following factors: The similarity between the prior decision and the proposed actions, the adequacy of the alternatives to the proposed action, any significant new circumstances or information since the prior decision, and the adequacy of the impact analysis for the proposed action.

The final rule retains and clarifies the DNA provision at § 220.4(j). A DNA documents the responsible official's review and determination whether a NEPA analysis prepared for a prior activity can satisfy NEPA's requirements for a new proposed action that is substantially the same. For example, approval of a special use permit for a commercial fishing derby at a lake on NFS ***lands*** could rely on NEPA documentation prepared for the same or similar event the year before. If the elements outlined at § 220.4(j)(1) are not met for the proposed action currently under consideration, the DNA provision should not be used.

The ***Forest*** Service has modelled its DNA regulation after provisions of the BLM's NEPA procedures and is consistent with CEQ's NEPA regulations (40 CFR 1500.4(p), 1501.12, 1502.9(d)(4), and 1506.3). CEQ's regulations require elimination of duplication, encourage incorporation by reference, allow reevaluation of prior NEPA analyses, and allow adoption of other agencies' NEPA documentation. BLM uses DNAs in association with previously prepared BLM NEPA documents. The ***Forest*** Service intends the use of DNAs to be in line with BLM's practice and will operate as essentially an “internal adoption” mechanism to be used when a new proposed action is substantially the same as an alternative analyzed in a prior ***Forest*** Service NEPA document.

The BLM's DNA mechanism also allows officials to use DNAs to document that no supplementation of an EIS or EA is required. However, the ***Forest*** Service will continue to use its Supplemental Information Reports (see FSH 1909.15, sec. 18) to assess new information and changed circumstances rather than use DNAs for such purposes consistent with 40 CFR 1502.9(d)(4).

As requested by some commenters, the final rule revises § 220.4(j) to more closely align with language from the Department of the Interior and the BLM. However, § 220.4(j)(1)(i) uses “substantially the same” instead of the BLM's use of “essentially similar” to describe the required relationship of the new proposed action to the previously analyzed proposed action. This change aligns with CEQ's related adoption provision, 40 CFR 1506.3, as described above.

The final rule also clarifies that, in order to use a DNA, the responsible official must determine that each of the elements set out at § 220.4(j)(1) are met. In addition, the final rule clarifies at § 220.4(j)(2) that proposed actions undergoing a DNA review shall be included on the Schedule of Proposed Actions; be subject to scoping; be subject to administrative review processes that were applicable to the prior decision; and include issuance of a new decision document.Section 220.6 Categorical Exclusions

Comment: Commenters expressed both general support and opposition to the use or expansion of CEs, as described in the proposed rule. Those in favor stated the new CEs will help the Agency conduct its NEPA review of projects in a more timely and efficient manner, supported the analysis done to substantiate the proposed CEs, and expressed confidence that responsible officials will use CEs appropriately. Those in opposition believed that the proposed CEs involved actions that would or could have significant effects, maintained that many or all proposed actions should undergo detailed analysis and public involvement, or that responsible officials would have too much discretion under the proposed CEs.

Response: The Agency has noted the comments providing general support or opposition. Comments specific to a certain CE are addressed below in additional responses. Administratively established CEs are a valid form of NEPA review. The CEQ regulations direct that for efficiency, agencies shall identify in their agency NEPA procedures categories of actions that normally do not have a significant effect on the human environment, and therefore do not require preparation of an environmental assessment or environmental impact statement (40 CFR 1501.4).

The ***Forest*** Service is establishing new CEs in the final rule pursuant to CEQ's implementing regulations at 40 CFR 1507.3 On November 10, 2020, CEQ issued a letter stating that CEQ has reviewed this rule and has found it to be in conformity with NEPA and CEQ regulations (per 40 CFR 1507.3). The ***Forest*** Service has prepared a supporting statement for the CEs that outlines the process the ***Forest*** Service followed to substantiate the establishment of the CEs. This document is titled, “Supporting Statement: Categorical Exclusions For Certain Special Uses, Infrastructure, and Restoration Projects,” and is available at [*https://www.fs.fed.us/emc/nepa/revisions/index.shtml*](https://www.fs.fed.us/emc/nepa/revisions/index.shtml) Specific responses to comments raised on the supporting statements are also addressed in later sections of this notice.

Categorical exclusions provide an efficient tool to complete the NEPA environmental review process for proposals that normally do not require EAs or EISs. The use of CEs can reduce paperwork and delay, so that EAs or EISs are ***targeted*** toward proposed actions where significant environmental impacts are uncertain or anticipated.

Consistent with CEQ regulations, the application of non-statutory ***Forest*** Service CEs is limited by “extraordinary circumstances,” in which a normally excluded action may have a significant effect (40 CFR 1501.4). Activities conducted under Agency CEs must be consistent with Agency procedures and must comply with all applicable Federal and State laws for protecting the environment. Management direction set forth in ***Forest*** Service ***land*** management plans also provides important parameters. ***Land*** management plans help ensure that potential environmental effects have been taken into account through the consistency requirement set forth in the National ***Forest*** Management Act and USDA's implementing regulations (16 U.S.C 1604(i); 36 CFR 219.15) directing projects and activities be consistent with plan direction or be accounted for through project-specific amendments.

Listing a category of actions as able to be categorically excluded in the agency's NEPA regulations does not constitute a final conclusive determination regarding the appropriate level of NEPA review for a specific proposed action. Listing a category of actions creates an initial presumption that a CE, rather than an EA or an EIS, is normally appropriate to support approval of the listed actions. The extraordinary circumstances review, interdisciplinary process, or public input can result in the determination to prepare an EA or an EIS.

The ***Forest*** Service made several modifications to the final rule regarding CEs as a result of public comment. The proposed CEs for converting unauthorized roads and trails to National ***Forest*** System roads and trails, as presented in the proposed rule at § 220.5(e)(23) and (25), were not carried forward in the final rule due to public concerns about whether establishment of those CEs could encourage the creation of unauthorized roads and trails. Additionally, the final rule includes modifications to the restoration CE (§ 220.6(e)(25)); the roads CEs (§ 220.6(e)(23) and (24)); and the special uses CEs (§ 220.6(d)(11) and (12) and § 220.6(e)(3)). Specific changes made to the CEs are discussed further in the responses to comments below and the Supporting Statement.

Comment: Some commenters asked the ***Forest*** Service to review all existing CEs and consider increasing their limits. Other commenters suggested the ***Forest*** Service is required to review all CEs for their potential for significant effects before proposing additional CEs.

Response: The Agency has exercised its discretion in defining the scope of the current rulemaking process and in electing to pursue additional CEs for special uses, infrastructure, and restoration consistent with its program needs. The Agency believes these program areas present the best opportunities for increasing efficiency in the Agency's NEPA procedures in furtherance of producing efficient, effective, and high-quality ***land*** management decisions that will timely accomplish work on the ground consistent with its statutory mission and authorities and be more responsive to the public. Focused consideration on establishing CEs for individual program activities is consistent with past agency practice to develop CEs (see, e.g , Oil and Gas Activities (72 FR 7391), Special Use Authorizations (69 FR 40591), Soil and Water Restoration Activities (78 FR 56153); Limited Timber Harvest (68 FR 44598)).

Comment: Beyond the additional and modified CEs identified in the proposed rule, commenters also asked that the ***Forest*** Service incorporate new CEs for a variety of activities, including grazing- and range-related activities, vegetation management plans and vegetation management activities, watershed and other research projects, ***land*** exchanges, and mineral exploration.

Response: The Agency appreciates the public interest expressed in identifying additional opportunities for CEs. While the Agency has elected to maintain the rulemaking's focus on special uses, infrastructure, and restoration, this does not preclude the agency from examining additional opportunities for improvement through additional reviews. For example, the ***Forest*** Service recently announced in the Spring 2020 Unified Agenda of Regulatory and Deregulatory Actions its intent to update its CE for rangeland management improvement projects at § 220.6(e)(9) to incorporate modern range management practices (see [*https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202004&RIN=0596-AD46).Comments*](https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202004&RIN=0596-AD46).Comments) on New and Revised CEs Not Requiring Documentation in a Project or Case File and Decision Memo

Comment: Many comments expressed support for the CE in paragraph (d)(11) of the proposed rule, along with the Agency's goals to expedite processing of special use authorizations and reduce confusion in implementation of existing CEs in paragraphs (d)(10) and (e)(15). Some commenters requested limiting this CE to recreation special uses, requiring documentation in a decision memo, requiring public involvement, or adding additional examples of actions that would be covered by the CE.

Response: The final rule consolidates two similar existing CEs regarding special use authorizations into a new category at § 220.6(d)(11). The ***Forest*** Service agrees that consolidation of CEs at §§ 220.6(d)(10) (covering amendment to or replacement of an existing special use authorization) and (e)(15) (covering issuance of a new special use authorization for a new term to replace an existing or expired special use authorization) of the existing regulations will reduce confusion and increase efficiency in use of the CE for special use authorizations. The ***Forest*** Service has extensive experience using these CEs. A review of use of the CE at § 220.6(e)(15) from fiscal years 2012-2016 demonstrates that responsible officials have been relying on this CE appropriately, well within its constraints. From fiscal years 2012 through 2016, category (e)(15) was used 1,584 times (roughly 317 times per year). A review of these projects indicated that the CE is being used as intended and within its limiting factors. Because the new, consolidated CE is limited to actions to replace an existing authorization where there are no changes to the authorized facilities or increases in the scope or magnitude of the authorized activities, the Agency has determined that documentation with a decision memo or project file is not required. An applicant or holder also must continue to comply with the terms and conditions of the existing special use authorization.

Some of the examples of actions covered by the CE have been clarified, but the list of examples for the category is not intended to be exhaustive, and additional examples have not been incorporated into the final rule. Outdated terms such as “electric transmission line” and “powerline,” which were used during development of the proposed rule, have been replaced with “powerline facility” to match recent revisions to the Agency's special use regulations (36 CFR part 251). Additional examples requested by commenters covering changes to the terms and conditions of an authorization that require ***Forest*** Service approval have not been added to the final rule because these examples are outside the scope of the existing and consolidated CEs. The CE in paragraph (d)(11) has also not been limited to recreation special uses as requested by some commenters. The existing CEs encompass both recreation and non-recreation special uses; limiting the consolidated CE to recreation special uses would undercut the Agency's efficiency goals.

Comment: Some commenters expressed support for the new CE at § 220.5(d)(12) of the proposed rule because it will increase NEPA efficiency related to recreation special use permits. Additionally, some commenters agreed that issuance of an outfitting and guiding permit where the use supported by the outfitter and guide is already allowed in the area should not have significant environmental effects and would be appropriate to cover under a CE. Many commenters requested that the final rule limit this CE to recreation special uses, provide further clarification on where activities covered by the CE could occur, and provide additional examples of activities covered by the CE. Some commenters also requested that the CE require a decision memo or interpreted the language related to ***land*** management plan consistency in the proposed CE to mean that a NEPA analysis would not occur. Some commenters more generally opposed issuance of special use permits being analyzed under a CE and that issuance of special use permits should always be subject to a higher level of environmental review and public input.

Response: The final rule retains this CE at § 220.6(d)(12) and makes some edits to the language used in the proposed rule. The final rule clarifies that the CE in paragraph (d)(12) is limited to recreation special uses. The final rule also revises the CE to clarify that it is limited to recreation special uses that occur on existing roads or trails, in existing facilities, at existing recreation sites, or in areas where the activities supported by recreation special uses are allowed. The intent of the CE is to facilitate issuance of recreation special use permits where the activities supported by those permits are already occurring or allowed on a noncommercial basis. In general, there is no difference in environmental impacts between recreational activities conducted by the general public and recreational activities led by an outfitter and guide. As a result, the final rule retains this CE under those administrative categories that do not require documentation in a decision memo. Agency proposed actions that rely on this CE, like all of the agency's proposed actions subject to NEPA, must be consistent with the ***land*** management plan and all other laws, regulations, and policies. This includes compliance with the Endangered Species Act, Clean Water Act, and National Historic Preservation Act.Comments on New and Expanded CEs Requiring Documentation in a Project or Case File and Decision Memo

Comment: Some commenters opposed the proposed rule's expansion of the existing special use authorization CE at § 220.6(e)(3) from 5 to 20 acres, on the grounds that this change would quadruple the existing acreage subject to the CE, which would result in significant effects. Some commenters stated that the rationale for expanding the CE was insufficient. Tribes and Tribal organizations expressed concern that this CE could adversely affect sacred and cultural sites. Several commenters supported expansion of the CE.

Response: At § 220.6(e)(3), the final rule retains the expansion of the CE from 5 to 20 acres and retains the ***removal*** of the words “contiguous” and “minor. ” These words were removed in the proposed rule to improve clarity and reduce confusion for Agency personnel in determining when the CE can be used. The final rule also modifies the list of examples for this CE to add clarity and reduce redundancy with other CEs. For example, subparagraph (vii) of the former version of the CE (“[a]pproving the continued use of ***land*** where such use has not changed and no change in the physical environment or facilities are proposed”) largely was redundant with the two existing CEs now consolidated at § 220.6(d)(11). The types of activities covered under the expanded CE are very similar to those covered under the existing CE. The final supporting statement provides additional information justifying the Agency's conclusion that expanding the CE from 5 to 20 acres will not result in significant impacts. The Agency reviewed 62 EAs, findings of no significant impact, and decision notices for proposed actions like those that would be covered by this CE. The average acreage authorized by these decisions was 41.9 acres. The modest expansion to 20 acres is well below this figure. Based on the agency's history with using the existing CE and the information presented in the supporting statement, the ***Forest*** Service has determined that the expansion of the CE is justified.

The ***Forest*** Service recognizes the importance of consultation and coordination with Tribes consistent with E.O 13175, which imposes requirements independent of compliance with NEPA. The ***Forest*** Service also will continue to ensure that Tribal consultation occurs on individual projects as required by Agency policy. Additionally, American Indian and Alaska Native religious or cultural sites and archaeological sites or historic properties or areas will be considered as part of the extraordinary circumstances review applicable to all CEs. See 36 CFR 220.6(b)(vi), (vii).

Comment: Some commenters opposed expansion of the existing CE at § 220.6(e)(20) because they believed that such an expansion would allow for closure of roads and trails without any public involvement. Other commenters requested notice, coordination, and consultation with county and local governments and raised concerns about compliance with the National Historic Preservation Act. Some commenters requested additional information regarding use of this CE in relation to the ***Forest*** Service's travel management rule at 36 CFR part 212. Other commenters expressed support for the expansion of the CE and agreed with the Agency's finding that the actions and environmental impacts for restoration of ***lands*** occupied by a NFS road or NFS trail are generally the same as when restoration occurs for ***lands*** occupied by an unauthorized road or unauthorized trail.

Response: The final rule retains the proposed rule's expansion of this CE at § 220.6(e)(20) to include decommissioning of NFS roads and NFS trails, as well as unauthorized roads and trails. The inclusion of NFS roads and NFS trails in the CE will help accomplish restoration objectives on national ***forests*** and grasslands, address road and trail maintenance backlogs, and help the Agency maintain compliance with long-standing policies that require decommissioning of unneeded roads and trails. Regardless of whether the activity undertaken is the restoration of ***lands*** occupied by an NFS road or NFS trail or unauthorized road or trail, the actions and environmental impacts are generally the same and not significant.

Proposed actions covered by this CE would be developed in compliance with the travel analysis process and the travel management rule. The Agency uses travel analysis to identify the minimum road system, including unneeded NFS roads and NFS trails. Travel analysis is a dynamic, interdisciplinary, science-based process that examines ecological, social, cultural, and economic concerns. Information from the travel analysis process is used to inform future travel management decisions at the project level. In particular, travel management decisions identify whether a route needs to be added or removed, if an NFS trail or NFS road needs to be constructed, or if a route needs to be decommissioned.

Prior to determining if an NFS road or NFS trail could be decommissioned using this CE, the NFS road or NFS trail would need to be identified as unneeded and eligible for decommissioning through the travel analysis and travel management processes. Appropriate compliance with the requirements of the National Historic Preservation Act is independent of compliance with NEPA, and not dependent on whether a CE, EA, or EIS is prepared for the latter.

This CE will not be used to make access decisions about which roads and trails are to be designated open for public use, or which will be closed from public use. This CE will allow the ***Forest*** Service to restore, rehabilitate, or stabilize ***lands*** more efficiently where public access is not currently permitted, e.g , for roads and trails that are already closed. This approach is consistent with the initial development and establishment of this CE (see 78 FR 56157).

Comment: Some commenters supported the proposed rule's new CE regarding administrative sites because it would add efficiency to their overall management and help the Agency address deferred maintenance of administrative facilities. Some commenters stated that the CE was written too broadly. Other commenters stated that the CE overlaps with an existing CE that does not require a decision memo and that this CE would result in unnecessary work and documentation.

Response: At § 220.6(e)(21), the final rule adopts the proposed rule's CE regarding administrative sites. The existing CE for repair and maintenance of administrative sites at 36 CFR 220.6(d)(3) of the final rule is unaffected by the new CE at 36 CFR 220.6(e)(21). The existing CE was established on September 18, 1992 (57 FR 43180), and the Federal Register notice for the final rule states that the CE is intended for routine repair and maintenance. Current ***Forest*** Service directives define “maintenance” as “an activity that entails preserving, insofar as practical, the original condition of ***Forest*** Service-owned buildings and related facilities” (***Forest*** Service Handbook (FSH) 7309.11, Zero Code). Repair is defined as “the refurbishment or replacement of existing facility components with the same kind of materials for the purpose of maintaining the original condition and function while returning the facility to a sound state” (FSH 7309.11, Zero Code).

The new CE in paragraph (e)(21) allows activities beyond routine repair and maintenance at existing administrative sites. Many of the ***Forest*** Service's administrative facilities need reconstruction or major repair, could be decommissioned, or may be subject to disposal. The new CE will increase NEPA efficiency associated with improving existing facilities to provide for both employee and public safety and decommissioning or disposing of administrative facilities to reduce the Agency's footprint. The CE in the final rule is limited to activities within an existing administrative site as defined in section 502(1) of Public Law 109-54 (119 Stat. 559; 16 U.S.C 580d note). Proposed actions covered by this CE will also be subject to established Agency processes for facilities management, including facility master planning.

Comment: Several commenters expressed opposition to the proposed rule's recreation sites CE at § 220.5(e)(22) on the grounds that it is too broad, that the actions covered could result in significant effects, and that changes to recreation sites should require public input and review. Some commenters argued that certain activities covered under this CE should require analysis under an EA or EIS to ensure consideration of social needs through analysis of multiple alternatives.

Response: The final rule retains the new recreation site CE at § 220.6(e)(22). The ***Forest*** Service provides access to roughly 29,700 recreation sites. This CE will increase efficiency in NEPA compliance for proposed actions to improve existing recreation sites that are in decline or pose safety or resource concerns.

The CE is limited to existing recreation sites and covers construction, reconstruction, decommissioning, or disposal of buildings, infrastructure, or existing improvements, including infrastructure or improvements that are adjacent or connected to an existing recreation site and provide access or utilities for that site. The CE does not cover development of new recreation sites. The CE would be used alongside other established Agency processes for recreation and facilities planning.

CEQ regulations define a CE as a category of actions that the agency has determined normally do not have a significant effect on the human environment. CEQ regulations further explain that social effects are not intended by themselves to require preparation of an EIS (40 CFR 1502.16(b)). However, social needs are considered during the recreation site planning process and development of a recreation site design narrative, which precede development of a specific proposed action for which this CE potentially would apply. Additionally, as noted above, this CE is limited to activities at existing recreation sites and does not encompass development of new recreation sites.

During development of this CE, the ***Forest*** Service reviewed previously analyzed projects that focused on recreation management and evaluated similar CEs in use by other agencies that manage public recreation sites and facilities. The Agency has determined that the activities covered by this CE will not result in significant effects. Further information and rationale are provided in the supporting statement.

Comment: Comments on the proposed rule's road construction CE at § 220.5(e)(24) were mixed. Those commenters in favor of the CE highlighted the beneficial effects of increasing access and public safety and addressing the Agency's backlog of road reconstruction and rehabilitation. Some of these commenters requested that the CE not have any mileage limitation. Other commenters supported certain road-related activities, such as realignment and culvert and bridge rehabilitation, but only if those activities benefitted fish and aquatic species.

Some commenters stated that the activities covered by the road construction CE would cause erosion and sedimentation and impacts on water quality and aquatic habitats, Commenters also stated that including construction of new roads in a CE would hamper the Agency's ability to maintain its existing roads. Some of these commenters requested reducing the mileage limits for all road activities.

More generally, commenters requested that the Agency clarify public involvement associated with projects that would be supported by this CE, coordination with state agencies, the CE's relation to travel management, the meaning of terms of like “open” and “close” in this context and the difference between the proposed CE and the existing CE for repair and maintenance of roads.

Response: The proposed rule included a CE for construction or realignment of up to 5 miles of NFS roads, reconstruction of up to 10 miles of NFS roads and associated parking areas, opening or closing an NFS road, and culvert or bridge rehabilitation or replacement along NFS roads. The inclusion of two mileage limits with a single list of examples created confusion. As a result, the final rule divides the proposed rule's roads CE into two separate CEs at §§ 220.6(e)(23) and (24). Each of these CEs applies only to NFS roads. The CE in paragraph (e)(23) covers up to 8 miles of certain road management activities and cannot be used for construction and realignment. The CE in paragraph (e)(24) covers road construction and realignment on up to 2 miles of NFS roads and associated parking areas.

The reduced road mileages in these two CEs are the result of consideration of public comment and additional review conducted by the Agency. As the Agency developed these two CEs, it narrowed the focus of its analysis of previously completed projects from broad, general project purposes to more specific project activities. Specifically, the Agency conducted an additional search of its NEPA database for previously completed projects to define appropriate mileage limitations for each of the CEs. This additional analysis is described in greater detail in the supporting statement.

Also based on additional review and analysis and in response to public comments, the Agency removed the example of opening or closing a road. Additionally, the Agency removed references to culvert rehabilitation and replacement because those activities are covered under the existing CE at 36 CFR 220.6(e)(18) of the final rule. The data used to establish these CEs is included in the supporting statement.

The ***Forest*** Service has an existing CE at 36 CFR 220.6(d)(4) of the final rule for repair and maintenance of roads, trails, and landline boundaries. That CE is intended to be used for routine maintenance of NFS roads and includes no mileage limit and no requirement for documentation in a decision memo. The new CEs established in the final rule cover NFS road management activities that go beyond routine repair and maintenance but have been demonstrated by the Agency's experience not to have significant effects.

In addition to adhering to the mileage limitations, determining that extraordinary circumstances do not exist, and requiring documentation in a decision memo, the responsible official incorporates design features as a standard operating procedure to avoid or minimize resource impacts. Examples of design features that are routinely incorporated are listed in the supporting statement. Design features to prevent impacts from erosion and sedimentation may include requiring road locations to be reviewed by an Agency watershed specialist, requiring erosion control measures in accordance with state department of transportation requirements, or minimizing erosion and ***removing*** sediment by capturing and filtering runoff before it leaves the project limits. Additional examples of design features have been added to the supporting statement.

All proposed actions covered under the CEs in paragraphs (e)(23) and (24) must be consistent with applicable travel management decisions. The travel management rule at 36 CFR part 212, subpart A, was promulgated in 2005 and established requirements for administration of the ***forest*** transportation system. The ***Forest*** Service uses travel analysis to identify the minimum road system. Travel analysis is a dynamic, interdisciplinary, science-based process that examines ecological, cultural, social, and economic concerns. Information from the travel analysis process is used to inform future travel management decisions at the project level. Travel analysis is used to identify whether a road needs to be added to the ***forest*** transportation system or decommissioned.

The CEs do not apply to decisions to add roads to the ***forest*** transportation system. Rather, once the Agency has determined that a road needs to be constructed during the travel management decision process, a CE could be used to comply with NEPA for the actual road construction. As explained above, the final rule does not address or reduce existing Agency public involvement practices concerning CEs.Restoration and Resilience CE Comments

Comment: The Agency received many comments covering a wide range of topics related to the restoration CE included in the proposed rule at § 220.5(e)(26). Some commenters supported the establishment of a restoration CE to help the Agency expedite activities to restore National ***Forest*** System ***lands*** and increase ***forest*** and grassland resilience. Other comments opposed the proposed restoration and resilience CE on general grounds or opposed specific elements of the CE.

Response: The Agency notes the general support or opposition regarding the restoration and resilience CE. The final rule retains a modified version of the CE covering restoration and resilience activities at § 220.5(d)(25). Specific comments and the resulting modifications from the proposed rule are addressed below.

Comment: Several comments on the proposed restoration and resilience CE concerned its scope or included activities. Some commenters requested that clearer examples be provided and that the Agency focus on practices instead of outcomes. Some supportive commenters requested ***removal*** of the limitation that commercial and non-commercial harvest activities be allowed only in conjunction with another restoration activity.

Some commenters expressed the general sentiment that the CE is too broad and needs narrowing definitions and limitations. Other commenters stated that the CE would allow activities not focused on restoration. Some commenters requested that either timber harvest generally, or salvage harvest in particular, should be prohibited because such activities are not always associated with restoration or scientific literature did not support such treatments use for restoration or resilience purposes.

Response: Following the public comment period, the ***Forest*** Service convened a group of Agency scientists to review the body of literature submitted in public comments specific to the proposed restoration CE. This review, combined with input from other Agency subject matter experts in the watershed, wildlife, and ***forest*** management program areas, resulted in changes to the restoration CE in the final rule.

In the final rule, the Agency has narrowed the scope of the category of permissible activities. The final rule requires all activities conducted under the CE have a primary purpose of meeting restoration objectives or increasing ***forest*** and grassland resilience. “Primary purpose” is a well understood operational term both within the Agency and by the public. This adjustment is responsive to concerns that the category focus on outcomes, as well as concerns regarding the use of certain tools that may be used to achieve restoration and resilience goals.

The primary purpose requirement is further amplified in paragraph (ii)(B), which limits qualifying thinning and harvesting activities to those designed to achieve ecological restoration or resilience objectives. Permissible projects may generate secondary or ancillary multiple use benefits other than restoration and resilience. Such is the nature of multiple use management. However, restoration and resilience must be the project's primary objective. Because the final rule adopts a primary purpose requirement, the final rule ***removes*** the provision that would have required commercial or non-commercial timber harvest activities to be carried out in combination with at least one additional restoration activity.

The Agency will rely on its standard definition of restoration in applying the category. (Restoration is “the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. Ecological restoration focuses on reestablishing the composition, structure, pattern, and ecological processes necessary to facilitate terrestrial and aquatic ecosystems sustainability, resilience, and health under current and future conditions. Functional restoration focuses on the underlying processes that may be degraded, regardless of the structural condition of the ecosystem. ” (FSH 1909.12 and 36 CFR 219.19)).

The final rule clarifies the list of activities to meet restoration and resilience objectives at paragraph (i). These include stream restoration, aquatic organism passage rehabilitation, or erosion control; invasive species control and reestablishment of native species; prescribed burning; reforestation; road and/or trail decommissioning (system and non-system); pruning; vegetation thinning; and timber harvesting. The restoration CE allows timber harvest because timber harvest is a general term that encompasses ***removal*** of trees for a variety of purposes. The restoration CE requires harvest activities to be designed to achieve ecological restoration objectives. The CE will not be available for projects designed primarily to achieve economic returns. The commercial sale of timber harvested via use of the CE is permissible, but as discussed above, only where commercial value is a secondary or ancillary benefit to the primary restoration activity.

Similarly, the Agency has added a limitation to the vegetation thinning and timber harvesting activities provision disallowing salvage harvesting under the restoration and resilience CE. The Agency defines salvage harvest as the ***removal*** of dead trees or damaged or dying trees due to injurious agents other than competition, to recover value that would otherwise be lost (FSM 2470). The effects of salvage harvest and its relation to restoration and resilience depend on a variety of factors. The exclusion of salvage harvest from the restoration CE does not mean that salvage harvest cannot be used to achieve restoration or resilience objectives in other contexts or under other categorical exclusions (see, for example, the existing salvage harvest CE at § 220.6(e)(13)). Nor does it imply that the effects of salvage harvest are significant under NEPA.

Comment: Some commenters supported the acreage limits in the proposed restoration CE. Other commenters argued that the acreage limits in the proposed restoration CE would allow for potentially significant effects, questioned their basis, or argued that the supporting statement did not demonstrate that allowing 4,200 acres of commercial or noncommercial harvest would not result in significant effects. Still other commenters requested ***removing*** express acreage limits entirely or expanding the acreage limit for all listed activities to 7,300 acres.

Response: The proposed restoration CE would have allowed activities to improve ecosystem health, resilience, and other watershed conditions on up to 7,300 acres. If commercial/non-commercial timber harvest activities were proposed, those aspects of the project were not to exceed 4,200 of the 7,300 acres.

The Agency reviewed information submitted in public comments, conducted a science review, and reviewed the original project data on which the limitations in the proposed rule were based. Based on that review, the final rule's restoration CE at § 220.6(e)(25) allows activities to improve ecosystem health, resilience, and other watershed conditions on up to 2,800 acres. This revision is described in more detail below in the discussion of the supporting statement for the CE. In general, the 2,800-acre limitation better accounts for the effects of outliers in the sampled EA data set, better reflects the average size of projects from the sampled EAs, and also aligns with average acreages of specific activities in the sampled EA data set for which some commenters had concerns regarding the degree of impacts (such as commercial timber harvest).

Comment: Some commenters supported establishment of the proposed CE and the analysis set forth in the supporting statement associated with the proposed rule and stated that the Agency had provided a strong rationale for the CE. Other commenters questioned the findings that the CE will not result in significant adverse impacts, stating that the supporting statement was insufficient and not supported by science or other benchmarks. Some of these commenters questioned the adequacy of the monitoring information presented, disagreed with reliance on ***forest*** plan standards and best management practices to prevent significant effects, questioned how agency experts or cited research papers were used to develop the CE, and argued that the Agency's analysis of sampled EAs did not support the size of the restoration CE in the proposed rule.

Response: The Agency has carefully considered all comments submitted concerning the proposed restoration and resilience CE and made adjustments that refine the terms and parameters for the category. The agency has revised its supporting statement to include more details related to the acreage data and monitoring information. The Agency has revised its acreage calculations to address sampled EAs in order to account for projects with multiple activities occurring per acre. The revised calculations more accurately reflect a net project acreage versus gross total activity acres. The supporting statement now includes a table clearly identifying the source of the acreage data. The appendix of previously implemented projects has also been updated to demonstrate how acreages were calculated.

In response to public comment, the supporting statement for the final rule now includes additional discussion of the project development process and the interactions between proposal development, responsible official engagement, best management practices, design features, extraordinary circumstances, and ***forest*** plan compliance. The supporting statement also includes examples of design features that are typically incorporated into a proposed action for activities covered under the CE. The supporting statement also includes additional information related to monitoring and how professional experts were engaged in the development of the CE.

Comment: Some commenters requested that a public participation or collaboration element should be added to the restoration CE.

Response: The Agency has added a collaboration requirement to the restoration CE at § 220.6(e)(25)(ii)(A): “Projects shall be developed through a collaborative process that includes multiple interested persons representing diverse interests. ” The Agency has had success working with various types of collaborative processes. This requirement is intended to be flexible, accommodate a variety of collaborative approaches, and does not require convening a formal collaborative group.

Comment: The ***Forest*** Service received a variety of comments regarding the road limitations in the proposed restoration and resilience CE. Comments included suggestions to increase the road mileages for construction of permanent and temporary roads, ***removing*** road construction from the CE, and questioning why the road mileage limitations for the restoration CE differed from those in the CE proposed rule's road construction CE at 36 CFR 220.5(e)(24).

Response: In the final rule, § 220.6(e)(25) includes adjusted road mileage limitations and addressed reconstruction within the framework of construction limits. The restoration CE allows construction and reconstruction of permanent roads up to 0.5 miles; and construction of temporary roads up to 2.5 miles. The restoration and resilience CE requires all temporary roads to be decommissioned no later than 3 years after the date the project is completed. The final rule also clarifies that the category allows repair and maintenance of NFS roads and trails to prevent or address resource impacts.

Some commenters were confused about the road limitations of the CE and how they compare to the limitations of other CEs. A frequent comparison was the limitation of construction of permanent roads of 0.5 miles when the proposed rule also included a proposed CE that would allow five miles of permanent road construction.

The proposed rule's use of different road mileage limitations reflected the purpose of the individual CE and the agency's experience in managing those activities categories. These two CEs were developed independently based on different supporting data and have different focuses. The restoration and resilience CE was developed with a focus on activities that improve overall ecosystem health and restore national ***forests*** and grasslands. The roads management CE was developed with a focus on road management activities to address access issues and resource impacts; it has a narrower scope than the restoration CE. In the final rule the road management CE was also modified, and the mileage limitations have been lowered to 2 miles for permanent road construction.

***Forest*** Service CEs are independently established, as has been the case with historical agency practice concerning development and use of CEs. The activities covered by, or limitations in, a particular CE do not constrain or limit the operation of any other CE. Likewise, more than one CE may apply to an activity. Integrated, multiple-use management activities, which are designed to accomplish management goals that often cross administrative program boundaries, can fit within multiple CEs.Regulatory CertificationsNational Environmental Policy Act

The final rule amends agency regulations for implementing NEPA. ***Forest*** Service NEPA procedures assist in the fulfillment of agency responsibilities under NEPA but are not the agency's final determination of what level of NEPA analysis is required for a particular proposed action. This rule would not authorize any activity or commit resources to a project that may affect the environment. This rule does not have any reasonably foreseeable impact on the environment, nor does the rule authorize or prohibit any action that would have any effect on the environment. The CEQ set forth the requirements for establishing agency NEPA procedures in its regulations at 40 CFR 1507.3 The CEQ regulations do not require agencies to prepare a NEPA analysis before establishing or updating agency NEPA procedures. The determination that establishing agency NEPA procedures does not require NEPA analysis and documentation has been upheld in Heartwood, Inc. v. U.S ***Forest*** Service, 230 F.3d 947, 954-55 (7th Cir. 2000).Energy Effects

The final rule has been reviewed under Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. It has been determined that the final rule does not constitute a significant energy action as defined in the Executive Order.Consultation and Coordination With Indian Tribal Governments

The ***Forest*** Service considered this final rule in compliance with E.O 13175, Consultation and Coordination with Indian Tribal Governments. On June 13, 2019, the agency initiated a 120-day consultation period. This period was extended an additional 26 days, based on requests from some Tribes. The ***Forest*** Service also considered input from Tribes received after this period. Twenty-eight federally and non-federally recognized Tribes submitted written comments and/or participated in regional tribal meetings.

While some Tribes expressed support for the proposed rule, many Tribes expressed concern over how the rule would impact the Agency's responsibility to consult with Tribes on federal actions. Specifically, many were concerned that the proposed rule's addition of CEs and elimination of the scoping requirement for CEs and EAs would reduce opportunities for tribal engagement.

In response, the ***Forest*** Service maintains and reiterates its commitment to ensuring that Tribal consultation occurs for individual projects as appropriate pursuant to ***Forest*** Service Manual 1560 and ***Forest*** Service Handbook 1509.13 This regulatory revision makes no change to Tribal consultation. Further as discussed above, the final rule is of limited scope and amends the ***Forest*** Service NEPA regulations to include only new and expanded CEs and the DNA provision. Projects and activities supported by environmental assessments remain subject to project-level pre-decisional administrative review process (“objections” process) at 36 CFR part 218, which requires notice and a designated opportunity for comments.

The Agency acknowledges that it shares a government-to-government relationship with Tribes that differs from its relationship with the general public. The final rule does not change the ***Forest*** Service's Tribal consultation obligations.Executive Order 12866

This rule has been reviewed under USDA procedures and Executive Order (E.O ) 12866 issued September 30, 1993, on regulatory planning and review. The Office of Management and Budget (OMB) has determined that this is a significant rule as defined by E.O 12866 and therefore subject to interagency review.

A more timely and efficient process will reduce administrative costs. There are many benefits and costs associated with the rule; however, they are not quantifiable with available data. Benefits (or cost reductions) derived from timely and focused environmental analysis, flexibility in preparation of environmental documents, and improved decision-making indicate a positive net benefit of the rule. The direct benefits of the rule are, therefore, reduced costs and time spent on environmental analysis.

For example, by implementing the Determination of NEPA Adequacy (DNA) provision, the Agency anticipates reductions in time and cost as a result of reducing redundant analyses. These efficiencies may reduce total Agency costs and decision-making time. These concepts, however, will take some time to become well established and widely used; potential benefits will occur over time.

The rule also establishes 5 new CEs that require a decision memo. Focusing on the new CEs, the Agency assumes for the purpose of this analysis, based on average use of its existing CEs, that each new CE may be used an average of 1 to 30 times per year. Under these assumptions, the rule may potentially result in 5 to 150 decision memos per year being completed in lieu of a decision notice.

From Fiscal Years 2014 to 2019, the Agency's average annual environmental analysis workload included approximately 1,588 CE determinations and 266 EAs. This six-year span includes the most recent data available. The average time to decision for CEs was 204 days and for EAs was 707 days. As a result, the Agency may complete NEPA analysis on proposed actions using the new CEs an average of 1 to 17 months earlier, per proposed action. In practice, these figures will vary dependent upon the proposed action and the particular CE being applied.

The ***Forest*** Service has combined and modified some existing CEs with this rulemaking to reduce confusion and better capture Agency proposed actions that do not normally have significant environmental effects. This, in turn, allows for timelier decision-making. Specifically, combining CEs at § 220.6(d)(10) (not requiring a decision memo) and § 220.6(e)(15) (requiring a decision memo) of the existing regulations, which both covered administrative actions on special use permits, eliminates confusion among Agency staff over which CE applies and reduces administrative workload by not requiring a decision memo. Expanding the acreage of special uses on which the existing CE at § 220.6(e)(3) can be applied from 5 acres to 20 acres, as well as expanding the roads and trails on which the existing CE at § 220.6(e)(20) can be applied, are practical, common sense changes that increase Agency NEPA efficiency.

While CEs replace the more costly use of EAs, several factors contribute to the determination of the most appropriate form of NEPA analysis. In general, qualifying projects that in the past would have been analyzed under an EA may now rely upon the new CEs, but responsible officials retain discretion to use another form of NEPA analysis.

DNAs will further reduce the number of EAs undertaken each year, as Agency staff make use of this tool rather than defaulting to preparing a second EA. However, the Agency expects that use of the DNA provision will be modest at least in the first several years of its establishment.

The Agency anticipates use of DNAs and of the new CEs to slowly increase over time, taking into account time for adoption across the agency as has been observed during implementation of new CEs, statutory categorical exclusions and exceptions over the course of the past several years.Executive Order 13771

The final rule has been reviewed in accordance with E.O 13771 on reducing regulation and controlling regulatory costs and is considered an E.O deregulatory action. The impacts of the final rule are as discussed above.Congressional Review Act

Pursuant to the Congressional Review Act (5 U.S.C 801 et seq.), the Office of Information and Regulatory Affairs designated this rule as not a `major rule', as defined by 5 U.S.C 804(2).Regulatory Flexibility Act

The Regulatory Flexibility Act, as amended by the Small Business Regulatory Enforcement Fairness Act of 1996, and Executive Order 13272 require an agency to prepare a regulatory flexibility analysis of a rule if the rule is subject to notice and comment under the Administrative Procedure Act. The final rule directly affects only the ***Forest*** Service. ***Forest*** Service NEPA procedures assist in the fulfillment of agency responsibilities under NEPA; the final rule does not impose any requirements on small entities. While small entities represent some applicants for special use authorizations that would now be covered by the CEs at §§ 220.6(d)(11) and (12) and 220.6(e)(3), this is a negligible indirect effect only to certain small entities. Not all applicants are small entities and, moreover, the timing of a special use authorization depends on several factors beyond NEPA compliance, including compliance with other laws and incomplete information provided by the applicant. Therefore, the USDA Under Secretary for Natural Resources and Environment certifies that the rule will not have a significant economic impact on a substantial number of small entities.Federalism

The Agency has considered this final rule under the requirements of Executive Order 13132, Federalism. The Agency has concluded that the rule conforms with the federalism principles set out in this Executive Order; will not impose any compliance costs on the states; and will not have substantial direct effects on the States or the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, the Agency has determined that no further assessment of federalism implications is necessary.No Takings Implications

This rule has been analyzed in accordance with the principles and criteria contained in Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights, and it has been determined that the rule does not pose the risk of a taking of protected private property.Civil Justice Reform

This final rule has been reviewed under E.O 12988, Civil Justice Reform. Under the final rule, (1) all State and local laws and regulations that conflict with this final rule or impede its full implementation will be preempted; (2) no retroactive effect is given to this final rule; and (3) the rule will not require the use of administrative proceedings before parties could file suit in court challenging its provisions.Unfunded Mandates Reform Act

Pursuant to Title II of the Unfunded Mandates Reform Act (UMRA) of 1995 (2 U.S.C 1531-1538), the Agency has assessed the effects of the final rule on State, local, and Tribal governments, and the private sector. This final rule would not compel the expenditure of $100 million or more by any State, local, or Tribal government, or anyone in the private sector. Therefore, this final rule is not subject to the requirements of section 202 and 205 of the UMRA.Controlling Paperwork and Burdens on the Public

This final rule does not contain any additional recordkeeping or reporting requirements or other information collection requirements as defined in 5 CFR part 1320 that are not already required by law, or are not already approved for use, and therefore imposes no additional paperwork burden on the public. Accordingly, the review provisions of the Paperwork Reduction Act of 1995 (44 U.S.C 3501 et seq.) and its implementing regulations at 5 CFR part 1320 do not apply.List of Subjects in 36 CFR Part 220

Administrative practices and procedures, Environmental impact statements, Environmental protection, National ***forests***, Science and technology.

Therefore, for the reasons set forth in the preamble, part 220 of title 36 of the Code of Federal Regulations is amended as follows:Part 220 National Environmental Policy Act Nepa ComplianceRegulatory Text

1. The authority citation for part 220 continues to read as follows:Authority:

42 U.S.C 4321 et seq.; E.O 11514; 40 CFR parts 1500-1508; 7 CFR part 1b.

2. Amend § 220.4 by adding paragraph (j) to read as follows:§ 220.4 General requirements.

\* \* \* \* \*

(j) Determination of NEPA Adequacy (DNA). (1) An existing environmental analysis prepared pursuant to NEPA and the Council on Environmental Quality regulations may be used in its entirety for a new proposed action if the Responsible Official determines that the existing NEPA analysis adequately assesses the environmental effects of the proposed action and reasonable alternatives. The responsible official must determine and document that each of the following elements is met:

(i) The new proposed action is substantially the same as a previously analyzed proposed action or alternative analyzed in detail in the existing NEPA analysis.

(ii) The range of alternatives analyzed in the existing NEPA document(s) is appropriate with respect to the new proposed action.

(iii) Any new information or circumstances relevant to environmental concerns would not substantially change the analysis in an existing NEPA document(s).

(iv) The environmental effects that would result from implementation of the new proposed action are similar to those analyzed in the existing NEPA document(s).

(2) A DNA for a new proposed action shall be included in the project record for the new proposed action. Proposed actions undergoing a DNA review shall:

(i) Be included on the SOPA;

(ii) Be subject to scoping;

(iii) Be subject to pre-decisional administrative review, if applicable; and

(iv) Include issuance of a new decision document (decision memo, decision notice, or record of decision) when approved.

3. Amend § 220.6 by:

a. ***Removing*** and reserving paragraph (d)(10);

b. Adding paragraphs (d)(11) and (12);

c. ***Removing*** “through (17)” and adding “through (25)” in its place in paragraph (e) introductory text;

d. Revising paragraph (e)(3);

e. ***Removing*** and reserving paragraphs (e)(10) and (15);

f. Revising paragraph (e)(20); and

g. Adding paragraphs (e)(21) through (25).

The additions and revisions read as follows:§ 220.6 Categorical exclusions.

\* \* \* \* \*

(d) \* \* \*

(11) Issuance of a new special use authorization to replace an existing or expired special use authorization, when such issuance is to account only for administrative changes, such as a change in ownership of authorized improvements or expiration of the current authorization, and where there are no changes to the authorized facilities or increases in the scope or magnitude of authorized activities. The applicant or holder must be in compliance with all the terms and conditions of the existing or expired special use authorization. Subject to the foregoing conditions, examples include but are not limited to:

(i) Issuing a new authorization to replace a powerline facility authorization that is at the end of its term;

(ii) Issuing a new permit to replace an expired permit for a road that continues to be used as access to non-NFS ***lands***; and

(iii) Converting a transitional priority use outfitting and guiding permit to a priority use outfitting and guiding permit.

(12) Issuance of a new authorization or amendment of an existing authorization for recreation special uses that occur on existing roads or trails, in existing facilities, in existing recreation sites, or in areas where such activities are allowed. Subject to the foregoing condition, examples include but are not limited to:

(i) Issuance of an outfitting and guiding permit for mountain biking on NFS trails that are not closed to mountain biking;

(ii) Issuance of a permit to host a competitive motorcycle event;

(iii) Issuance of an outfitting and guiding permit for backcountry skiing;

(iv) Issuance of a permit for a one-time use of existing facilities for other recreational events; and

(v) Issuance of a campground concession permit for an existing campground that has previously been operated by the ***Forest*** Service.

(e) \* \* \*

(3) Approval, modification, or continuation of special uses that require less than 20 acres of NFS ***lands***. Subject to the preceding condition, examples include but are not limited to:

(i) Approving the construction of a meteorological sampling site;

(ii) Approving the use of ***land*** for a one-time group event;

(iii) Approving the construction of temporary facilities for filming of staged or natural events or studies of natural or cultural history;

(iv) Approving the use of ***land*** for a utility corridor that crosses a national ***forest***;

(v) Approving the installation of a driveway or other facilities incidental to use of a private residence; and

(vi) Approving new or additional communication facilities, associated improvements, or communication uses at a site already identified as available for these purposes.

\* \* \* \* \*

(20) Activities that restore, rehabilitate, or stabilize ***lands*** occupied by roads and trails, including unauthorized roads and trails and National ***Forest*** System roads and National ***Forest*** System trails, to a more natural condition that may include ***removing***, replacing, or modifying drainage structures and ditches, reestablishing vegetation, reshaping natural contours and slopes, reestablishing drainage-ways, or other activities that would restore site productivity and reduce environmental impacts. Examples include but are not limited to:

(i) Decommissioning a road to a more natural state by restoring natural contours and ***removing*** construction fills, loosening compacted soils, revegetating the roadbed and ***removing*** ditches and culverts to reestablish natural drainage patterns;

(ii) Restoring a trail to a natural state by reestablishing natural drainage patterns, stabilizing slopes, reestablishing vegetation, and installing water bars; and

(iii) Installing boulders, logs, and berms on a road segment to promote naturally regenerated grass, shrub, and tree growth.

(21) Construction, reconstruction, decommissioning, relocation, or disposal of buildings, infrastructure, or other improvements at an existing administrative site, as that term is defined in section 502(1) of Public Law 109-54 (119 Stat. 559; 16 U.S.C 580d note). Examples include but are not limited to:

(i) Relocating an administrative facility to another existing administrative site;

(ii) Construction, reconstruction, or expansion of an office, a warehouse, a lab, a greenhouse, or a fire-fighting facility;

(iii) Surface or underground installation or decommissioning of water or waste disposal system infrastructure;

(iv) Disposal of an administrative building; and

(v) Construction or reconstruction of communications infrastructure.

(22) Construction, reconstruction, decommissioning, or disposal of buildings, infrastructure, or improvements at an existing recreation site, including infrastructure or improvements that are adjacent or connected to an existing recreation site and provide access or utilities for that site. Recreation sites include but are not limited to campgrounds and camping areas, picnic areas, day use areas, fishing sites, interpretive sites, visitor centers, trailheads, ski areas, and observation sites. Activities within this category are intended to apply to facilities located at recreation sites managed by the ***Forest*** Service and those managed by concessioners under a special use authorization. Examples include but are not limited to:

(i) Constructing, reconstructing, or expanding a toilet or shower facility;

(ii) Constructing or reconstructing a fishing pier, wildlife viewing platform, dock, or other constructed feature at a recreation site;

(iii) Installing or reconstructing a water or waste disposal system;

(iv) Constructing or reconstructing campsites;

(v) Disposal of facilities at a recreation site;

(vi) Constructing or reconstructing a boat ***landing***;

(vii) Replacing a chair lift at a ski area;

(viii) Constructing or reconstructing a parking area or trailhead; and

(ix) Reconstructing or expanding a recreation rental cabin.

(23) Road management activities on up to 8 miles of NFS roads and associated parking areas. Activities under this category cannot include construction or realignment. Examples include but are not limited to:

(i) Rehabilitating an NFS road or parking area where management activities go beyond repair and maintenance;

(ii) Shoulder-widening or other safety improvements within the right-of-way for an NFS road; and

(iii) Replacing a bridge along an NFS road.

(24) Construction and realignment of up to 2 miles of NFS roads and associated parking areas. Examples include but are not limited to:

(i) Constructing an NFS road to improve access to a trailhead or parking area;

(ii) Rerouting an NFS road to minimize resource impacts; and

(iii) Improving or upgrading the surface of an NFS road to expand its capacity.

(25) ***Forest*** and grassland management activities with a primary purpose of meeting restoration objectives or increasing resilience. Activities to improve ecosystem health, resilience, and other watershed and habitat conditions may not exceed 2,800 acres.

(i) Activities to meet restoration and resilience objectives may include, but are not limited to:

(A) Stream restoration, aquatic organism passage rehabilitation, or erosion control;

(B) Invasive species control and reestablishment of native species;

(C) Prescribed burning;

(D) Reforestation;

(E) Road and/or trail decommissioning (system and non-system);

(F) Pruning;

(G) Vegetation thinning; and

(H) Timber harvesting.

(ii) The following requirements or limitations apply to this category:

(A) Projects shall be developed or refined through a collaborative process that includes multiple interested persons representing diverse interests;

(B) Vegetation thinning or timber harvesting activities shall be designed to achieve ecological restoration objectives, but shall not include salvage harvesting as defined in Agency policy; and

(C) Construction and reconstruction of permanent roads is limited to 0.5 miles. Construction of temporary roads is limited to 2.5 miles, and all temporary roads shall be decommissioned no later than 3 years after the date the project is completed. Projects may include repair and maintenance of NFS roads and trails to prevent or address resource impacts; repair and maintenance of NFS roads and trails is not subject to the above mileage limits.

\* \* \* \* \*James E. Hubbard,Under Secretary, Natural Resources and Environment.[FR Doc. 2020-25465 Filed 11-18-20; 8:45 am]BILLING CODE 3411-15-P

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**Body**

**Sludge and organic waste can be converted into valuable products like biocarbon and bioenergy instead of being "wasted". - We have been waiting for this for 25 years says Frederic Hauge in Bellona, that is now joining forces with Vow to solve one of the major environmental challenges.**

Vow ASA´s pyrolysis technology converts sludge, organic waste, and other types of biomass into biocarbon and biogas. But are we able to get hold of enough of these resources to make an impact for climate change mitigation? This is the big question that Bellona and Vow ASA jointly will be finding the answer for.

- Pyrolysis solves numerous environmental challenges by converting waste to valuable resources. Vow has an industrialized technology solution that we have been waiting for the past 25 years, says the founder of Bellona Frederic Hauge

Vow, with its subsidiary Scanship, has for decades delivered technologies to process and purify wastewater, foodwaste and garbage on cruise ships far beyond regulatory requirements. In recent years, the company has developed a new pyrolysis technology that converts these waste streams into biocarbon and clean, CO2 neutral energy.

- Through years of technology development combined with last year acquisition of the French company ETIA, we now have a solution to turn biomass, sludge and other waste streams into valuable commodities and energy, helping multiple industries reduce ***emissions*** and meet their CO2 neutral ***targets***, says the CEO of Vow ASA Henrik Badin.

Carbon sequestration with biocarbon will play an important role cutting world CO2 ***emissions*** by half within 2030, and to further reach negative ***emissions*** by the middle of the century. Converting sludge, organic waste, and other types of waste into biocarbon will make significant contribution to these ***targets***.

- The technical solutions already exist. We have them. What we need is to get access to these vast streams of biomass and organic waste, to obtain political support to use it, and to develop efficient ways to roll-out technology in larger scale. We must make it all relevant in a bigger picture. With Bellona's broad knowledge and experience of industrial and political processes in climate matters, we believe that together we can solve this, Badin continues.

**- Biomass, sludge, and organic waste is most often untapped resources**The access to sufficient biomass is one of the major unsolved challenges according to UN's IPPC (Intergovernmental Panel on Climate Change). Thus, finding good solutions that exploits these waste streams into resources along with CO2 ***removal***, are becoming key in the fight against climate change.

- Processes that can stabilize carbon from biological sources will be an important solution for the 2020s. With stable storage of biocarbon, we are also creating opportunities for negative ***emissions***, says Hauge.

- We can obviously not cut down ***forests*** or use cropland to meet the need for biomass and bioenergy. We need to use the enormous waste streams being lost every year. One example is sludge from aquaculture fish farming industry. These waste streams entering our oceans represents untapped resources of valuable nutrients and energy. We need to utilize this, not only to recycle scarce resources as phosphorus but also to produce biocarbon and biogas to mitigate climate change, Hauge continues.

Sludge from wastewater and municipal sewage plants are often stabilized and reused as ***agricultural*** fertilizes. But with increasing concerns around environmental toxins, contamination of food chains, micro plastics and more, an increasing number of countries are restricting such use of sludge. As a result, sludge is instead being incinerated with high CO2 ***emissions***. This serves no one according to Bellona.

**Pyrolysis and biocarbon are part of the solution**Biocarbon can play a central role in solving many of the environmental challenges going forward, Bellona believes. When biomass, sludge and organic waste are just incinerated, these valuable resources are destructed into ash. When instead, using a pyrolysis process, biocarbon and energy rich synthesis gas can be the basis for production of CO2 neutral energy, electricity, and even decarbonized energy such as hydrogen.

-The biocarbon can be redeployed into soil, not only as carbon sequestration ***removing*** carbon form the CO2 cycle but also as soil enrichment, increasing nutrient levels and humidity, fertilizing the soil for years to come, says Hauge.

Biocarbon could also play an important role in replacing fossil-based energy in industries, as an example, to replace large amounts of fossil coke and coal today used in the metallurgical industries. This is something Bellona has been focusing on for years, working closely with the Norwegian Ferroalloy Producers Research Association (FFF).

-We must reset our minds and handle the enormous waste streams that today cause large environmental damage. That is how we together can make a change, says Frederic Hauge in Bellona.

For further queries, please contact:

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**Bellona in brief**

The Bellona Foundation is an international environmental NGO working on the major climate and environmental problems. Founded in 1986 as a direct action protest group, Bellona has become a recognised technology and solution-oriented organization with offices in Oslo, Brussels, UK, St. Petersburg and Murmansk, and representatives in USA and several EU Member States. Frederic Hauge, founder of Bellona, was named a TIME Magazine Hero of the Environment in the award's inaugural year 2007. In addition to Hauge, some 60 engineers, ecologists, biologists, economists, lawyers, political scientists and journalists work at Bellona. Our websites are in[*Norwegian*](https://www.globenewswire.com/Tracker?data=8HkKV-60ujWzZJh4KGg6rzHSSGVbm3q_cYv6df9VlpGgDrixWCTJh-RU5mkWZFA8MWMO___af7cuwXIbqzE0VUvxq2W2AZXMU6JOZK7S53-RcSTjd-tGM-6q2MmlqnTtCMh5ZrvKh83STXjUD0CprHb1SsX9Jn8B9wQUS0s4jkB8bDa2yVFqTrOdAUG9HxjUeNmkA_QR5mzYwtQClWiktt8hEfgrAcA_HOUkMrtIYQ8BOOFkE8IQq_FYH0_ui512XYBBZTWqpolZzXZrPzgdBoDMmDvTztU-m8BGra2tVh8wVhxntIdyNDgHCV8qyw5i9dz2sOJKrx8xWRHCm9sQJvs-nIoPrednREU_pERosCgGAIcz75nNEAYtxewjRBzKQo6RYTaJC9aq74FVLpT3jA==),[*English*](https://www.globenewswire.com/Tracker?data=yqNyMooLe3rh4e9_Bqj0MfRY6QMx7mM73tLb_n61DSxUHba2ZU8fG9mJwe8_JcZ8DuCwM7FNsVPdaz41ecdi9axIstp6yZTX7HYNPgCa611wbsDJj3p00P4PG_cNpf9ndGuP40Cj-TJlJU0x5sP-MQ7ctnGalMtGSweRC2ZF1qmSWXl6_JFsOmbQZ_XUVJJAp3_7R_MHNRCgL2SaTbA_fNFL9IygnTEjU2Ym1wwAQW7288tgn0-yHjrCJTiQPbcO0PnvhLvE8UbaofzWzJS0ywFZF-KJWC1khoFWObh8HhbUoQKfIE1miZC0DPnOyuD7tfJl8kD6rQm0m8E_x2JhBtr6x6ZVYHugY5Ylt0s_kPFEnXIL6WvvXxsVI_Z3bfwlEPMo8wDbXzmGfiRjyBK01g==)and[*Russian*](https://www.globenewswire.com/Tracker?data=dyN4rc9455VsyUerUWjC23XTB08Krvt_yf8CrkDamXs5xXbaG1BNdRnzrYzOS0PI3ae6hnLSLs6VzkxBuxlDXlIE40iWBYIgGYL4dSTPCvyy2oykZ1gUGFrhnmFUws1_Ybp-mlTfXbMGDT6Dy6CxbYvscuxKW4MNMGbraujiTermPB6HdIs-5DTLNj0rjLt14cSuWstdRTDUaTDDBOK625k8SuR1m_7Cp3XXXvg-cvkROV-s4OTzKLUJmOCq5Q4Ge5SJE5p4mXIvQKmGuZub5sL0xmAExJS4Yp_IwqdNZ8huzHA5wM86v2h176vZmCY52c3HgTK1xfZgkFVwYCwOSsYdXbOtnBLWtpk0VXoIw8hLm5VrvwE_5DV5clSZTb3-qUkO__DV5BsVp-v3MxcAIQ==).

**About Vow ASA**

In Vow and our subsidiaries Scanship and Etia we are passionate about preventing pollution and giving waste value. Our world leading solutions convert biomass and waste into valuable resources and generate clean CO2 neutral energy for a wide range of industries.

Cruise ships on every ocean have Vow technology inside which processes waste and purifies wastewater. Fish farmers are adopting similar solutions, and public utilities and industries use our solutions for sludge processing, waste management and biogas production on ***land***.

Our ambitions go further than this. With our advanced technologies and solutions, we turn waste into biogenetic fuels to help decarbonize industry and convert plastic waste into fuel, clean energy and high-value pyro carbon.

Our solutions are scalable, standardized, patented and thoroughly documented, and our capability to deliver is well proven. They are key to end waste and stop pollution.

Located in Oslo, the parent company Vow ASA is listed on the Oslo Stock Exchange (ticker VOW from 13 January 2020).

This information is subject to the disclosure requirements pursuant to section 5-12 of the Norwegian Securities Trading Act.

**Load-Date:** December 9, 2020

**End of Document**



[***Federal Energy Regulatory Commission Issues Environmental Assessment Report for Columbia Gas Transmission, LLC's Sections 157.205 and 157.216- Prior Notice Filing- Abandonment of Natural Gas Storage Facilities under CP20-501***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60XD-KBB1-F0YC-N2G1-00000-00&context=1516831)

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**Body**

Washington: Federal Energy Regulatory Commission Issues the followingFERC Report/Study Environmental Assessment (EA) and Environmental Impact Statement (EIS) to Columbia Gas Transmission, LLC's

Federal Energy Regulatory CommissionOffice of Energy Projects, Division of Gas-Environment & EngineeringENVIRONMENTAL ASSESSMENT REPORTName of Applicant: Columbia Gas Transmission, LLC (Columbia)Application Received: July 27, 2020Docket No:CP20-501-000Type: Sections 157.205 and 157.216 – Prior Notice Filing – Abandonment of Natural Gas Storage FacilitiesCost:$11,000,000Facilities:Columbia proposes to abandon four injection/withdrawal wells, including the Brinker Wells 3644 and 4356; Donegal Well 4042; and Ripley Well 7307, and associated pipelines and appurtenances, located in its Brinker Storage Field in Columbiana County, Ohio, Donegal Storage Field in Washington County, Pennsylvania, and Ripley Storage Field in Jackson County, West Virginia.Columbia states that these wells are not efficient (contributing less than one percent of total delivery volumes from the field) and would require extensive casing replacements that are not cost effective.Environmental Impact -- Conclusions:Categorical ExclusionEnvironment Not InvolvedX Environmental Review CompleteEnvironmental Considerations or Comments:Environmental comments are attached.Prepared by:Date:09/23/2020Approved by Branch Chief:Date:09/23/2020Document Accession #: 20200923-3017 Filed Date: 09/23/20201Columbia Gas Transmission, LLCBrinker, Donegal, and Ripley Wells Abandonment ProjectCP20-501-000ENVIRONMENTAL COMMENTS1.0 PROJECT INTRODUCTIONColumbia Gas Transmission, LLC (Columbia), pursuant to Commission regulations under the Natural Gas Act (18 Code of Federal Regulations [CFR] Sections 157.205 and 157.216(b), as amended) and Columbia’s authorization in Docket No. CP83-76-000,1 proposes to abandon certain natural gas facilities. Columbia is proposing to abandon four injection/withdrawal (I/W) natural gas storage wells (Brinker Wells 3644 and 4356, Donegal Well 4042, and Ripley Well 7307), associated pipelines, tie-in valves, and other associated aboveground appurtenances in its Brinker Storage Field in Columbiana County, Ohio, Donegal Storage Field in Washington County, Pennsylvania, and Ripley Storage Field in Jackson County, West Virginia (Brinker, Donegal, and Ripley Wells Abandonment Project or Project). Columbia states that these wells are not productive (contributing less than one percent of total delivery volumes from the field) and would require extensive casing replacements that are not cost effective. The abandonments would have no impact on Columbia’s existing customers or affect Columbia’s existing storage operations.The location of the project existing facilities are shown on figures 1-1 through 1-3 and involves the following:Brinker Well 3644Columbia proposes to plug and abandon this natural gas storage well; cut, cap, and abandon in-place the 4-inch-diameter pipeline PL-9095; and abandon a tie-in valve setting and other associated aboveground appurtenances by ***removal***. The construction work area (CWA) for the Brinker Well 3644 portion of the project totals 1.83 acres. No work is proposed outside of Columbia’s existing permanent easement and existing access roads.Brinker Well 4356Columbia proposes to plug and abandon this natural gas storage well; cut, cap, and abandon in-place the 4-inch-diameter pipeline PL-19083; and abandon a tie-in valve setting and other associated aboveground appurtenances by ***removal***. The CWA for the Brinker Well 4356 portion of the Project totals 0.95 acre. No work is proposed outside of Columbia’s existing permanent easement and existing access roads.1 Columbia Gas Transmission Corporation (predecessor to Columbia Gas Transmission, LLC), 22 FERC ¶ 62,029 (1983) Document Accession #: 20200923-3017 Filed Date: 09/23/20202Donegal Well 4042Columbia proposes to plug and abandon this natural gas storage well; cut, cap, and abandon in-place the 4-inch-diameter pipeline PL-9203; and abandon a tie-in valve setting and other associated aboveground appurtenances by ***removal***. The CWA for the Donegal Well 4042 portion of the Project totals 1.76 acres. Except for the widened areas of existing permanent access road entrances and the temporary workspace (TWS) for equipment staging, no portions of the Donegal Well 4042 CWA are outside of Columbia’s existing permanent easement and existing access roads.Ripley Well 7307Columbia proposes to plug and abandon this natural gas storage well; cut, cap, and abandon in-place the 6-inch-diameter pipeline X59W7307; and abandon a tie-in valve setting, well house, and other associated aboveground appurtenances by ***removal***. The CWA for the Ripley Well 7037 portion of the Project totals 1.21 acres. No work is proposed outside of Columbia’s existing permanent easement and existing access roads.1.1 ***Land*** RequirementsColumbia states that the proposed Project would only result in temporary ***land*** impacts; no permanent ***land*** impacts are proposed. Project abandonment activities would require temporary disturbance within existing permanent access roads (3.08 acres), TWS within Columbia’s existing pipeline and/or wellhead easement (2.44 acres), and TWS outside of Columbia’s existing easement, including areas where existing permanent access road entrances would be widened (0.36 acre). These areas, collectively the Project CWA, would total 5.88 acres of temporary disturbance.1.2 Abandonment of Project Facilities - Procedures and Required PermitsColumbia would adhere to the terms and conditions of all applicable federal, state, and local permits obtained for the Project. Abandonment activities for Brinker Wells 3644 and 4356 would adhere to all specifications required by the Ohio Department of Natural Resources (ODNR), which is the regulating agency for natural gas well abandonment in Ohio. In addition, Columbia would implement the procedures contained within its 2018 Environmental Construction Standards (ECS) and 2018 Draft West Virginia ECS and site-specific Erosion and Sediment Control Plans (ESCP) during abandonment of Project facilities and restoration activities. Columbia’s ECS adopts and incorporates the requirements of the Commission’s Upland Erosion Control, Revegetation, and Maintenance Plan (Plan) and Wetland and Waterbody Construction and Mitigation Procedures (Procedures). Additionally, Columbia would adhere to its Spill Prevention, Containment, and Control (SPCC) Plan; Dust Control Plan; and Unanticipated Discovery Plan for Contaminated Media during project abandonment activities. Unanticipated Discovery Plans for cultural resources are included in Columbia’s categorical exclusion agreements with the Ohio Historic Preservation Office (OHPO),Document Accession #: 20200923-3017 Filed Date: 09/23/20203Pennsylvania State Historic Preservation Office (PASHPO), and West Virginia State Historic Preservation Office (WVSHPO). All activities associated with the abandonment Project facilities would be completed Monday through Saturday, from 7:00 AM to 7:00 PM.Figure 1-1. Location of Brinker Well 3644/PL 9095, and Brinker Well 4356/PL19083 Tie-in-ValveDocument Accession #: 20200923-3017 Filed Date: 09/23/20204Figure 1-2. Location of Donegal Well 4042/PL 9203 Tie-in-ValveDocument Accession #: 20200923-3017 Filed Date: 09/23/20205Figure 1-3. Location of Ripley Well 7307/X59W7307 Tie-in-Valve Document Accession #: 20200923-3017 Filed Date: 09/23/202062.0 ENVIRONMENTAL ANALYSISOur evaluation of the proposed action indicates that the following resources or hazards do not occur, or are of minimal concern in the project area, and that abandonment of the Project I/W wells would result in little to no impacts to these resources, or from these hazards:• geologic resources (minerals, fossil fuels, etc.);• geologic hazards; and• fisheries.We conclude the following resources would not be adversely affected by the proposed action, as discussed further below:• soils;• water resources;• vegetation, wildlife, and threatened and endangered species;• ***land*** use;• cultural resources; and• air quality and noise.2.1 SoilsSoilsColumbia compiled soils data from the U.S Department of ***Agriculture***’s Natural Resources Conservation Service Web Soil Survey, as well as its Soil Survey Geographic Database, as summarized in Attachment 1.The CWAs classified as important farmlands (0.36 acre of prime farmland, 0.42 acre of farmland of statewide importance, and 0.13 acre of farmland of local importance) are currently being used for ***agricultural*** purposes. The portions of the CWA currently used for ***agricultural*** purposes would be restored in accordance with Columbia’s ECSs (which includes our Plan) and the landowners requirements. Typically, Columbia would utilize rye grass cover unless the landowner requests a different seed mix. Columbia’s 2018 ECS and 2018 Draft WVECS state the following with respect to restoration measures in ***agricultural*** areas:• seeding would not be performed in cultivated croplands unless requested by the landowner;• restoration would not be performed in ***agricultural*** ***lands*** from the beginning of the spring thaw through May 15 unless requested by the landowner;22 Per Columbia ECS and WVECS, the Project Environmental Inspector would determine whether the project can be completely restored during the winter season or if permanent restoration activities should be delayed until after the spring thaw. Restoration of ***agricultural*** ***lands*** would not be performed during the winter season or from the beginning of the spring thaw through May 15, unless requested by the landowner, to avoid unfavorable conditions for revegetation (i.e , belowDocument Accession #: 20200923-3017 Filed Date: 09/23/20207• restoration would be coordinated with the landowner’s planting schedule;• grazing deferment plans would be developed with willing landowners, grazing permittees, and ***land*** management agencies as appropriate to minimize grazing disturbance of revegetation efforts;3 and• revegetation would be considered successful if in accordance with the FERC Plan, crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise.To minimize or avoid impacts on Project soils due to wind and water erosion or from compaction, Columbia would implement the soil conservation measures outlined in Columbia’s 2018 ECS and Draft WVECS, and site-specific ESCPs. With adherence to these plans, we do not expect the Project abandonment activities to significantly affect soils in the Project area. Additionally, as there are no permanent impacts associated with the Project, no important farmlands would be excluded from future potential ***agricultural*** use within the Project CWAs.2.2 Water ResourcesGroundwaterNo U.S Environmental Protection Agency-designated sole source aquifers were identified within the Project area; no springs were identified within 150 feet of the CWAs, and no public water supply wells are present within 0.25 mile. Groundwater resources for the Project CWAs are described below:Brinker Well 3644/PL 9095, and Brinker Well 4356/PL19083 Tie-in-ValveThe unconsolidated Lisbon Thin Upland Aquifer, and Pennsylvanian-age consolidated sedimentary bedrock aquifers underlie the Brinker Wells 3644 and 4356 CWAs. The Lisbon Thin Upland Aquifer is comprised of glacial till which in places contains sand and gravel lenses of varying thicknesses. The overall thickness of the Lisbon Thin Upland Aquifer is between 25 to 100 feet. Pennsylvanian-age sedimentary bedrock aquifers consists of shale, siltstone, and sandstone, with minor amounts of limestone, clay, flint, and coal underlie the glacial till.Four private water well locations were approximated in the vicinity of the Brinker Wells 3644 and 4356 using well logs obtained from the ODNR’s Division of Water Resources. The exact locations of these water wells are indefinite because the well logs only provided the address, road name (Lodge Road), and section associated with the well logs. The well logs showed that these water wells were drilled to total depths ranging from 105 feet below groundfreezing temperatures), ensure revegetation success, and avoid adverse effects on ***agricultural*** ***lands***.3 No portions of the CWAs are ***land*** management areas and no portions of the Brinker Wells 3644 and 4356 CWAs or Donegal Well 4042 CWA are used for grazing. Columbia is currently coordinating with landowners to determine if areas within the Ripley Well 7307 CWA are used for grazing. Any grazing ***land*** that is present within the Ripley Well 7307 would be revegetated and restored per Columbia’s ECS. Additionally, no ground disturbance within grazing ***lands*** or elsewhere within the CWAs would occur prior to landowner approval. Document Accession #: 20200923-3017 Filed Date: 09/23/20208surface (bgs) to 170 feet bgs. Water levels in these wells are between 45 and 52 feet bgs with yields of between 8 and 20 gallons per minute (gpm).One groundwater drinking water source protection area, the Lisbon Village Community, is within 1-mile west of the Brinker Well 4356 CWA. Additionally, the Trickling Springs Country Store groundwater drinking water source protection area is within 1 mile north of the Brinker Wells 3644 and 4356 CWAs; and the Chester Water Department is also within 1 mile of the Brinker Wells 3644 and 4356 CWAs.The Brinker Wells 3644 and 4356 CWAs are within the East Liverpool City Community Surface Water Drinking Water Protection Area of the Ohio River Public Water Systems. Additionally, a small portion of the Brinker Well 4356 CWA is within the Buckeye Water District - Ohio River Surface Water Drinking Water Protection Area of the Ohio River Public Water Systems. Due to their proximity to West Virginia, Brinker Wells 3644 and 4356 CWAs are also within 0.25 mile of a West Virginia Source Water Protection Area for the Chester Water District.The proposed excavation depths within the Brinker Wells 3644 and 4356 CWAs is between 4 to 5 feet below ground surface (bgs). The depth to the water table in this area would likely be intercepted within the trench excavation. If groundwater is encountered and trench dewatering is required, it would be conducted in accordance with Columbia’s 2018 ECS, the Project-specific ESCP, and our Plan.Donegal Well 4042/PL 9203 Tie-in-ValveThe Donegal Well 4042 CWA is within the Appalachian Plateaus Aquifers region. Surficial aquifers present consist of unconsolidated till and glacial-lake deposits as well as the Permian and Pennsylvanian-age sedimentary bedrock aquifers, of which, sandstone and limestone are the dominant water bearing units in the region, with yields of 30 to 300 gpm.No private water wells are within 150 feet of the Donegal Well 4042 CWA; and no potable water intakes are within 3 miles upstream or downstream of the Donegal Well 4042 CWA. Additionally, no groundwater withdrawal locations/surface water supplies are within 0.25 mile of the Donegal Well 4042.The Pennsylvania Department of Environmental Protection did not identify any groundwater protection areas or wellhead protection areas within 1 mile of the Donegal Well 4042 CWA. However, due to its proximity to West Virginia, the Donegal Well 4042 CWA is in the Wheeling Water District’s West Virginia Source Water Protection Area and within 1 mile upstream of the West Virginia Source Water Protection Area associated with the Hammond Public Service District.The proposed excavation depths within the Donegal Well 4042 CWA is between 4 to 5 feet below ground surface (bgs). The depth to the water table in this area, would likely be intercepted within the trench excavation at a depth of 2.6 feet bgs. If groundwater is encountered and trench dewatering is required, it would be conducted in accordance with Columbia’s 2018 ECS, the Project-specific ESCP, and our Plan. Document Accession #: 20200923-3017 Filed Date: 09/23/20209Ripley Well 7307/X59W7307 Tie-in-ValveThe aquifers underlying the Ripley Well 7307 CWA consist of Pennsylvanian to Permian -age sedimentary bedrock of cyclic sequences of sandstone, shale, conglomerate, clay, coal, and limestone. The sandstone aquifers are the most productive and are considered as principle aquifers in the Project area.There are no private groundwater supply wells within 150 feet of the proposed CWA. There are no specially designated surface water, groundwater, or wellhead protection areas within 1 mile of the Ripley Well 7307 CWA. The proposed excavation within the Ripley Well 7307 CWA is 4 to 5 feet bgs. As the proposed depth of excavation is higher than the depth to water table, it is unlikely that shallow groundwater and/or saturated soils would be encountered during abandonment of Project facilities. However, if groundwater is encountered and trench dewatering is required, it would be conducted in accordance with Columbia’s 2018 Draft WVECS, the Project-specific ESCP, and our Plan.Well Abandonment and Protection of Potable Groundwater ResourcesColumbia provided pre- and post-abandonment well schematics for the four wells (Attachment 2). Each of the wells is constructed with multiple casing strings. Columbia states that it does not plan to ***remove*** the outermost casing or any casing string that is cemented in the well. The outermost casing would be left in the wellbore to provide a conduit in the event that future well intervention is required. Columbia would make good faith efforts to pull and ***remove*** all uncemented casing strings, with the exception of the outermost casing. If well records or downhole geophysical surveys (i.e , cement bond log) indicate that there is no cement behind the casing that is adjacent to fresh water zones, and the casing cannot be removed to facilitate installation of a solid cement plug, Columbia would perforate and squeeze cement to create a hydraulic barrier across and/or below the base of the fresh water zones. A cement retainer would also be installed within the production casing string during the well plugging. Pulling of all uncemented casings strings except the outermost casing, existing cemented casing, the proposed cement, and the cement retainer would prevent and/or mitigate potential cross-contamination of shallow aquifers from displacement of poor-quality groundwater from the well’s production intervals.Columbia states that each well abandonment would produce between 10,000 and 20,000 gallons of waste fluid. Waste fluids from the Brinker wells and Donegal Well 4042 abandonments would be temporarily stored in sealed steel tanks. If well plugging and abandonment activities at Ripley Well 7307 occurs after November 14, 2020, waste fluids from the Ripley Well 7307 abandonment would be temporarily stored in a plastic-lined earthen pit as permitted by the West Virginia Department of Environmental Protection Office of Oil and Gas on July 17, 2020. If well plugging and abandonment activities at the Ripley Well 7307 occurs before November 14, 2020, per Columbia’s Multi-Species Habitat Conservation Plan discussed in section 2.3 , Columbia must use tanks to store waste fluids to ensure no loss of bats by entrapment in waste pits. All waste fluids would be disposed at state approved facilities. Document Accession #: 20200923-3017 Filed Date: 09/23/202010Additionally, Columbia would implement its site-specific ESCP and Columbia’s ECS, and the Project-specific SPCC Plan in the event of an inadvertent spill or release were to occur.Based on the distance between CWAs and existing water wells, existing well construction details utilizing multiple cemented casing strings along with Columbia’s in-well abandonment plans; its management and disposal plan for fluids displaced from the wells; use of erosion control BMPs, and its SPCC Plan to mitigate any inadvertent release of displaced fluids, we conclude that shallow potable aquifers would be adequately protected and impacts on potable groundwater would not be significant.Columbia would identify/confirm the locations of all water wells within 150 feet of the construction work areas (CWAs) by contacting landowners and conducting visual and Global Positioning System mapping prior to the start of Project abandonment activities; and would monitor groundwater quality and yield for all water wells within 150 feet (pre- and post-construction) of CSAs to determine whether water supplies have been affected. If it is found that the Project abandonment activities impacted any of these wells, Columbia states that it would repair or replace these water supplies.Additionally, although there are no requirements for coordination or notification with either the Ohio Environmental Protection Agency, the Pennsylvania Department of Environmental Protection, or any public water systems for work in a source water protection area, Columbia would notify the public water suppliers of their abandonment activities per a request made by the West Virginia Department of Health and Human Resources (WVDHHR).4WaterbodiesThe Project would cross two streams. Stream SBRI-001 is an intermittent stream and would be crossed by an existing culverted permanent access road for I/W well 3644. The existing culvert would not be impacted during Project abandonment activities. Stream SDON-004 would likewise be crossed by an existing permanent access road (EPAR-003) to I/W well Donegal 4042. This waterbody is classified as being a Special Protection Water and would be crossed using a temporary air bridge.5Five perennial streams (SBRI-003, & -005; SDON-003, -005, -& -006) , four intermittent streams (SBRI-001, -002 & -004, and SDON-0020, and one ephemeral stream (SRIP-002) were identified within 50 feet from CWAs. Columbia would implement its ESCP and our Procedures to mitigate impacts on these streams. Specifically, Columbia would install compost filter socks along edges of CWAs or silt fencing to prevent potential sedimentation impacts on any streams. Based on the temporary nature of the project and the proposed mitigation measures, including the implementation of our Procedures within Columbia’s ECS, we conclude that impacts on surface waters would not be significant.Columbia would implement measures in its project-specific ECSP, which includes the installation of 8-inch, 12-inch, or 32-inch compost filter socks installed at the edge of the CWA4 Columbia personal communication, with B. Carr on June 10, 2020.5 Temporary air bridge would be installed outside of the ordinary high water mark of SDON-004. A Pennsylvania Chapter 105 GP-8 for the temporary bridge placement would be obtained from the PADEP prior to the start of the Project. Document Accession #: 20200923-3017 Filed Date: 09/23/202011where it is closest to delineated waterbodies and appropriately placed waterbars and broad-based dips installed across existing permanent access roads to divert flows across the CWA and away from waterbodies.WetlandsColumbia conducted field investigations, in accordance with the 1987 USACE Corps of Engineers Wetlands Delineation Manual, to identify and delineate wetlands within the Project area in April 2019. Five palustrine emergent (PEM) wetlands (totaling 0.2 acre) and one palustrine scrub shrub (PSS) wetland (totaling less than 0.1 acre) were identified within CWAs and would be temporarily impacted during Project abandonment activities. Five additional PEM wetlands, one PSS wetland, and two palustrine ***forested*** wetlands (PFO) would be within 50-feet of project CWAs. Columbia would implement the appropriate controls in accordance with its site-specific ESCP and its ECS (which includes our Procedures) to mitigate sedimentation and minimize/avoid impacts on these wetlands. These measures include the installation of 8-inch compost and/or 12-inch filter socks installed at the edge of the CWA where it is closest to delineated wetlands; and appropriately placed waterbars and broad-based dips installed across existing permanent access roads to divert flows across the CWA and away from wetlands.As discussed above all waste fluids generated during the I/W well(s) abandonment would be stored in steel tanks or plastic-lined earthen pits at the surface and disposed at state approved facilities. Given these mitigation measures we conclude that impacts on wetlands would be minimal, temporary, and not significant.Project Water UseColumbia would obtain approximately a total of 100,000 gallons of water from a municipal source for fugitive dust control and abandonment activities, which is not anticipated to have any measurable impact on the local water supplies.2.3 Vegetation and WildlifeVegetationColumbia conducted surveys in April 2020 to identify vegetation types within the Project area, including ***agricultural***, PEM wetland, PSS wetland, upland ***forest***, herbaceous upland, and unvegetated ***land*** (existing roads and open water) as shown on table 1. Unvegetated areas and wetlands will not be discussed further in this section. Clearing and grading of the Project area would result in temporary loss of 2.6 acres of vegetated upland; however, no permanent impacts would occur.Document Accession #: 20200923-3017 Filed Date: 09/23/202012Columbia would stabilize and reseed the disturbed areas in accordance with its ECS, which is consistent with our Plan, and site-specific ESCPs. As discussed in section 2.4 below, the portion of the Project CWA currently used for ***agricultural*** purposes would be allowed to revert to active ***agricultural*** ***land***, and Columbia would restore all disturbed ***land*** per their 2018 ECS and 2018 Draft WVECS, and our Plan, and with consideration of the landowner’s request. Columbia states that it would utilize rye grass cover unless the landowner requests a different seed mix. Disturbed areas would be returned to as close as possible to pre-construction condition. Tree clearing would only result in minor impacts, as the extent of tree clearing would be limited and trees are abundant in the immediately adjacent areas. Long-term impacts on upland ***forest*** include 0.4 acre of tree clearing for construction workspaces, which may take up to 30 years to reestablish.We conclude that with Columbia’s mitigation measures described above, and abundance of adjacent upland ***forested*** areas, impacts on upland vegetation would be mostly temporary and not significant.WildlifeRepresentative wildlife within the Project area include several mammalian, bird, reptile, amphibian, and invertebrate species. Supporting habitat is described as corn and upland grassland (***agricultural***); herbaceous wetlands; and upland ***forest***.. Impacts on wildlife could occur primarily due to vegetative clearing and grading for Project abandonment activities. These impacts may include the mortality of less mobile species. Mobile species would most likely avoid the Project area during Project abandonment activities. Following these activities, wildlife would be expected to return. We conclude that any impacts on local wildlife would not be significant due to the minimal disturbed area, abundance of similar habitat adjacent to the Project area, and Columbia’s commitment to restore the right-of-way.Table 1Vegetation Impacts from the ProjectProject ComponentAgriculturalPEM WetlandPSS WetlandUpland ForestHerbaceous UplandUnvegetated1Total2Brinker Well 3644/PL-9095 Tie-In Valve0.50.1-0.10.11.11.8Brinker Well 4356/PL-19083 Tie-in Valve<0.10.1<0.1-0.20.71.0Donegal Well 4042/PL-9203 Tie-in Valve0.2--0.40.21.11.9Ripley Well 7307/X59W7307 Tie -in Valve0.5---0.40.31.2Total11.20.2<0.10.41.03.15.91 Existing roads and open water.2 Totals may vary slightly from the sum of their parts due to rounding. Document Accession #: 20200923-3017 Filed Date: 09/23/202013Migratory BirdsColumbia would conduct 0.42 acre of tree clearing for the Project. In a letter to Columbia dated June 2, 2020, from the Ohio USFWS Field Office, the service provided recommendations such as conducting vegetation ***removal*** outside of the nesting season, which for migratory song birds in Ohio is between April 1 to July 15. Columbia submitted a comment request letter to the West Virginia USFWS Field Office on June 1, 2020 and has not received a response to date. No tree clearing would occur at the Ripley Well 7307 location in West Virginia.Columbia also received recommendations from the Pennsylvania USFWS Field Office on July 17, 2020 to conduct vegetation ***removal*** from September 1 to March 31 and avoid vegetation ***removal*** to the extent practicable. Columbia would adhere to both field office’s recommendations and ***remove*** vegetation after October 15. Although Project activities may cause some migratory birds to avoid the area during Project abandonment activities, impacts would be limited to the relatively short period during these activities. Given the limited area of disturbance, the availability of ample adjacent habitats, and Columbia’s proposed restoration measures, we conclude that Project abandonment activities would not adversely impact migratory bird populations in the Project area.State-Listed SpeciesThe ODNR identified the American bittern, northern harrier, sandhill crane, eastern hellbender, eastern massasauga rattlesnake, channel darter, American eel, gill darter, Indiana bat, NLEB, least bittern, little brown bat, northern harrier, river darter, threehorn wartyback, Tippecanoe darter, and the tricolored bat as state-listed species that could occur within the Project area. Correspondence from the ODNR on July 20, 2020 indicated that no records of state-listed species occur within a 1-mile radius of the Project area, and that the Project would not likely impact state-listed species.Columbia also conducted a Pennsylvania Natural Diversity Inventory search to identify state-listed species within the Project area. The search indicated that no known impacts would occur on state-listed species within the Project area. Based on the limited disturbance of the proposed Project area lack of suitable habitat, and Columbia’s proposed restoration measures, we conclude that impacts on state-listed species would not be significant.Federally Threatened and Endangered SpeciesColumbia and the U.S Fish and Wildlife Service (USFWS) have developed a Multi-Species Habitat Conservation Plan (MSHCP) (January 1, 2014) in order to streamline federally listed species consultations. The Project occurs entirely within ***lands*** described and covered in the MSHCP. The MSHCP identified the Indiana bat (endangered), northern long-eared bat (NLEB) (threatened), eastern massasauga rattlesnake (threatened), fanshell (endangered), pink mucket pearlymussel (endangered), and the sheepnose mussel (endangered) as federally listed species that could occur in the Project area. Columbia would follow the mitigation measures outlined in the MSHCP to avoid and minimize adverse impacts on federally listed species. However, Columbia would adhere to the timing restrictions in its MSHCP for tree clearing.Document Accession #: 20200923-3017 Filed Date: 09/23/202014Further, Columbia’s MSHCP requires Avoidance and Minimization Measures (AMMs) for the Indiana bat and the NLEB for the Project and can be found in FERC docket CP20-510-0006. With these measures, we conclude that the Project is not likely to adversely affect the Indiana bat and the NLEB. We also conclude that the Project would have no effect on the eastern massasauga rattlesnake, fanshell, pink mucket pearlymussel, and the sheepnose mussel as no suitable habitat is present, and no additional consultation is required for the Project under section 7 of the Endangered Species Act.2.4 ***Land*** UseLand use categories within the Project CWAs include ***agricultural***, existing roads, ***forest***, and open ***land***. ***Land***-use impacts for the four wells planned for abandonment include temporary workspace within existing easements (2.44 acres); temporary workspace outside of existing easements (0.36 acres); and existing permanent access roads (3.08 acres).After the abandonment, the portion of the Project CWA currently used for ***agricultural*** purposes would be allowed to revert to active ***agricultural*** ***land***, and Columbia would restore all disturbed ***land*** per their 2018 ECS and 2018 Draft WVECS, our Plan, and with consideration of the landowner’s request. Columbia states that it would utilize rye grass cover unless the landowner requests a different seed mix.Disturbed areas would be returned to as close as possible to pre-construction condition. Tree clearing would only result in minor impacts, as the extent of tree clearing would be limited (approximately 0.42 acre) and trees are abundant in the immediately adjacent areas.Four residences are with 50 feet of the Ripley Well 7307/X59W7307 Tie-in Valve, and a total of three sheds, two livestock facilities, two silos, and one barn are present within 50 feet of the Project CWAs. A total of five residences are present within 100 feet of the Project CWA. Noise impacts on the residences near the Project CWA could result from the Project well abandonment activities. These impacts are discussed in greater detail in section 2.7, below. Columbia would maintain access to all nearby structures and would adhere to the Project’s Residential Construction Plan for residences within 50 feet of the of the Project CWA.No public parks, schools, churches, cemeteries, sports facilities, campgrounds, ball fields, other public areas, ***lands*** used for recreational purposes, state game management areas, orchards, or nurseries are within or adjacent to the Project CWA. The Project CWA is not within or near any known environmentally sensitive ***lands***, including natural or scenic areas and parks; state or national ***forests***; registered natural landmarks; designated wild, scenic, or recreational rivers; protected areas; or special use areas.Columbia conducted research of federal, state, and other available databases to identify potentially contaminated sites within and/or near the Project CWAs, including, but not limited to, petroleum sites, nonhazardous solid waste sites, brownfield sites, and hazardous waste sites.6 AMMs for the Indiana bat and NLEB can be found under FERC docket CP20-501-000 accession number 20200821-5035. Document Accession #: 20200923-3017 Filed Date: 09/23/202015With the exception of the Brinker Wells and tie-in valve locations, no contaminated sites were identified.For the Brinker Wells and tie-in valves, the database search identified a site listed in multiple databases, including the Resource and Recovery Act – Small Quantity Generator, Facility Index System/Facility Registration System, and Enforcement and Compliance History Information databases, as approximately 1,040 feet west of the CWAs. However, no violations or releases were reported in connection with this site. It is not anticipated that any contaminated media would be encountered during Project abandonment activities; however, in the event that contaminated media is encountered, Columbia would implement the procedures described in its Project Unanticipated Discovery Plan for Contaminated Media.Columbia’s review of aerial imagery, surrounding vegetation survey, and topography indicates that the Project would have limited impact on visually sensitive areas. Significant visual impacts from the Project are not anticipated. In general, the ***land*** surrounding the Project CWA is ***agricultural***, ***forested***, and sparsely populated. Modification of viewsheds from tree clearing would be minor, as the extent of tree clearing would be limited, and the abundance of trees in the immediately adjacent areas. Overall, visual impacts from the Project would be limited due to screening from vegetation and rolling topography, the short-term and temporary nature of the Project with no new aboveground structures proposed, ***removal*** of some aboveground facilities, and post-construction restoration of the CWAs to as close as possible to original elevation and contours.However, potential short-term visual impacts from the Project abandonment activities could occur on residences in the vicinity of the Ripley Well 7307/X59W7307 Tie-in Valve location. The TWS around the wellhead is visible from a residence approximately 110 feet to the north and the TWS around the tie-in valve is visible from a residence approximately 27 feet to the east; a residence approximately 24 feet to the north; a residence approximately 27 feet to the northwest; a residence approximately 44 feet to the east; and a public road abutting the CWA (Puckett Ridge Road/County Road 21/19). The CWA is not visible from any other residences, visually sensitive resources, or public roads due to screening from tree stands and rolling topography, as well as distance from the CWA, and no tree clearing is required for this portion of the Project. Because of the limited duration of Project abandonment activities, limited ***removal*** of vegetation, and ***removal*** of aboveground facilities associated with the Project, we conclude that impacts on ***land*** use and visual resources would not be significant.2.5 Cultural ResourcesColumbia provided a 5-year Memorandum of Understanding (MOU) with the Ohio State Historic Preservation Office (SHPO) signed on December 9, 2015, an MOU with the Pennsylvania SHPO covering 2019 to 2023, and a 2-year Categorical Exclusion Agreement (CatEx) with the West Virginia SHPO signed on January 7, 2019. These CatEx and MOUs govern abandonment activities that would occur on Columbia’s existing pipeline facilities within the right-of-way associated with this Project. Document Accession #: 20200923-3017 Filed Date: 09/23/202016On June 22, 2020, Columbia submitted a Project Review Form to the Pennsylvania SHPO recommending that Project activities outside of Columbia’s right-of-way which were not covered by the MOU would not have an effect on historic properties. On June 25, 2020, the Pennsylvania SHPO agreed with Columbia that no historic properties would be affected by the proposed Project. We agree that the Project would have no effect on historic properties and is covered by the CatEx and MOUs provided.2.6 Air Quality and NoiseAir quality impacts from ***emissions*** would be short-term intermittent, and minimal. For the five residences within 100 feet of the Project CWAs, Columbia would implement its Dust Control Plan to mitigate fugitive dust ***emissions***. Additionally, Columbia’s Residential Construction Plan contains site-specific measures to minimize fugitive dust for residences within 50 feet of those areas. Therefore, we conclude there would be no significant impacts on air quality during Project abandonment. No Project air quality impacts are anticipated following the abandonment.Noise impacts would be short-term, lasting 3 to 4 weeks per well. All Project abandonment activities would be completed Monday through Saturday, from 7:00 AM to 7:00 PM. None of these activities would occur outside the stated construction hours. Columbia's Environmental Construction Standards state that construction equipment would be properly muffled and maintained to avoid producing excessive noise near noise sensitive areas. Therefore, no significant Project noise impacts are anticipated during abandonment activities. No Project noise impacts are anticipated following the abandonment.3.0 CONCLUSIONSBased on this environmental analysis, Commission staff has determined that approval of the proposed project, as described, would not constitute a major federal action significantly affecting the quality of the human environment. Commission staff has determined that Columbia would abandon the project in accordance with the requirements of sections 157.205 and 157.216 of the Commission’s regulations, and in accordance with our Plan and Procedures.Document Accession #: 20200923-3017 Filed Date: 09/23/202017Attachment 1Summary of Soils DataDocument Accession #: 20200923-3017 Filed Date: 09/23/202018Soils in Project Work AreasSoil UnitShallow Bedrock1Revegetation PotentialHigh Compaction Potential2High Wind Erodibility3High Water Erodibility4Farmland ClassificationAcreage CWABrinker Well 3644 and PL 9095 Tie-in-ValveCanfield Silt Loam, 2 to 6 percent slopeNoFairNoNoYesPrime Farmland0.94Canfield Silt Loam, 6 to 12 percent slopeNoFairNoNoYesNot Prime Farmland0.63Ravenna Silt Loam, 2 to 6 percent slopeYesFairNoNoYesPrime Farmland if Drained0.26Brinker Well 4367 and PL 19083 Tie-in-ValveCanfield Silt Loam, 2 to 6 percent slopeNoFairNoNoYesPrime Farmland0.23Canfield Silt Loam, 6 to 12 percent slopeNoFairNoNoYesNot Prime Farmland0.34Kensington Silt Loam, 6 to 15 percent slopeNoFairNoNoYesNot Prime Farmland0.08Ravenna Silt Loam, 0 to 2 percent slopeNoFairNoNoYesPrime Farmland if Drained0.06Ravenna Silt Loam, 2 to 6 percent loamNoFairNoNoYesPrime Farmland if Drained0.25Donegal Well 4042 PL 9203 Tie-in-ValveCulleoka Channery Silt Loam, 8 to 15NoFairNoNoNoFarmland of Statewide Importance0.29 Document Accession #: 20200923-3017 Filed Date: 09/23/202019Soils in Project Work AreasSoil UnitShallow Bedrock1Revegetation PotentialHigh Compaction Potential2High Wind Erodibility3High Water Erodibility4Farmland ClassificationAcreage CWApercent slopeCulleoka Channery Silt Loam, 15 to 25 percent slopeNoFairNoNoNoNot Prime Farmland0.37Dormont Silt Loam, 3 to 8 percent slopeNoFairNoNoYesPrime Farmland0.01Dormont Silt Loam, 8 to 15 percent slopeNoFairNoNoYesFarmland of Statewide Importance0.12Dormont Culleoka Complex, 25 to 50 percent slopeNoFairNoNoYesNot Prime Farmland0.59Fluvaquents, loamyNoFairYesNoYesNot Primer Farmland0.25Weikert-Culleoka Complex, 15 to 25 percent slopeYesPoorNoNoNoNot Primer Farmland0.29Ripley Well 7307 X59W7307 Tie-in-ValveUpshur-Gilpin Silt Loam, 15 to 25 percent slopeNoPoorNoNoYesFarmland of Statewide Importance1.06Upshur-Gilpin Silt Loam, 25 to 35 percent slopeNoPoorNoNoYesFarmland of Statewide Importance0.161) Bedrock within 5-feet from surface; 2) High Compaction includes clay content > 28%; 3) Includes Wind Erodibility Groups 1-2; and 4) Includes all K-Factor ratings >-0.28Document Accession #: 20200923-3017 Filed Date: 09/23/202020Attachment 2. Well SchematicsDocument Accession #: 20200923-3017 Filed Date: 09/23/202021Document Accession #: 20200923-3017 Filed Date: 09/23/202022Document Accession #: 20200923-3017 Filed Date: 09/23/202023Document Accession #: 20200923-3017 Filed Date: 09/23/202024Document Accession #: 20200923-3017 Filed Date: 09/23/202025Document Accession #: 20200923-3017 Filed Date: 09/23/202026Document Accession #: 20200923-3017 Filed Date: 09/23/202027Document Accession #: 20200923-3017 Filed Date: 09/23/202028Document Accession #: 20200923-3017 Filed Date: 09/23/2020Document Content(s)CP20-501 Environmental Comments.PDF ......................................1Document Accession #: 20200923-3017 Filed Date: 09/23/2020

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[***The climate change mitigation potential of bioenergy with carbon capture and storage***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:671W-P2B1-JCWX-C2JN-00000-00&context=1516831)

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**Body**

Main

Most climate change mitigations pathways that limit global warming to 1.5 °C or 2 °C rely on negative ***emission*** technologies, in particular bioenergy with carbon capture and storage (BECCS)–, which has the benefit of combining the energy generation based on existing technologies with the geological storage of sequestered atmospheric carbon–.

However, concerns have been raised on the biophysical feasibility, environmental effects and biodiversity impacts of large-scale BECCS deployment, which stem from its intensive ***land***, water and nutrient use,–. Moreover, BECCS cost estimates vary widely, and BECCS implementation may prove to be socio-politically difficult, among other issues due to the challenge of accounting and rewarding negative ***emissions***–.

Given that BECCS is considered a crucial technology in many mitigation pathways, but also has major drawbacks, it is essential to assess its effectiveness as a climate change mitigation strategy. Two previous studies report that BECCS electricity can result in both net-negative and -positive GHG ***emissions***, mainly depending on the required ***land***-use change (LUC) and the efficiency of the bioenergy supply chain,. Earlier work stresses that the climate change mitigation potential of bioenergy is highly dependent on biomass cultivation location and conversion technology–, and that bioenergy crop yields may not suffice to achieve ambitious carbon sequestration ***targets*** via BECCS. However, spatially explicit GHG ***emissions*** for bioelectricity and liquid biofuels with CCS have not been estimated yet, despite being essential in evaluating the contribution of BECCS in mitigation pathways.

***Emission*** factors (EFs) express the amount of GHG ***emissions*** per unit bioenergy produced. Here we quantified spatially explicit EFs and determined the global potential supply of BECCS at increasing EF levels, producing so-called ***emission***–supply curves. ***Emission*** factors and supply potentials were calculated using the global vegetation model, LPJml, which was combined with full life-cycle GHG ***emission*** data. The EFs include ***emissions*** from LUC, the lost carbon sequestration capacity of natural vegetation (foregone sequestration), bioenergy supply chain ***emissions*** including fertilizers and CO2 sequestered through CCS over a set evaluation period. ***Agricultural*** areas (cropland and pastures), including projected additional ***land*** requirements, are excluded from our analysis, as employing them could lead to indirect ***land***-use change (iLUC) effects, or threaten food security–. We assessed bioelectricity and liquid biofuels (Fischer–Tropsch (FT) diesel and bioethanol) produced with CCS, and considered lignocellulosic biomass from fast-growing grasses (Miscanthus and switchgrass) and woody bioenergy crops (short-rotation poplar, willow and Eucalyptus), as well as sugarcane (for bioethanol only), with all crops being rainfed. We used a 30-year evaluation period that reflects typical plantation lifetimes and short- to medium-term mitigation without carbon budget overshoot, as well as an 80-year evaluation period that corresponds with mitigation pathways towards 2100. Biomass present before plantation establishment (initial biomass) was assumed to be burned, consistent with previous analyses,,, but we also quantified EFs and energy supply potential under the assumption that initial biomass is used to produce bioenergy or biomaterials. Our ***emission***–supply curves provide new insights into the amount of BECCS energy that can be produced with negative ***emissions*** or with EFs below those of alternative energy generation, allowing evaluation of BECCS’s climate change mitigation potential.

Bioelectricity

For a 30-year evaluation period, the global lignocellulosic crop-based BECCS electricity potential with negative ***emissions*** is 28 EJelec per year (Fig. ), which equals around 32% of the current global electricity production and would entail net sequestration of 2.5 GtCO2e per year (Supplementary Table ) based on a 90% carbon capture rate (Supplementary Table ). At EFs above zero, BECCS electricity does not result in net-negative ***emissions***, but GHG ***emissions*** would be reduced when replacing electricity generation technologies with higher EFs. Bioenergy with carbon capture and storage electricity typically achieves lower EFs on ***agricultural*** ***lands*** that are abandoned or are projected to be abandoned (abandoned ***lands***), but electricity supply potential with negative EFs on these abandoned ***lands*** is limited to around 6 EJelec per year. ***Emission*** factors are usually higher on natural ***forest*** and grasslands, and on managed and degraded ***forests*** that have recently been logged or burnt and are regrowing (managed and degraded ***forests***; see ). Net-negative EFs are furthermore typically achieved in subtropical and warmer temperate areas (Fig. ), which often sustain high yields (Supplementary Fig. ) but do not have the large carbon stocks and the associated initial LUC ***emissions*** of natural tropical and boreal ***forests***. In large parts of the globe, however, purpose-grown biomass use for BECCS electricity would result in (considerable) positive EFs over this 30-year evaluation period, stressing that BECCS’s mitigation potential is highly dependent on the location of biomass cultivation. The geographical pattern we observe is in line with earlier geospatially explicit results on biofuels without CCS,, although Elshout and colleagues do deem boreal areas suitable on the basis of more optimistic estimates of both high crop yields and limited soil carbon losses in these regions.

Global ***emission***–supply curve and ***emission*** factor map of bioelectricity with CCS.

a, An ***emission***–supply curve of bioelectricity with CCS over a 30-year evaluation period (black solid line), split over different original ***land*** cover types (coloured areas) and excluding ***agricultural*** ***land***. Shaded columns indicate EF ranges for alternative electricity generation technologies,. b, An ***emission*** factor map of bioelectricity with CCS over a 30-year evaluation period. c,d, An ***emission***–supply curve (c) and ***emission*** factor map (d) of bioelectricity with CCS over an 80-year evaluation period.

Longer evaluation periods lead to substantially higher BECCS energy potential at low EFs (Fig. , Supplementary Fig. ), predominantly as initial LUC ***emissions*** are amortized over longer periods, and to a lesser extent due to projected yield increases and levelling off of foregone carbon sequestration in the natural vegetation benchmark scenario. At an 80-year evaluation period (2020–2100), almost the entire global BECCS electricity potential (that is, 220 EJelec per year) has EFs below zero (Fig. ), which entails a large sequestration potential (40 GtCO2e per year; Supplementary Table ). The increase in the BECCS’s electricity supply potential is predominantly realized on natural ***forest*** and grasslands. On abandoned ***lands*** and on managed and degraded ***forests***, the electricity supply potential with negative ***emissions*** is limited to 12 and 31 EJelec per year, respectively. Care should be taken when drawing conclusions based on longer evaluation periods, as BECCS capacity that is installed later in the century may only achieve net-negative ***emissions*** beyond the ***target*** year 2100. The results shown here represent lignocellulosic crops in general (grass and woody crop-specific results are provided in Supplementary Figs. –). Furthermore, we also investigated a shorter, 20-year evaluation period, which reduces electricity potentials by about 60% compared to 30-year evaluation period results (Supplementary Fig. ).

Liquid biofuels

Lignocellulosic FT-diesel with CCS has the highest energy and sequestration potentials of the investigated liquid biofuel routes; however, over a 30-year evaluation period, the FT-diesel supply with negative ***emissions*** is minimal (Fig. , Supplementary Table ). As there is substantial supply potential at EFs below those of fossil diesel (67 EJfuel per year), replacing the entire current global diesel consumption of 60 EJfuel per year (including gas oil) could theoretically result in GHG ***emission*** savings of approximately 5.5 GtCO2e per year, although this is not the same as net sequestration. Savings could also be achieved if FT-diesel and FT-synthetic kerosene are used to replace fossil shipping and aviation fuels. At an 80-year evaluation period, the global supply potential of lignocellulosic FT-diesel with negative ***emissions*** is large (282 EJfuel per year; Fig. ), but the resulting global net sequestration potential of 4.8 GtCO2e per year is about eight-times lower than for BECCS electricity over the same evaluation period (Supplementary Table ), predominantly due to FT-diesel’s lower carbon capture rate of 52% (Supplementary Table ). The relative geographic and crop-specific patterns for EFs of FT-diesel with CCS are, however, similar to those of BECCS electricity for both evaluation periods (Supplementary Figs. and ). Over both a 30- and 80-year evaluation period, the bioethanol pathways with CCS do not result in net-negative ***emissions*** (Fig. ). This is primarily due to their low carbon capture rates (12 and 24% for lignocellulosic and sugarcane ethanol, respectively, see and Supplementary Table ).

Global ***emission***–supply curves of liquid biofuels with CCS.

a–c, Global ***emission***–supply curves of lignocellulosic FT-diesel (a), lignocellulosic ethanol (b) and sugarcane ethanol (c), all with CCS, over a 30-year evaluation period. d–f, The corresponding global ***emission***–supply curves of these liquid biofuels with CCS over an 80-year evaluation period. The orange and blue lines indicate the EFs of fossil diesel (94 kgCO2e per GJfuel) and petrol (92 kgCO2e per GJfuel), respectively. Note that electricity, FT-diesel and bioethanol potentials cannot be summed, as they are based on overlapping locations.

Initial biomass

In line with previous work,, we conservatively assumed that the original vegetation is burned when a bioenergy crop plantation is established, releasing all carbon in the initial biomass to the atmosphere as CO2; however, part of this initial biomass could also be used to produce bioenergy (Fig. ). Using initial biomass for bioenergy increases overall BE(CCS) energy potential and sequestration (as also suggested by Harper and colleagues), and decreases EFs as ***emissions*** are allocated over more energy generated. If 80% (ref. ) of all initial stem biomass is used and 90% of its carbon content is captured, BECCS electricity potential becomes approximately 4.5 times larger at EFs below zero, increasing from 28 to 125 EJelec per year over a 30-year evaluation period (Fig. ). Carbon sequestration increases from 2.5 to 5.9 GtCO2e per year (Supplementary Table ).

Global ***emission***–supply curves of BECCS electricity with different initial biomass use scenarios over a 30-year evaluation period.

a, An overview of ***emission***–supply curves for three initial biomass scenarios. b, An ***emission***–supply curve of BECCS electricity, with 80% of the initial stem biomass used to produce additional BECCS electricity (red solid line), split over different original ***land*** cover types. c, An ***emission***–supply curve of BECCS electricity with 80% of initial stem biomass used in other sectors (blue solid line). Shaded columns indicate EF ranges for alternative electricity generation technologies,.

Alternatively, the initial biomass can be used in other sectors to create more valuable products such as timber and paper. In this scenario, part of the initial carbon is stored in these products and allocated to them when it is ultimately emitted. Under this assumption, initial LUC ***emissions*** of BE(CCS) are lower, thus lowering EFs. If 80% of initial stem biomass is used in other sectors, the potential of BECCS electricity increases from 28 to 129 EJelec per year at EFs below zero (Fig. ) and sequestration increases sharply from 2.5 to 11 GtCO2e per year (Supplementary Table ).

It is evidently better to use initial biomass for energy or materials rather than burning it, as is also reflected by the lower EFs in both cases; however, the increased energy and sequestration potential of BECCS at negative EFs would also come from converting additional natural ***forests*** and savannahs, which have substantial initial stem biomass. At longer evaluation periods, the influence of using initial biomass for bioenergy or other products is limited (Supplementary Fig. ), as ***emissions*** from initial biomass are amortized over longer time periods and have a smaller effect on EFs. Patterns for FT-diesel with CCS are similar to those of bioelectricity with CCS (Supplementary Fig. ).

BECCS in mitigation pathways

We used our spatially explicit EFs and energy and sequestration potentials for BECCS to analyse global carbon sequestration until 2100 following the phased deployment of BECCS in two illustrative mitigation pathways of the IPCC SR1.5 °C report: the S2 middle-of-the-road pathway and the S5 fossil fuel and BECCS-intensive pathway, (see ). In our analysis, we deployed ***land*** starting with the best locations (lowest EFs; excluding ***agricultural*** ***land***) and we matched prescribed BECCS deployment rates either in terms of pathway-prescribed energy generation or pathway-required sequestration. We used a dynamic evaluation period up until 2100 for the installed BECCS capacity (for example, a 40-year evaluation period for capacity installed in 2060) and assumed that the initial vegetation is burned.

As we determine EFs from a full life-cycle perspective and include foregone sequestration, we typically find less carbon sequestration per unit BECCS energy than in mitigation pathways. Following energy-based BECCS deployment rates thus resulted in lower carbon sequestration than projected in the pathways (Fig. ). Following pathway-required annual sequestration, BECCS electricity from lignocellulosic crops only can keep up net sequestration until the year 2066 for S2 and the year 2050 for S5 (Fig. ), after which additional ***land*** conversion does not provide negative ***emissions*** over the remaining period to 2100. When first deploying all biomass residues that are available for energy (based on IMAGE shared socio-economic pathway 2 (SSP2), see ) to BECCS before using lignocellulosic crops, these points are postponed to the year 2076 and 2058 for S2 and S5 (Fig. ).

Carbon sequestration potential of BECCS electricity in climate change mitigation pathways.

Carbon sequestration refers to negative ***emissions***. a, Annual sequestration through BECCS electricity. b, Total (cumulative) sequestration through BECCS electricity. Dots indicate the point at which pathway-prescribed sequestration can no longer be kept up with, as additional ***land*** conversion no longer results in negative ***emissions*** over the remaining (evaluation) time until 2100. seq., sequestration; incl., including.

Over the century, the estimated sequestration that could be achieved using lignocellulosic crops alone (250 and 1,008 Gt for S2 and S5) is 61–84% of total projected sequestration (408 and 1,207 Gt for S2 and S5; Fig. ). This is in line with an earlier, crop yield-based exploration of BECCS’ global sequestration potential, which found that 59% of the sequestration required in a limited global warming scenario (representative concentration pathway 2.6) may be achieved. When also including biomass residues, we find that projected sequestration is approached to 88–94%, but not fully achieved (360 and 1,132 Gt for S2 and S5; Fig. ). In this estimate 0.8 to 2.4 Gha of ***land*** is required by 2100 to grow crops for BECCS (for S2 and S5 respectively), which equals 5.1% and 16% of the total ***land*** surface area on Earth and of which 53% and 72% are currently natural ***forests*** and grasslands. It is important to note that these extreme levels of ***land*** demand partly arise due to the time profile of, in particular, the S2 pathway, and from our assumption to use residues before crops. The cumulative sequestration these pathways demand by 2100 could biophysically be achieved with lower ***land*** requirements if deployment of crop-based BECCS starts even earlier on, as indicated by the importance of evaluation periods in our analysis (see Supplementary Fig. ). In any scenario, sequestration potential is drastically increased when deploying BECCS earlier, as also suggested in earlier work.

Sensitivities and limitations

Figure shows how ***emission***–supply curves of BECCS electricity are influenced by three key parameters. First, keeping bioenergy crop yields constant at their 2020 values decreases BECCS electricity supply potential at negative EFs by 25–32%, whereas enhanced yield improvement (that is, global improvement of ***agricultural*** management to current best practice, representing SSP1) increases it by 6–11% (Fig. ). Second, in line with previous studies,, BECCS electricity supply potential is sensitive to electricity conversion efficiency: a literature-based 5–7% change in conversion efficiency (Supplementary Table ) changes supply potential with negative ***emissions*** by 6–8% (Fig. ). Carbon sequestration potential is, however, unaffected as the carbon capture rate is not influenced by conversion efficiency. Third, more arable ***lands*** become available for bioenergy if less ***land*** is required for conventional ***agriculture***. Following the SSP1 scenario (with a smaller population and low meat diet, see ), BECCS electricity potential at EFs below zero increases by 21–93% (Fig. ). When all three parameters are combined into a best- and worst-case scenario, BECCS energy potential at negative EFs approximately doubles or halves from the default (Fig. ). These patterns are similar for lignocellulosic FT-diesel (Supplementary Fig. ). Our results are less sensitive to variation in other parameters. Doubling supply chain ***emissions***, for instance, only resulted in a 1–5% reduction of BECCS electricity supply potential at negative EFs (Supplementary Fig. ), although liquid biofuel EFs are more strongly affected (Supplementary Fig. ).

Sensitivity of BECCS electricity ***emission***–supply curves to parameterization.

The default ***emission***–supply curve is plotted in grey in all panels. a, ***Emission***–supply curves at constant 2020 crop yields (light blue) and high SSP1 crop yields (dark blue). b, ***Emission***–supply curves for low (light green) and high (dark green) biomass to energy carrier conversion efficiencies (based on literature, Supplementary Table ). c, ***Emission***–supply curves for scenarios with low (yellow) and high (orange) ***agricultural*** ***land*** requirements (based on SSP1 and SSP3 in IMAGE; default is SSP2). d, ***Emission***–supply curves for a best-case (green) and worst-case (red) scenario. e–h, These same ***emission***–supply curves for an evaluation period of 80 years rather than 30 years. Shaded columns indicate EF ranges for alternative electricity generation technologies,.

There are several possible limitations to the biophysical climate change mitigation potential of BECCS. First, our analysis focuses on high-yielding lignocellulosic bioenergy crops and sugarcane. In the boreal ***forest*** region, however, yields would typically be low and natural carbon stock losses high, meaning that lower EFs may be achieved by sourcing biomass from sustainably managed ***forests***, if their carbon stocks are maintained,. Under such boreal continuous cover forestry, we find that electricity supply potential with negative ***emissions*** increases by 2.5 EJ per year over a 30-year evaluation period, but decreases over longer evaluation periods, as yields are lower than for lignocellulosic crops (Supplementary Figs. and ). Continuous cover forestry would, on the other hand, have key benefits in terms of biodiversity conservation and ecosystem services–. Second, we excluded projected ***agricultural*** areas (cropland and pastures) to avoid iLUC effects, but conversion of managed ***forests*** could also lead to iLUC ***emissions***, as forestry products like timber and paper are partly sourced from such ***forests***. Third, biomass yields in the LPJml model are not explicitly influenced by soil quality parameters. However, yields are calibrated (see ) and we found that over 99% of the BECCS electricity potential with negative ***emissions*** is derived from areas with soils that are classified as moderately or highly suitable for rainfed crop cultivation over the continuous period 2011–2100. Finally, albedo reduction could lower mitigation, which is not accounted for in our calculations. Changes in albedo are typically limited though for grasses and coppiced trees (approximately 5% maximum reduction).

Implications

We conclude that the climate change mitigation potential of lignocellulosic crop-based BECCS is largest when producing electricity at locations with high biomass yields and relatively low carbon stocks (that is, abandoned ***lands*** and typically warmer temperate and subtropical areas) while utilizing the original vegetation for bioenergy or materials. We found that the EFs derived for BECCS are crucially dependent on the evaluation period considered, as they account for LUC ***emissions*** and foregone sequestration. Our global ***emission***–supply curves and EF maps show that, biophysically, many cultivation locations could supply electricity with negative EFs, leading to a large global electricity supply and carbon sequestration potential of 28 EJelec and 2.5 Gt per year over 30 years, 220 EJelec and 40 GtCO2e per year over 80 years, and 129 EJelec and 11 GtCO2e per year over 30 years when utilizing initial biomass. The sequestration potential of liquid biofuels with CCS is limited, although BECCS FT-diesel can lead to negative ***emissions*** over an 80-year evaluation period and replacing GHG-intensive fossil transport fuels greatly reduces ***emissions***.

Using our global ***emission***–supply curves, we showed that the projected trajectory of BECCS-based sequestration in mitigation pathways S2 and S5 can biophysically be approached (88–94%) but not fully achieved as residues and arable ***land*** with negative ***emissions*** become depleted. Part of the reason for this is that S2 in particular deploys BECCS later in the century and that biomass residues are used first, which leads to shorter evaluation periods up to 2100 for crop-based BECCS and therefore larger ***land*** requirements. This highlights that crop-based BECCS should be deployed early on to most effectively contribute to climate change mitigation; still, the ***land*** requirements for BECCS to achieve the cumulative amount of carbon sequestration projected in these pathways would probably be large to the point of being unfeasible, as also suggested in bottom-up assessments of BECCS’s sequestration potential.

Depending on the exact scenario, around 50–90% of the ***land*** area required, carbon sequestered and energy supplied would come from natural ***forests*** and grasslands. As ***land*** conversion to BECCS strongly reduces biodiversity, trade-offs clearly exist between BECCS’s climate change mitigating effect and biodiversity conservation,,. The mitigation potential of BECCS is further reduced by other environmental,– and socio-political– constraints, limitations to the amount of developed geologic storage sites–, and the challenge of upscaling BECCS by orders of magnitude from its current demonstration phase,–.

Yet, BECCS may play an important role in mitigating climate change and the energy transition, alongside renewables, other negative ***emission*** technologies and deep-***emission*** reduction,. Residues and waste flows form low-impact feedstocks for BECCS with little effect on ***land***-use. Lignocellulosic crop-based BECCS could also be deployed on abandoned ***agricultural*** ***lands***. Biodiversity and other environmental impacts of BECCS could be reduced using locally optimal crops and supply chain configurations. In all cases, our results indicate that earlier deployment of BECCS greatly increases its climate change mitigation potential, and suggest that policymakers ought to complement BECCS with other options for GHG ***emission*** reduction and carbon dioxide ***removal***.

Methods

Calculations

The GHG EFs for feedstock i (fast-growing grasses/short-rotation coppicing/sugarcane), carrier j (electricity/FT-diesel/ethanol), evaluation period t (20–80 years) and location x (66,663 ***land*** cells; 30 × 30 arcminute raster) were calculated as the sum of GHG ***emissions*** minus sequestration per unit energy carrier produced (in tCO2e per GJcarrier; equation ()).

***Land***-use change ***emissions*** (EmLUC) were calculated as the difference in carbon stocks between the bioenergy plantation and a natural vegetation regrowth benchmark at the end of the considered evaluation period (that is, including foregone sequestration) divided by energy carrier production over the evaluation period (equation ()). Fertilizer N2O ***emissions*** (EmFertilizer) were obtained by converting crop-specific fertilizer ***emissions*** to ***emissions*** per carrier produced (equation ()). Life-cycle supply chain ***emissions*** for the production of the energy carrier, including CH4 (EmSupply chain) were based on the literature (Supplementary Table ). Net CO2 sequestration from CCS (SeqCCS) was calculated as the captured amount of carbon per carrier produced minus additional supply chain ***emissions*** of CCS per carrier produced (equation ()).Where ∆C is the difference in above- and below-ground carbon stocks (tonne C per hectare) between the bioenergy plantation and a natural regrowth benchmark at the end of the considered evaluation period; r is the molar ratio between CO2 and C (that is, 3.66); Y is the annual bioenergy crop yield over the considered evaluation period (tonne dry biomass/(hectares × year)); t is the evaluation period (in years); floss is the biomass loss correction factor; η is the biomass to final carrier conversion efficiency (GJcarrier per tonne dry biomass); π the penalty in conversion efficiency due to CCS (GJcarrier per tonne dry biomass); Em represents GHG ***emissions*** per biomass produced (kgCO2e per tonne dry biomass); cc is the carbon content of the feedstock (tonne C per tonne dry biomass); κ is the carbon capture efficiency of CCS (tonne CO2 captured per tonne CO2 emitted) at the power plant or fuel production facility. EmSupply chain CCS represents the (additional) life-cycle supply chain ***emissions*** from using CCS (tonne CO2e per GJcarrier). Note that EFs are expressed in kgCO2e per GJcarrier throughout the main text.

Energy potentials (EP; in GJcarrier per year) per grid cell were calculated as production area times net bioenergy yields (equation ())Where A is the ***land*** area of each grid cell (in hectares).

Global ***emission***–supply curves were determined by sorting all grid cells available for BECCS by ascending ***emission*** factor and summing energy potential across these cells. Lignocellulosic bioenergy crop results in the main text were combined from the results for grasses and short-rotation coppicing, by selecting the crop type for each grid cell that results in the lowest EF (details and alternative selection methods are provided in Supplementary Figs. and ). Carbon stocks and bioenergy crop yields were modelled in the (IMAGE-)LPJml global vegetation model and ***land*** availability was determined using the IMAGE integrated assessment model, as detailed below. All other parameter values and their ranges are based on literature (Supplementary Tables and ). Of these parameters, κ stands out as its value differs strongly among the different energy carriers: 90% for lignocellulosic electricity, 52% for lignocellulosic FT-diesel, 12% for lignocellulosic ethanol and 24% for sugarcane ethanol, with the reason for these differences being the assumption that CO2 ***emissions*** from liquid fuel combustion are not captured and stored, as these fuels are almost entirely used in transport and other decentralized applications without feasible CCS capability. Furthermore, we assume that only CO2 from the FT-process or fermentation step itself is captured in the FT-plant or biorefinery. The more disparate flows of CO2 that, for instance, arise from the combustion of biomass or fossil fuels for process heat or auxiliary power (modelled as part of supply chain ***emissions***) are relatively small in volume and low in CO2 concentration and are assumed not be captured, in line with previous work, as explained in detail in Supplementary Section . ***Emission*** factors of alternative energy technologies were derived from literature (Supplementary Table ). Non-CO2 GHGs were accounted for using global warming potentials over a 100-year time period based on the IPPC fifth assessment report.

Carbon stocks and bioenergy crop yields in IMAGE-LPJml

We used the IMAGE integrated assessment model coupled to the LPJml global vegetation and hydrological model, to determine carbon stocks and yields per location over time. By default, we used a forced climate scenario via a representative concentration pathway leading to 2.6 W m−2 radiative forcing by 2100, reflecting substantial climate change mitigation. A warmer climate scenario is explored in the Supplementary Fig. .

Carbon dynamics modelled in LPJml cover above-ground biomass, below-ground biomass and soil carbon. We determined carbon stock changes by comparing the difference in carbon stocks at the end of the evaluation period between two scenarios: (1) the bioenergy scenario, where ***land*** in each available cell is used to grow a bioenergy crop (excluding above-ground biomass, which is harvested), and (2) the natural vegetation ‘benchmark’ scenario, where vegetation grows naturally without management. By looking at this difference in carbon stocks, we thus explicitly account for the lost sequestration capacity of natural vegetation that is foregone by using the ***land*** for bioenergy crop plantations instead. Three bioenergy crop types were considered: (1) grassy bioenergy crops, that is, fast-growing grasses parameterized based on both Miscanthus and switchgrass cultivars, (2) woody bioenergy crops, that is, short-rotation coppiced trees parameterized based on Eucalyptus spp. in the tropics and both willow and poplar in colder areas, and (3) sugarcane. Non-CO2 GHG ***emissions*** of ***land*** conversion were not explicitly included here but, based on Whitaker and co-workers, would typically be below 2% of total GHG ***emissions*** per energy carrier in this study.

Yield is determined as the crop-specific rainfed potential biophysical yield in the LPJml model multiplied by a calibration factor that expresses how much of that potential yield is realized. Globally, the average yield potential in LPJml increases by approximately 25–30% from 2020 towards 2100, due to climate feedbacks. The calibration factors were determined, based on empirical data of historic, current and best-practice yields, and are projected into the future as part of the IMAGE model. They represent ***agricultural*** management, including fertilization, improved crop strains and pest control. In line with historic trends, the calibration factors result in a global average increase in yields of 0.72–1.0% per year for grasses and woody bioenergy crops, and 0.76% per year for sugarcane, from 2020 towards 2100. Energy potentials and EFs were always determined using yields and carbon stock changes from 2020 onwards (for example, 2020–2060 for a 40-year evaluation period).

***Land*** availability

The availability of locations for bioenergy production was determined using the IMAGE model. It was assumed that areas used for ***agriculture*** (cropland and pastures) over the considered evaluation period, are not available for bioenergy production. Default results were based on a median ***land***-use scenario following shared SSP2. Scenarios with lower and higher ***agricultural*** ***land*** demand in the sensitivity analysis were based on SSP1 and 3, respectively. SSP1 includes assumptions on a shift towards less meat-intensive diets and a low population size. SSP3 on the other hand, is characterized by high population growth and low technological development and therefore higher ***agricultural*** ***land*** requirements. Beside ***agricultural*** ***land***, built-up areas were also excluded. The amount of ***land*** available for bioenergy was further constrained by a minimum yield threshold; that is, ***lands*** yielding less than 2.5 tonne wet biomass per hectare per year (or 10 t for sugarcane) as determined in LPJml, were excluded in our analysis. For all crop types these thresholds are about 5% of the global maximum yields per hectare per year.

***Land*** cover types

The original ***land*** cover types presented in this analysis were based on IMAGE classification (Supplementary Fig. ). Specifically, abandoned ***lands*** are based on which ***agricultural*** ***lands*** are abandoned towards 2100, depending on the projected supply and demand of ***agricultural*** products as determined in IMAGE. The managed and degraded ***forests*** ***land*** cover type is defined here as forestland that is in a regrowing state after recent human interventions. It encompasses: (1) managed ***forests*** for wood production, which predominantly occur in temperate and boreal zones, and (2) regrowing degraded ***forests*** that remain after logging for the most valuable trees or slash-and-burn practices, predominantly in tropical areas. For degraded ***forests*** specifically, default LPJml carbon dynamics were recalibrated on the basis of the literature–. We estimated that above-ground carbon stocks in ***forests*** that have been degraded within the last 20 years are approximately two-thirds of unharvested carbon stocks, as detailed in Supplementary Section . In the natural vegetation benchmark scenario, we therefore modelled carbon stocks of degraded ***forests*** following the default growth curves for natural ***forests*** in LPJml, but starting where above-ground carbon stocks are at two-thirds of their maximum.

Alternative uses initial biomass

When initial biomass from the original vegetation is utilized in other sectors, EFs and EPs were calculated by subtracting 80% (ref. ) of the carbon present in initial stem biomass from the original (preconversion) carbon stocks. When initial biomass is used to produce bioenergy, 80% of initial stem biomass is instead added to the overall yield over the evaluation period. It is assumed that initial biomass is used to produce the same energy carrier, including CCS.

BECCS in mitigation pathways

As a starting point of this analysis we took two illustrative climate change mitigation pathways from the IPCC special report on 1.5 °C (ref. ): the S2 middle-of-the-road pathway (MESSAGE-GLOBIOM 1.0 SSP2) and the S5 fossil fuel and BECCS-intensive pathway (REMIND-MagPIE 1.5 SSP5). The IPCC SR1.5 °C online database provides total global carbon sequestered by BECCS electricity (Carbon Sequestration|CCS|Biomass) and primary energy used in BECCS electricity (Primary Energy|Biomass|Modern| w/CCS). We converted global primary energy used to global electricity produced with BECCS, assuming an energetic conversion efficiency of 0.31 GJelectric per GJbiomass, following the IPCC Fifth Assessment Report median dedicated biomass electricity plant efficiency. We used ten year intervals in our calculations, as provided in the IPCC database, with linear interpolation. In the analysis, we deploy ***land*** starting with best locations (that is, with the lowest EFs) and follow the global energy and sequestration-based BECCS deployment rates. We use an evaluation period up until 2100 (for example, 50 years for capacity installed in 2050, 40 years for 2060 and so on). From 2070 onwards we use the default evaluation period of 30 years to avoid underestimating BECCS potential.

When including biomass residues, we deployed all residues available for bioenergy to BECCS, before allocating any ***land*** to bioenergy crop production for BECCS. In all cases, residue availability for bioenergy was based on the IMAGE SSP2 baseline scenario and included both ***agricultural*** and forestry residues (Supplementary Table ). The GHG balance of residues-based BECCS included CO2 sequestered via CCS (assuming a 50% carbon content; Supplementary Table ) and supply chain ***emissions*** (based on parameterization for grassy lignocellulosic biomass, excluding fertilizer ***emissions***; Supplementary Table ). Residues were assumed not to cause ***land***-use change ***emissions*** or result in foregone sequestration of a natural vegetation reference scenario.

Online content

Any methods, additional references, Nature Research reporting summaries, source data, extended data, , acknowledgements, peer review information; details of author contributions and competing interests; and statements of data and code availability are available at [*https://doi.org/10.1038/s41558-020-0885-y*](https://doi.org/10.1038/s41558-020-0885-y).

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**Notes**

Supplementary informationSupplementary information is available for this paper at [*https://doi.org/10.1038/s41558-020-0885-y.Peer*](https://doi.org/10.1038/s41558-020-0885-y.Peer) review informationNature Climate Change thanks Page Kyle, Daniel Sanchez and the other, anonymous, reviewer(s) for their contribution to the peer review of this work.Publisher’s note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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**End of Document**



[***EIGHT AREAS WHERE URGENT EFFORTS ARE NEEDED TO PROTECT UK FROM CLIMATE IMPACTS***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62XK-BR91-JCBD-Y1N4-00000-00&context=1516831)

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**Section:** HOME NEWS

**Length:** 834 words

**Byline:** Emily Beament, PA Environment Correspondent

**Body**

The Climate Change Committee is urging the Government and devolved administrations to take immediate action to ensure the UK can cope with the inevitable impacts of climate change.

Here are the eight key areas that the committee warns need to be tackled within the next two years.

- Risks to ***land*** and freshwater habitats and species:

Climate change threatens wildlife at a time when it is already in decline, with increased temperatures, drought and wildfire among the biggest risks, and the UK uplands are particularly vulnerable.

Action is needed to reduce pollution and create suitable habitats for species to continue to live, such as shading rivers using trees, helping wildlife to move, for example with fish passes, and improving the resilience of habitat with mixed planting and ***removing*** material that risks wildfires.

- Risks to soil health from increased floods and drought:

Soils are a key natural asset which provide foods, store carbon and are a home to wildlife, but they are at risk from erosion and damage from heavier rainfall and drought.

Healthy soils are also needed to boost crop yields, which will free up ***land*** to plant trees to help cut carbon ***emissions***.

Action is needed to bring in soil-friendly farming practices, and the post-Brexit overhaul of environmental laws, including new payments to farmers to provide public goods, provides an opportunity to encourage soil conservation.

- Risks to natural carbon stores such as woods and peatlands:

Hotter, drier conditions reduce the functioning of peatlands and ***forests*** and threaten their existence, while ``blue carbon'' stores such as saltmarsh and kelp ***forests*** are at risk from warming seas and the loss of coastal habitat.

Meeting ***targets*** to cut UK ***emissions*** to net zero by 2050 relies on these natural stores of carbon to absorb around 50 million tonnes of ***emissions*** per year, so protecting them is a high priority, the Climate Change Committee says.

Action is required to ensure the right trees are planted in the right places and degraded peatlands are restored.

- Risks to crops, livestock and commercial trees:

Climate change poses a direct risk to ***agriculture*** and forestry through heat, drought, waterlogging, flooding, fire, and spread of pests, diseases and non-native species - and there is no evidence these risks are being strategically planned for, the report says.

Action to cope with these issues will include new varieties of crops and trees and different breeds which are more resilient, and changes to ***land*** management including better technology for managing water and supplying nutrients as well as improving soil conservation.

- Risks to supply of food, goods and vital services due to collapse of supply chains and distribution networks:

Climate change can disrupt the often international supply chains of goods, through heavy rainfall, flooding and high temperatures.

Action includes better information, diversifying supply chain risks, and new technology and infrastructure, and will mostly fall to businesses, though the Government can support them with advice and information.

- Risks to people and the economy from power system failures:

The UK currently gets around 15-20% of its energy from electricity but that is set to grow to around 65% as we switch to electric vehicles and heat pumps, alongside its use for lighting, communications and other necessities.

Flooding, water shortages, wildfire, high temperatures, rising seas and increases in storms can all hit parts of the power supply system, causing blackouts and hitting multiple areas of the economy.

As the UK ramps up investment in electricity generation such as offshore wind farms and the grid, there is an urgent need to ensure the power system is resilient to climate impacts.

- Risks to health, wellbeing and productivity from increased exposure to heat in homes and buildings:

People are already at risk of illness and death from high temperatures, with more than 2,500 deaths linked to last year's heatwave in England - more than at any time since records began in 2003.

Without adaptation, the number of people dying from heat could treble to around 7,000 by 2050, while there will also be losses in productivity, and effects on elderly people being cared for in their homes.

Efforts to stop overheating in buildings are missing, even though it is one of the biggest risks the UK faces, the report warns as it calls for updating of building regulations and policies to ensure new homes are built with cooling measures as well as energy efficiency.

- Multiple risks to the UK from the impacts of climate change overseas:

Extreme weather events such as floods and hurricanes could create cascading risks that spread through sectors and countries, in the same way Covid-19 has caused terrible impacts to society and costs to Government, the report warns.

Overseas aid programmes should reduce underlying vulnerabilities, not just respond to disasters, and there should be greater finance for adaptation as part of efforts to help poorer countries tackle climate change.

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**End of Document**



[***Summary report of sectoral low-carbon roadmaps published***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:615P-2XC1-F0YC-N2BM-00000-00&context=1516831)

Nordic Daily

October 22, 2020 Thursday

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**Body**

Helsinki: Government of Finland has issued the following press release:

The Ministry of Economic Affairs and Employment has published a report summarising the main results of the sectoral roadmaps produced during the past year. The report includes summaries of the published roadmaps, key conclusions of the project, a description of the work process and estimates of further work. It also explores how the roadmaps will be utilised in climate and energy work towards a low-carbon Finland.

The roadmaps show that the Government’s goal of a carbon neutral Finland in 2035 is achievable for industry and other sectors with existing or upcoming technologies. However, the realisation of roadmaps requires that the investment environment is favourable and that a number of conditions are met.

“Although the roadmaps have now been published, practical work in companies and across central government is only just beginning. Ultimately, success will be determined by how well the measures highlighted in the roadmaps can be transformed into concrete investments and new practices. What matters here is the commitment of sectors and companies,” says Minister of Economic Affairs Mika Lintilä.

“At the same time, the Government must create the conditions for large-scale investments and other measures. The forthcoming strategic work on renewable industries will contribute to meeting this particular challenge,” Lintilä adds.Roadmaps to benefit sectors, businesses and climate and energy policy

The preparation of sectoral low-carbon roadmaps was included in the Government Programme of Prime Minister Rinne in summer 2019, and subsequently in the Government Programme of Prime Minister Marin. The roadmaps’ purpose was to provide a more accurate picture of the scale, costs and conditions of the measures needed to move to a carbon neutral Finland by 2035.

A total of 13 sectors prepared their roadmaps by summer 2020. In support of the sectors, the Ministry of Economic Affairs and Employment coordinated the project as a whole, provided guidance and organised discussions and popular thematic seminars.

The roadmaps offered a new perspective on responding to the climate challenge, produced a great deal of new information and increased the commitment of sectors and companies to climate work.

The report summarises the roadmaps for the following sectors: energy industry, chemical industry, ***forest*** industry, technology industry, food industry, trade, transport and logistics, ***agriculture***, tourism and restaurants, construction industry, property owners and developers, sawmill industry, textiles and bioenergy.Roadmaps show electrification, clean energy and RDI investments play key roles

According to the report, the roadmaps reveal the potential for significant reductions in greenhouse gas ***emissions*** in different sectors. With regard to industry and other sectors, the Government’s ***target*** for 2035 can be achieved with existing or upcoming technologies, provided that investment environment is favourable and that a number of conditions are met.

Because of the ambitious ***target***, ***emission*** reductions are needed in all sectors. The impact of individual investments on ***emissions*** development is significant and therefore ***emissions*** reductions are often not linear but happen step by step. Although the amount of ***emissions*** varies greatly between the sectors, each sector’s contribution is necessary and valuable.

The electrification of industry and the rest of society would reduce greenhouse gas ***emissions*** in several sectors considerably. According to the roadmaps, electrification could increase industrial electricity consumption by 100% and Finland’s electricity consumption by more than 50% by 2050. Significant investments are needed to increase the capacity for low-***emission*** electricity generation and to expand the transmission network.

The implementation of the roadmaps requires that many conditions are met. Key conditions include an open and predictable operating environment, RDI investments, availability of experts and smooth regulation. In addition, the sectors must have a strong commitment to further work.

The energy transition required by the carbon neutrality ***target*** calls for more reasonably priced electricity that can be reliably supplied. In addition, sectoral integration, development of energy networks and ***removal*** of administrative barriers are essential for accelerating change. Sectoral integration will enable significant reductions in ***emissions*** due to the electrification of society.

***Targeting*** RDI investments will determine the future developments and it is therefore one of the focal issues for creating a low-carbon society. In industry, investment cycles are long and the reliance on coal must end. The technological solutions highlighted in the roadmaps relate to low-***emission*** energy production, material and energy efficiency, alternative propulsion technologies (biofuels, hydrogen, electrification), waste heat recovery and carbon dioxide capture, use and storage.The carbon handprint – the positive climate impact – of the current and upcoming products is considerable. Clean solutions offer great opportunities for exports and new business ventures. Carbon neutral solutions can be a significant competitive factor for the Finnish industry.Roadmap work continues – results to be used in strategy work and further steps

The roadmaps will contribute directly to the Government’s climate and energy strategy, which is currently under preparation by the Ministry of Economic Affairs and Employment, as well as to many other plans related to the State’s energy and climate policy. In addition, the roadmaps support, for example, the ***targeting*** of RDI investments and the preparation of a sustainable recovery.

Several sectors are planning or preparing further steps on their roadmaps, including more thorough reviews and means to put the results into practice. There are also plans to develop tools for the members (including a calculator for carbon handprint and Scope 3 ***emissions***) and to begin a systematic dialogue with stakeholders. Many sectors find the practical implementation of the results and, in particular, the reaching of SMEs challenging, which highlights the importance of further work.

“We want to support further work and the implementation of results. Preparing the roadmaps showed how strong results we can achieve through cooperation – be it between the public and private sectors or between sectors. This kind of cooperation, which is exceptionally close even in international terms and can serve as a model for others, will be needed in the future too,” Minister Lintilä says.

**Load-Date:** October 29, 2020

**End of Document**



[***These 5 beer companies are taking steps to protect the planet***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62WG-YCT1-JDG9-Y395-00000-00&context=1516831)

Impact News Service

June 10, 2021 Thursday

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**Length:** 791 words

**Body**

Cologny: World Economic Forum has issued the following press release:

Barley crops are under threat from increased droughts and extreme heat, due to climate change. Beer will become increasingly expensive and in short supply as a result. But brewers such as Carlsberg and Heineken are taking action. Solar-powered breweries, tree planting and shock tactics are all part of attempts to make the industry more sustainable.

Beer will become increasingly expensive and could be in short supply by the end of the century because of climate change, experts say.

Increased droughts and extreme heat waves are threatening crops of barley, the grain typically used in beer, and also water, which makes up to 95% of an average beer.

Brewers are responding by improving their sustainability credentials. Here are some examples.Have you read?

Why sustainability is the new digital How sustainability will drive growth in the packaging industry These 10 golden rules for planting trees could help save the planet

1. Heineken’s zero-carbon breweries

Based in Amsterdam, Heineken aims to be a carbon-neutral producer of beer by 2030 and have a carbon-neutral supply chain, including ***agriculture***, packaging, distribution and cooling, by 2040. Using renewable energy to power its breweries is key to this.

In Spain, for example, Heineken has signed a deal with energy supplier Iberdrola to power all four of its Spanish breweries and its offices with solar power. It then plans to replace existing gas boilers with ones that use biomass.

This will allow it to brew beer using only renewable energy by 2023, when Heineken Spain aims to be 100% carbon neutral. Heineken has implemented more than 130 renewable energy projects since 2018, including five of the world’s 10 largest on-site solar-powered breweries, according to Global News Wire.

2. Carlsberg invests in natural carbon capture

Danish beer giant Carlsberg has joined forces with conservation charity WWF to help restore seagrass meadows around the UK coastline. Consumers can donate to the project through buying special edition packs of beer.

Seagrass is a marine plant that can absorb carbon up to 35 times faster than a rainforest when it is massed together in underwater meadows. These natural carbon sinks are at risk from pollution and extreme weather.

The project is part of Carlsberg’s Together Towards Zero sustainability strategy, which includes ***targets*** to halve carbon ***emissions*** at its breweries by 2022.

3. AB InBev uses blockchain to boost sustainability

Anheuser-Busch InBev, based in Belgium, is one of the largest buyers of barley globally for beer brands including Budweiser, Corona, Beck’s and Leffe. In a pilot project in Europe, it is using blockchain technology to track where the barley in every beer comes from.

As well as giving consumers an end-to-end view of a product’s supply chain, the project aims to improve growers’ yields, water and energy efficiency and soil health.

The brewer’s sustainability goals include measurably improving water availability and quality in all of its communities in high-stress areas by 2025.Belgian brewer AB InBev is using blockchain technology to boost the traceability and sustainability of its beer.Belgian brewer AB InBev is using blockchain technology to boost the traceability and sustainability of its beer.Image: AB InBev

4. BrewDog’s tree solution

BrewDog, a craft brewer and pub chain based in Aberdeenshire, Scotland, is planting millions of native trees on its own patch of ***forest*** in the Highlands of Scotland.

The company says the 50 square kilometres Lost ***Forest*** project, west of Aviemore in the Cairngorms National Park, is the biggest native woodland establishment and peatland restoration project ever carried out in the UK. “Overall, the Lost ***Forest*** is capable of pulling 1 million tonnes of carbon dioxide out of our atmosphere,” said BrewDog chief executive and co-founder James Watt.

The company says it has been carbon negative since August 2020 and is ***removing*** double the carbon it emits.BrewDog’s ‘Lost ***Forest***’ covers an area bigger than 17 countriesBrewDog’s ‘Lost ***Forest***’ covers an area bigger than 17 countriesImage: LinkedIn/BrewDog

5. A warning in a can

New Belgium Co, based in Colorado in the United States, says it is the first American company to create a nationally distributed carbon-neutral beer. The limited edition ‘Torched Earth Ale’ uses ingredients like dandelions, hop extracts and smoke-tainted water instead of the usual purified ingredients used to make beer.

The company says the beer has been intentionally designed to taste “not great”, using “the kind of ingredients that would be available in a climate-ravaged future”.

The aim is to shock bigger beer businesses into action to help tackle the industry’s carbon footprint.

**Load-Date:** June 10, 2021

**End of Document**



[***Holyrood election 2021: What the parties are pledging on the climate emergency***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62H2-3JP1-F0JC-M4W4-00000-00&context=1516831)

Herald Scotland

April 22, 2021 Thursday

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**Length:** 1149 words

**Byline:** [*David Bol*](http://David Bol)

**Body**

AN ACTION plan to tackle the climate emergency is central to all parties' manifestos ahead of May's Holyrood election.

The Scottish Government has committed to transforming the country into a carbon net zero nation by 2045 while MSPs have agreed to cut Scotland's 1990 levels of carbon ***emissions*** by 75% by 2030.

We take a look at what the parties are bringing forward in their plans to deal with the climate and biodiversity crisis.

SNP - carbon neutral islands, biodiversity and peatland funding and cutting car kilometres

The SNP is investigating "pilots for some islands to run on 100% renewable energy" with plans with at least three islands over the next five years to allow the communities to become fully carbon neutral by 2040.

The party has committed to investing an extra £500 million to help tackle the biodiversity crisis, more than £250 million to restore 250,000 hectares of Scottish peatland by 2030 and increase new woodland creation ***targets*** to 18,000 hectares per year by 2025.

The SNP has pledged to decarbonise one million homes by 2030 with £1.6 billion of investment, while all new homes and buildings from 2024 will be required to use renewable or zero ***emission*** heating systems.

The SNP has committed to reduce 'car kilometres' by 20% and phase out new petrol and diesel cars and vans by 2030. The party also wants to ***remove*** "the majority of fossil fuel buses" from public transport by 2023.

READ MORE: Sturgeon places hydrogen technology central to SNP's climate strategy

The SNP is pledging to "shift half of all funding for farming and crofting from unconditional to conditional support with ***targets*** for biodiversity gain". The SNP is also backing the development and scaling up of hydrogen technology.

The SNP will bring forward a Circular Economy Bill to encourage reuse and cut waste, particularly sing-use plastics. The party will also review why so much waste in Scotland ends up being incinerated.

Scottish Conservatives - nature networks, new national park and new farm payment system

The Scottish Tories have committed to drawing up a nature bill to "strengthen environmental protections on ***land*** and sea" with one in nine species in Scotland threatened by extinction.

The party wants to review marine protected areas and promote sustainable fishing and effective stock management with a £25 million cleaner seas fund used to ***remove*** harmful products including plastics.

The Conservatives want to set up nature networks to safeguard protected areas and end peat extraction for use in compost and increase peatland restoration to 20,000 hectares annually by 2025.

The party has promised to increase new tree planting to 18,000 hectares annually by 2025 and create Scotland's third national park in Galloway.

The party has pointed to a lack of progress it says has happened for farmers and draw up a new farm payment system.

The Conservatives' manifesto stresses that "North Sea oil and gas has a long future of many decades ahead" and has pointed to the UK Government's £16 billion North Sea Transition Deal to protect jobs in the sector.

Scottish Labour - warmer homes and more trees and peatland restoration

Labour has placed improving energy efficiency standards at the heart of its climate strategy - with a commitment to retrofit all homes across Scotland to a minimum of energy efficiency rating C by 2030. The party's manifesto points to reviewing the use of large-scale incineration of waste.

Labour has pledged to increase the current 11,000 hectares of tress planted a year to at least 15,000 hectares a year, building to at least 18,000. The party has also committed to increasing peatland restoration to 20,000 hectares each year, alongside measures to end commercial peat extraction.

The party wants to support a plan for ocean recovery with at least one tenth of Scotland's seas fully protected, and a further 20% highly protected, from destructive and extractive activities by 2030.

Labour will support councils to run their own bus services, creating a green bus fleet and moving towards the long-term aim of universal free bus travel.

Scottish Greens - harness tidal power, faster action and more investment in restoration

The Greens want to ban the sale of new petrol and diesel cars from 2026 and scale up the use of tidal energy with a ***target*** of 1GW in Scotland by 2030.

The party has pointed to plans to replace air passenger duty with a frequent flyer levy once the pandemic is over - while onshore wind capacity would be scaled up under the party's plans. The party would also end public support for new buses that are not fully electric from 2022.

To decarbonise heating systems, the Greens want to introduce grants to replace fossil fuel boilers with 500,000 heat pumps to be installed by 2030.

The Greens support a ban on new fossil fuel boilers from 2025 for buildings off the gas grid, and 2028 for all buildings.

The party has pledged £150 million for a nature restoration fund, £250 million for more and better national and regional parks, £250 million for public and community native woodland planting and £145 million extra to restore peatlands - with all peatland restored by 2030 and a ban on peat extraction and sale for horticultural use.

The Greens have pledged to "make ***emission*** reductions and climate mitigation measures a compulsory requirement for all (***agriculture***) subsidies" and support the partial replacement of corporation tax at the UK level with a carbon tax that increases over time in line with climate ***targets***.

Scottish Liberal Democrats - low carbon homes and new national parks

The Lib Dems want to move 1 million homes to zero ***emission*** heating by 2030 and invest in low carbon heat networks and establish new national parks and woodlands.

The party has committed to setting legally binding nature recovery ***targets*** and expand woodland using at least 50% native species, increasing Scotland's ***forest*** cover by an additional 36 million trees every year.

The Lib Dems have promised to set a new ***target*** for 100% of energy generated in Scotland to come from renewables by 2030 and "plan for the inevitable end of oil and gas" by ensuring there is a just transition for workers.

The party wants to introduce a circular economy law, including ***targets*** that reduce the carbon ***emissions*** produced in creating everything we consume.

Alba Party

Alex Salmond's party has pressed the case for commissioning a "roadmap" setting out how Scotland will electrify its transport system to ensure ***targets*** for ending petrol and diesel cars are not missed.

The party will "support the transition away from fossil fuels by introducing a wellhead production tax on Scotland's offshore oil industry as soon as it is possible".

Alba's manifesto says the tax will replace corporation tax as the basic means of offshore taxation, with the revenue used to finance "the move to carbon capture projects, the hydrogen economy and the further transition to offshore and marine renewables".

**Load-Date:** April 22, 2021

**End of Document**



[***Vow ASA: A breakthrough solution in the fight against climate change***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61GV-0M51-F0YC-N3T7-00000-00&context=1516831)

Impact Financial News

December 10, 2020 Thursday

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**Length:** 825 words

**Body**

Oslo:Vow ASA has issued the following news release:

Sludge and organic waste can be converted into valuable products like biocarbonand bioenergy instead of being 'wasted'. - We have been waiting for this for 25years says Frederic Hauge in Bellona, that is now joining forces with Vow tosolve one of the major environmental challenges.

Vow ASA´s pyrolysistechnology converts sludge, organic waste, and other typesof biomass into biocarbon and biogas. But are we able to get hold of enough ofthese resources to make an impact for climate change mitigation? This is the bigquestion thatBellona and Vow ASA jointly will be finding the answer for.

- Pyrolysis solves numerous environmental challenges by converting waste tovaluable resources. Vow has an industrialized technology solution that we havebeen waiting for the past 25 years, says the founder of Bellona Frederic Hauge

Vow,withits subsidiary Scanship, has for decades delivered technologies toprocess and purify wastewater, foodwaste and garbage on cruise ships far beyondregulatory requirements. In recent years, the company has developed a newpyrolysis technology that converts these waste streams into biocarbon and clean,CO2 neutral energy.

- Through years of technology development combined with last year acquisition ofthe French company ETIA, we now have a solution to turn biomass, sludge andother waste streams into valuable commodities and energy, helping multipleindustries reduce ***emissions*** and meet their CO2 neutral ***targets***, says the CEO ofVow ASA Henrik Badin.

Carbon sequestration with biocarbon will play an important role cutting worldCO2 ***emissions*** by half within 2030, and to further reach negative ***emissions*** bythe middle of the century. Converting sludge, organic waste, and other types ofwaste into biocarbon will make significant contribution to these ***targets***.

- The technical solutions already exist. We have them.What we need is to getaccess to these vast streams of biomass and organic waste, to obtain politicalsupport to use it, and to develop efficient ways to roll-out technology inlarger scale. We must make it all relevant in a bigger picture. With Bellona'sbroad knowledge and experience of industrial and political processes in climatematters, we believe that together we can solve this,Badincontinues.

- Biomass, sludge, and organic waste is most often untapped resourcesThe access to sufficient biomass is one of the major unsolved challengesaccording to UN's IPPC (Intergovernmental Panel on Climate Change). Thus,finding good solutions that exploits these waste streams into resources alongwith CO2 ***removal***, are becoming key in the fight against climate change.

- Processes that can stabilize carbon from biological sources will be animportant solution for the 2020s. With stable storage of biocarbon, we are alsocreating opportunities for negative ***emissions***, says Hauge.

- We can obviously not cut down ***forests*** or use cropland to meet the need forbiomass and bioenergy. We need to use the enormous waste streams being lostevery year. One example is sludge from aquaculture fish farming industry. Thesewaste streams entering our oceans represents untapped resources of valuablenutrients and energy. We need to utilize this, not only to recycle scarceresources as phosphorus but also to produce biocarbon and biogas to mitigateclimate change, Hauge continues.

Sludge from wastewater and municipal sewage plants are often stabilized andreused as ***agricultural*** fertilizes. But with increasing concerns aroundenvironmental toxins, contamination of food chains, micro plastics and more, anincreasing number of countries are restricting such use of sludge. As a result,sludge is instead being incinerated with high CO2 ***emissions***. Thisserves no oneaccording to Bellona.

Pyrolysis and biocarbon are part of the solutionBiocarbon can play a central role in solving many of the environmentalchallenges going forward, Bellona believes. When biomass, sludge and organicwaste are just incinerated, these valuable resources are destructed into ash.When instead, using a pyrolysis process, biocarbon and energy rich synthesis gascan be the basis for production of CO2 neutral energy, electricity, and evendecarbonized energy such as hydrogen.

-The biocarbon can be redeployed into soil, not only as carbon sequestrationremoving carbon form the CO2 cycle but also as soil enrichment, increasingnutrient levels and humidity, fertilizing the soil for years to come, saysHauge.

Biocarbon could also play an important role in replacing fossil-based energy inindustries, as an example, to replace large amounts of fossil coke and coaltoday used in the metallurgical industries. This is something Bellona has beenfocusing on for years, working closely with the Norwegian Ferroalloy ProducersResearch Association (FFF).

-We must reset our minds and handle the enormous waste streams that today causelarge environmental damage. That is how we together can make a change, saysFrederic Hauge in Bellona.

**Load-Date:** December 11, 2020

**End of Document**



[***Study: U.S and Minnesota Need to Boost Nursery Production***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:624H-FGK1-F0YC-N33D-00000-00&context=1516831)

Impact News Service

March 3, 2021 Wednesday

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**Length:** 701 words

**Body**

Arlington, Virginia: The Nature Conservancy has issued the following press release:

In order to realize the full potential of reforestation in the United States, the nation's tree nurseries need to increase seedling production by an additional 1.7 billion each year, a 2.4-fold increase over current nursery production. In Minnesota, the challenge is even greater: public and private nurseries would need to grow more than 10 times the number of seedlings they do today. These numbers, taken from a new study, show the promise of increased nursery output as a way to fight climate change, create jobs and recover from uncharacteristically severe wildfires.

With more than 200,00 square miles in the United States suitable for reforestation, ramping up nursery production could offer big benefits for the climate. Restoring ***forests*** is an important nature-based solution to climate change and a compliment to the critical work of reducing fossil fuel ***emissions***.

Reforesting 1.4 million acres in Minnesota by 2040 would store about 2.2 million tons of carbon annually—equivalent to ***removing*** 495,000 passenger cars from the road. It would require an additional 61 million new trees per year. Currently, the state produces about 6.1 million seedlings a year.

'To meet the need for reforestation, we'll need to invest more in trees, more nurseries, more seed collection, and a bigger workforce,' said the study's lead author, Joe Fargione of The Nature Conservancy, who is based in Minneapolis. 'In return, we'll get carbon storage, clean water, clean air, and habitat for wildlife.'

The study, published in the science journal Frontiers in ***Forests*** and Global Change, was co-authored by 18 scientists from universities, nonprofits, businesses, and state and federal agencies.

To illustrate the requirements for increasing reforestation capacity in the U.S , the researchers identified 64 million acres of natural and ***agricultural*** ***lands***, nearly half of the total reforestation opportunity. Accounting for different planting densities by region, it would require 30 billion trees to reforest these ***lands***. This equates to 1.7 billion more seedlings produced each year for this ***land*** to be reforested by 2040.

To achieve this large increase, investment is required across the entire reforestation 'pipeline.' Additional investment would be needed to expand capacity for seed collection and storage, tree nursery expansion, workforce development, and improvements in pre- and post-planting practices. To encourage nursery expansion, low-interest or forgivable loans in addition to long-term contracts, will be needed. Across the pipeline, achieving this scenario will require public support for investing in these activities, plus incentives for landowners to reforest. The investments will create jobs in rural communities, not only in nurseries but across the whole spectrum of reforestation activities - from seed collection to preparing sites for planting, to post-planting management activities essential to growing healthy young stands.

There are several existing reforestation programs in the U.S that could be scaled up to put the new study's information to work. On public ***lands***, this includes the Reforestation Trust Fund, which can be enhanced via the soon-to-be-introduced federal REPLANT Act to fully fund reforestation of America's national ***forests***. On private ***lands***, they include the U.S Department of ***Agriculture***'s Environmental Quality Incentives Program (EQIP) and Conservation Reserve Program (CRP), as well as state conservation agency cost-share programs.

Given the large opportunity for reforestation across the country, more funding will be needed, particularly for federal and state agencies that lack a stable, dedicated funding source for reforestation, such as the Department of the Interior.

In the U.S , hundreds of millions of acres are potentially reforestable. Currently, most ***lands*** in need of reforestation are not being reforested. The problem is being exacerbated by the increasing need to reforest after fires - which are becoming increasingly large and severe due to a century of misguided fire suppression and climate change. Only by increasing our capacity to plant trees will this need be met.

**Load-Date:** March 4, 2021

**End of Document**



[***Hemp proving a worthy contender to cotton in denim***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62JJ-PTT1-F14X-V3R2-00000-00&context=1516831)

just-style global news

April 29, 2021 Thursday 1:06 PM GMT

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**Length:** 646 words

**Byline:** Hannah Abdulla

**Body**

While hemp is trending in a number of industries globally, when it comes to apparel production, its use is relatively new.

Footwear brand Ugg last month launched a line using plant-based materials including hemp, while Superdry notes one-third of its garments contain organic, recycled and low impact fibres including Tencel, hemp, yak or linen.

But with enviable sustainability benefits, the apparel industry is now paying increased attention to the fibre, particularly as it seeks out new and more environmentally-friendly alternatives to cotton.

Panda Biotech is developing the largest and most state-of-the-art industrial hemp processing centre in the United States, to both process and cottonise industrial hemp fibre in commercial quantities.

The cottonisation process ***removes*** the lignin that binds hemp fibres together in bundles and "opens" them for further refinement. Once cottonised, the hemp fibre can be blended with other natural or man-made fibres such as cotton, silk, wool and polyester and spun into yarns that will be knit or woven into fabric.

Just last week, Pakistan's AGI Denim inked the first global production partnership with Panda Biotech to use its US-grown industrial hemp, which can be tracked and traced back to its American farmers.

AGI has already made great strides in developing innovative alternatives to traditional denim manufacturing and processing methods, including a Gold Level Cradle-to-Cradle Certification for its latest hemp-based fabric material, Hemp X.

Speaking during a webinar for the Kingpins24 virtual event last week, Ali Tekken, R&D director of AGI Denim, touted the benefits of hemp and why it is proving a worthy contender to cotton.

"We need a natural fibre alternative to cotton," he asserted, noting the rapid ***land*** and water depletion linked to cotton farming. "Some research suggests that by 2030 there will be a 20m tonne shortage of fibres. We don't have any other option."

Blended with cotton and other fibres, industrial hemp offers a host of environmental benefits, including the ability to absorb more carbon dioxide per acre than any ***forest*** or commercial crop. It requires a fraction of the water needed by most major crops, can grow in a wide variety of climates and soil types, is naturally resistant to most pests, and grows very tightly spaced allowing it to "outcompete" most weeds.

"Hemp is important because of its different features," said Tekken, pointing to the fact that hemp does not require pesticides and fertilisers.

"There are huge environmental benefits, including that of water. Yes, hemp requires water for ***agriculture***, but where for 1kg of cotton you need 10,000 litres of water, 1kg of hemp will use 2,000 litres of water, meaning 80% less than cotton.

"Also, in terms of carbon dioxide absorption and ***emissions***, hemp absorbs four times more carbon dioxide than a traditional ***forest***. It is like a natural carbon equaliser."

The global industrial hemp market is projected to grow from $4.6bn in 2019 to $32bn by 2022.

The US hemp industry has opened up thanks to the passage of the federal Hemp Farming Act of 2018, which was incorporated in the 2018 US Farm Bill and signed into law by President Trump. Both chambers of the Texas state legislature subsequently passed House Bill 1325, that was signed into law in June 2019 and authorises the production and manufacture of industrial hemp crops in the State of Texas.

Most of the consumer textile applications for hemp tend to focus on products such as rugs, upholstery and other home furnishings.

The challenge of integrating hemp into the apparel supply chain requires finding and learning to grow a regionally appropriate seed variety. There's also the issue of incorporating it into US mills' cotton-based spinning systems to produce apparel grade fibres and yarns. But the upside is the fibre's enhanced environmental and performance attributes.

**Load-Date:** April 29, 2021

**End of Document**



[***FIRE FACTS; Congressional Record Vol. 166, No. 171 (House of Representatives - October 01, 2020)***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6104-C431-JDG9-Y450-00000-00&context=1516831)

Impact News Service

October 2, 2020 Friday

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**Length:** 4152 words

**Body**

Washington: The Library of Congress, The Government of USA has issued the following house proceeding:

The SPEAKER pro tempore. Under the Speaker's announced policy of January 3, 2019, the Chair recognizes the gentleman from Arkansas (Mr. Westerman) until 10 p.m as the designee of the minority leader. General Leave Mr. WESTERMAN. Mr. Speaker, I ask unanimous consent that all Members may have 5 legislative days within which to revise and extend their remarks and include extraneous material on the topic of this Special Order. The SPEAKER pro tempore. Is there objection to the request of the gentleman from Arkansas? There was no objection. Mr. WESTERMAN. Mr. Speaker, fires are ravaging the West. I want to talk a little bit about what is going on with the fires, and I want to talk about what is not going on here in Congress. To start with, I just want to take a quick look at the science of fire. This fire triangle shows that three things are required to have a fire. You have to have fuel, heat, and oxygen. There is a lot of talk about the role climate change is playing in these fires. Climate increasing temperatures can draw fuel. If it gets windy, you can have more oxygen. Lightning can be one of the things to ignite fires, but a lot of fires obviously are ignited by man-made ways. When we talk about putting out fire, the first thing we do is try to get the fuel out of the way, or we use water to cool the fire and ***remove*** the oxygen. But we have to spend way too much time working on extinguishing fires when we can take the actions to reduce the fuel to reduce the fires. Any time I talk about ***forest*** management, I get accused of wanting to clear-cut the national ***forests***, and I can promise you the last thing I want to do is clear-cut the national ***forests***. I want to use good management on the national ***forests***. That is what we should be doing. But I often wonder if those people who talk about clear-cutting even have any idea of what a clear-cut is. I have put this chart together that shows a comparison between a clear-cut and a catastrophic wildfire, and I will go on the record and say that catastrophic wildfires are worse than clear-cuts. Look at the data. During a clear-cut, the trees are killed. During a catastrophic wildfire, the trees are killed. During a clear-cut, the trees are removed. During a catastrophic wildfire, you are left with dead snags that can be fuel for additional wildfires. All vegetation is killed. That is what happens in a catastrophic wildfire. At least in a clear-cut you leave the residual grasses and the shrubs. {time} 2145 Stream zones are protected when a clear-cut is done. You leave vegetation around the stream. Catastrophic wildfire burns to the edge of the water. Soil and organic materials are all burned up in a catastrophic wildfire. Special care is taken to protect the soil in a clear-cut. When a clear-cut is planned, a plan for reforestation is also in place. Often on catastrophic wildfire, there is no reforestation. As far as planting goes, it is extensive with a clear-cut. It is unplanned and uncontrolled in a catastrophic wildfire. The size of a clear-cut, in California, it is less than 20 acres. Wildfires are huge, burning millions of acres. We have almost burned 8 million acres to date in the wildfire season this year in the U.S We can continue going down the list, but you can see, even talking about carbon, at least with a clear-cut, you are putting the wood into material that stores carbon. With a wildfire, you are releasing the carbon into the air. And these dead snags eventually rot. And they are not just releasing carbon dioxide like the fire does; they are releasing methane, which is a worse greenhouse gas. Clear-cutting is not something that we want to do in a national ***forest***, but people who are not allowing good ***forest*** management--and that is Congress with the rules that we have--are doing something much more devastating than clear-cutting by allowing these catastrophic wildfires to continue unabated. Just as an example, this is the Angora fire. That is a natural clear- cut. That is a stand replacing fire. This is 12 years later, where you have no regrowth on the site. On top of that, according to the USGS, in 2018, the carbon ***emissions*** from wildfires released the same amount of carbon as the ***emissions*** that would be produced by generating enough electricity to power California for a whole year. Mr. Speaker, we need to take action. It is not that the ***Forest*** Service doesn't know how to manage the ***land***, it is that we have tied their hands and we have allowed activists and lawyers to manage the ***forests*** rather than the professionals in the ***Forest*** Service. If we don't want to see the same things repeating over and over, with loss of life, loss of property, loss of a resource that actually pulls carbon dioxide out of the air and could be used to reduce the effects of climate change, we should do something proactive and actually start managing these ***forests***. It is time to act, and unfortunately, Congress has sat on their hands while we continue to watch the West burn. Mr. Speaker, I yield to the gentleman from Arizona (Mr. Gosar). Mr. GOSAR. Mr. Speaker, first of all, I thank the gentleman from Arkansas (Mr. Westerman), my friend, for organizing this Special Order and for his leadership and expertise on forestry issues. The events of the last month and the last decade plus show how poorly our current ***forest*** management policies are and that they are broken and in drastic need of reform. Nearly every corner of the West has been touched by catastrophic wildfire. My district has been home to several major fires this year, including the Bush fire that burned over 193,000 acres. 700,000 acres of ***land*** has been burned across my State. Even before this year's fire season, the evidence of our ***forest*** management practices being broken are clear. In the last 10 years alone, wildfires have burned over 74 million acres of ***land*** in the West, and our Federal Government's reaction to this has been extremely lacking. These catastrophic fires have devastating impacts on the environment and human health. For example, one large wildfire is roughly the equivalent of a major volcanic eruption, releasing large amounts of dangerous particles into the air. This increase of air pollution exacerbates respiratory illnesses, such as COVID-19. Because of this, earlier this year, I wrote a letter to ***Agriculture*** Secretary Perdue and Interior Secretary Bernhardt. This letter urged them to act quickly to secure contracts with private businesses to ensure that firefighters could be properly protected from COVID-19 and that the aerial support they needed to adequately fight catastrophic fires was there. Recent studies conducted at George Mason University showed that on average, a fire stands a higher probability of being contained within 24 hours if air tankers are deployed on that fire within the first few hours. Fires that do not receive air tanker support for a period of 13 hours or more are likely to take days or weeks to achieve containment. I also wrote a letter to Attorney General Barr that urged him to ensure that the Justice Department's Natural Resources Division was adequately resourced to fight frivolous lawsuits from radical leftwing environmental organizations. Lawsuits from radical environmentalists are nothing new. We have seen this already in Arizona with the disastrous WildEarth Guardians lawsuit regarding the Mexican Spotted Owl. In that case, a U.S District Court judge in Tucson issued a ruling based on bad and debunked science that stopped active ***forest*** management activities in six national ***forests***, including the Tonto National ***Forest*** in Arizona, which was the home of the Bush fire. This decision was a massive setback, and it is directly contributing to the enhanced fire risk that threatens our communities that we are seeing across the West. A devastating wildfire season is not inevitable. It isn't something that we must just accept. There are steps that can be taken now to ensure that our communities are protected. [[Page H5635]] I will continue to urge the Federal agencies tasked with managing our ***forests*** and fighting catastrophic fires that bold action is necessary. Lives depend on it. Just last year, as chairman of the Congressional Western Caucus, I had the opportunity to visit the district of my friend from California, Mr. McClintock, where aggressive ***forest*** management practices in the Lake Tahoe Basin have prevented catastrophic fire. This active management was made possible by getting unnecessary red tape out of the way and putting what is most important first: protecting our communities from the destruction of wildfire. Just in the last 2 years, this administration has taken steps to manage vegetation inside utility corridors, build additional firebreaks, and reform the NEPA process within the ***Forest*** Service. However, after so many years of inaction, there is a long road to hoe to where we have to get, which is why I am so pleased we are here tonight calling for serious action by this House. There are a few pieces of legislation that have been introduced. Just to name a few: H.R 7978, a bipartisan, comprehensive forestry reform bill led by the gentleman from California (Mr. LaMalfa), as well as H.R 2607, the Resilient Federal ***Forests*** Act, by Mr. Westerman, both of which I am proud to support. The Democratic leadership in this House has been transparent about the fact that they do not view ***forest*** management to prevent wildfires as a legislative priority, and that has deadly consequences. Again, Mr. Speaker, I thank my friend from Arkansas for holding this Special Order and for his leadership and expertise on this issue. Mr. WESTERMAN. Mr. Speaker, I thank the gentleman from Arizona (Mr. Gosar) for being here tonight. Mr. Speaker, I yield to the gentleman from Washington (Mr. Newhouse). Mr. NEWHOUSE. Mr. Speaker, I thank the gentleman from Arkansas (Mr. Westerman), my good friend, for yielding. As we all know, the West has been on fire. In my home State of Washington, over 700,000 acres have burned, causing thousands of families to evacuate, leaving their homes, their businesses, and their farms behind. Whole towns have essentially been wiped off the map. Smoke blanketed central Washington, with fires raging up and down the West Coast. The air quality of our cities and our rural areas ranked the worst in the world. As the people of central Washington and many of my colleagues in Congress understand, healthy, resilient ***forests*** are the key to wildfire prevention. We have made significant progress, but there is still much work to be done. Without our leadership in Congress, families will continue to lose their homes and their businesses, and jobs will continue to be lost, and our public health will continue to be threatened. While a loss of homes and livelihoods is heartbreaking, there is nothing more tragic than the loss of life. Today, I join the people of central Washington in mourning the loss of 1-year-old Baby Hyland, whose life was tragically cut short as his parents fled to escape the Cold Springs fire that was raging across Okanogan County. The Hyland family has suffered immeasurable loss with the deaths of both their toddler as well as the death of their unborn child. My heart aches and my prayers go out for the Hylands as they recover from their own wounds in this unimaginable heartbreak. These tragic circumstances fall on us, Mr. Speaker. We are responsible, as the Federal Government, for failing to deliver a management strategy that enables us to prevent these catastrophic events. We cannot continue to sit idly by. We have to responsibly log our ***forests*** and graze our ***lands***, or we will watch them burn. These wildfires and this year have truly tested our resilience, but of this I am certain: in the face of catastrophe, central Washington will recover. Now it is the Federal Government's responsibility to do everything in its power to prevent another disaster like this again. For years, extreme environmentalist groups have insisted that we leave our ***forests*** and natural ***lands*** alone, leaving them in their quote ``natural state.'' But as we witness, year-after-year, that strategy simply does not work. Many point to climate change as a contributing factor; I am not here to refute that. At the end of the day though, the facts remain: our ***land*** management--or lack thereof--is a serious problem. Decades of mismanagement, misguided environmental policies, and lackluster forestry and grazing practices have led to ***forests*** and grasslands that act as tinder for wildfires, just waiting to be set ablaze each summer. We cannot continue to sit idly by. We have to responsibly log our ***forests*** and graze our ***lands***, or we will watch them burn. As I have stated all along throughout the many challenges this year has presented: Central Washington's communities are resilient. Wildfire recovery is no easy feat, but I have seen firsthand how citizens, volunteers, local organizations, and government entities work together to revive our communities, rebuild our fallen structures, and actively work to prevent future devastation. I have heard stories of students and volunteers jumping into action, working to clear burnt areas, making way for new structures. Fairgrounds and community groups opened to help house and treat evacuated or injured livestock and animals. Donations continue to pour in from across the state, region, and country to families and firefighters in need. I am working closely with FEMA and USDA to ensure our communities receive the federal assistance they need, and I stand ready to help the people of our district in any way I can. These wildfires--and this year--have tested our resilience, but of this I am certain: In the face of catastrophe, Central Washington will recover. Now it is the federal government's responsibility to do everything in its power to prevent another disaster like this again. Mr. WESTERMAN. Mr. Speaker, I thank the gentleman from Washington (Mr. Newhouse) for his comments tonight. Mr. Speaker, I yield to the gentleman from Alabama (Mr. Palmer). Mr. PALMER. Mr. Speaker, I thank the gentleman from Arkansas (Mr. Westerman) for holding this discussion about ***forest*** management. Mr. Speaker, I rise today because ``California's ***forests*** suffer from neglect and mismanagement, resulting in overcrowding that leaves them susceptible to disease, insects and wildfire.'' These are not my words. They are the words of the Little Hoover Commission, an independent State oversight agency in California. In their 2018 report entitled ``Fire on the Mountain,'' the Little Hoover Commission called for a transformational change in California ***forest*** management practices after ``A century of mismanaging Sierra Nevada ***forests*** has bought an unprecedented environmental catastrophe that impacts all Californians.'' That is a direct quote from the report. California's own Legislative Analyst's Office agreed and found that limitations on timber harvests and emphasis on fire suppression and an increasing number of environmental permitting requirements have led to unhealthily dense ***forests***. Thankfully, both groups recognize that commonsense ***forest*** management practices could not only help prevent wildfires, but also reduce carbon ***emissions***. Properly managed and healthy ***forests*** are more resilient and sequester more carbon than overgrown ***forests***. Simple recommendations like shifting from fire suppression to using fire as a tool and setting up long-term ***forest*** management strategies are just a couple of the low-cost solutions that can help us achieve healthier ***forests***. Unlike policies such as the Green New Deal, these practices would actually help address wildfires and would not cost trillions of dollars to implement. Furthermore, these actions can all be taken today, and they fall in line with some of the things that my Republican colleagues and I have been suggesting on the Select Committee on the Climate Crisis: that if we take action to mitigate and adapt to the climate change that we know is going to occur, we could avoid some of the catastrophes that we are seeing play out in California right now and in other places in the West. If you care about protecting our citizens from wildfires and reducing carbon ***emissions***, then you should support responsible ***forest*** management. Instead of wasting time on unrealistic solutions, we should take serious action to prevent unnecessary wildfires and [[Page H5636]] improve the carbon sequestration potential of our ***forests***. Mr. WESTERMAN. Mr. Speaker, I thank the gentleman from Alabama (Mr. Palmer) for his comments. Mr. Speaker, I yield to the gentleman from Pennsylvania (Mr. Thompson). Mr. THOMPSON of Pennsylvania. Mr. Speaker, I thank the gentleman from Arkansas (Mr. Westerman) for hosting this Special Order on wildfire. Mr. Speaker, over the past decade, there has been an average of 64,100 wildfires and 6.8 million acres burned every year. With over 10 million acres burned, we saw the highest number of Federal acres burned in 2015--and nearly that amount in 2017. But this year, it has been even worse. 2020 has been an extremely difficult wildfire year for our firefighters, our responders, and many rural communities in and near the ***forests***. As of today, October 1, over 44,000 wildfires have burned nearly 7.7 million acres this year alone. In addition to the destruction of these ***forests***, homes, and property, we sadly continue to see lost lives. Over the past 25 years, active management has plummeted across the national ***forest*** system; consequently, it is no coincidence that the larger, more intense fires are happening on Federal ***lands***, where there is less management, versus State and private ***lands***. More individual fires occur in the East, but the wildfires in the West are larger and burn more acres. Wildfires also have significant impacts on eastern ***forests*** because of the budgetary effects on the ***Forest*** Service's ability to manage and personnel. We must be encouraging more active ***forest*** management across the National ***Forest*** system. This includes thinning, prescribed fires, and hazardous fuels reduction, especially in the roughly 19 million acres of Federal ***lands*** that are already known to be at high risk. Mr. Speaker, I thank my colleague, Mr. Westerman, for his great work during the last farm bill and his leadership with the Resilient Federal ***Forests*** Act and the Trillion Trees Act. Through the next farm bill, I am hopeful that we can continue to build on those commonsense reforms, and we will provide more authorities to help the ***Forest*** Service better manage and encourage more partnerships. Mr. WESTERMAN. Mr. Speaker, I thank the gentleman from Pennsylvania (Mr. Thompson) for being here tonight. Mr. Speaker, I just want to illustrate here that this isn't difficult. It is not rocket science. This is a control in the first picture. You see all the underbrush, the ladder fuels. This is on Federal ***land*** as well. You see the ***forest*** management in the middle where you thin it out, you do controlled burns. You do those every few years, and you get a resilient ***forest*** that looks like this. California and Oregon and Arizona and Washington State, Nevada, they could have ***forests*** that look like this. Now, it would be those species that are out there, and the management would be done accordingly, but there is no reason we can't do this. It is Speaker Pelosi's State that is on fire. It is Chairman Grijalva's State that is on fire. It is Chairman DeFazio's State that is on fire. I wish that Democrats would take time to do what is right, to address these fires, to quit playing politics with relief bills that are going nowhere and do something that could really help the people and their States. We want to help, but we can't do it on our own. We are in the minority. We will work together and offer suggestions, but it is going to take a bipartisan effort to change these rules so that management can take place. Mr. Speaker, I yield back the balance of my time. Mr. CALVERT. Mr. Speaker, I rise to honor our firefighters who put their lives on the line to keep our communities safe every day. As new wildfires start every week, these brave men and women selflessly join the fight to protect life and property, while their families must live with the uncertainty of the threats they face on the frontlines. I commend these individuals, and Congress must provide all the support necessary to ensure our firefighters can return safely to their families. I also commend the heroes joining the fight from across the country. California's firefighting resources are strained by the sheer number and size of the fires we face, and it is a testament to our nation's highest ideals that firefighters from across the West have come to our aid as these historic fires rage in every corner of our state. Riverside County has already faced four distinct fires this wildfire season, burning over 60,000 acres in and around my district. In these fires alone, 17 individuals have been injured, and one firefighter lost his life trying to put out the El Dorado fire. Charlie Morton was a 14- year veteran of the ***Forest*** Service, and I send my deepest condolences to Charlie's family for their terrible loss. Nearly every year California seems to break some record during the fire season. It doesn't have to be this way. For years, top congressional Democrats have rejected bipartisan proposals to reform our nation's ***forest*** management practices. Many Democrats have outright rejected the idea that how we manage our National ***Forests*** has anything to do with the increasing frequency and intensity of wildfires in the West. Well, here are some of the facts: Since 2010, approximately 150 million trees have died across federal, state, and private ***lands*** in California. It is estimated that over 2 million properties are at extreme risk of wildfire due to high fuel loads nearby. Between 60 and 80 million acres of national ***forest*** are at high- to very-high risk of catastrophic wildfire, but the ***Forest*** Service treats between just 1 and 2 percent of high risk acres each year. In January, a study in Nature found that California needs to treat approximately 20 million acres to meaningfully impact wildfire risk. We treat closer to 13,000 acres annually. Bureaucratic delays and frivolous lawsuits have halted much of this proactive work. The town of Berry Creek, received a grant to ***remove*** hazardous fuels, but it took the state nearly two years to review the project and allow it to proceed. By the time they did, it was too late, and the North Complex fire was already raging, destroying more than 50 homes in this community. Salvage logging is another example of a win-win solution where companies still have an economic incentive to harvest the timber while helping prevent the next catastrophic wildfire. Charred trees left in the wake of wildfires are extremely flammable and hazardous fuels. Salvage operations must be conducted quickly or the economic value is lost, and extreme environmental groups frequently file lawsuits to halt these efforts. In 2018 when I served as Chairman of the Interior Appropriations Subcommittee, I worked in a bipartisan fashion with Congresswoman McCollum to prioritize ***forest*** management and fuel reduction on our federal ***lands***. We worked in good faith to achieve some meaningful reforms including a funding fix for the ***Forest*** Service and some limited regulatory reforms. Still, much more needs to be done to protect our communities. We need to eliminate the red-tape that prevents these common-sense management efforts. We must take ***forest*** management decisions out of the courts and put the ***forest*** managers back in the driver's seat. Fortunately, House Republicans have solutions. Congressman McClintock's Proven ***Forest*** Management Act takes lessons learned from a pilot program in Lake Tahoe National ***Forest***. ***Land*** managers were able to approve the first ***forest*** management project in under four months in a 16-page report, compared to an average of 4.5 years and 500 pages. We should pass this bill and expand this successful program nationwide. Congressman Westerman's Resilient Federal ***Forests*** Act is another example. This legislation has passed the House twice with overwhelming bipartisan support but was never considered by the Senate. This bill would streamline permitting for a wide array of ***forest*** management projects. When it comes to ***forest*** management, time is of the essence, and this legislation would dramatically increase our national capability to reduce the frequency and severity of catastrophic fires across the West. I call on Speaker Pelosi to take up these bills and pass meaningful, comprehensive forestry reform. More bureaucracy is not the answer to our wildfire crisis, and we in Congress must act like there are lives at stake, because that is the reality of the threat we face.

**Load-Date:** October 3, 2020

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[***Brazil political press review 21 April 2021***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62H0-K5M1-DYRV-34M2-00000-00&context=1516831)

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**Body**

By BBC Monitoring

Supreme Court to rule on former judge Moro's bias trial

On 22 April, the plenary session of the Federal Supreme Court (STF) resumes the trial that may define the legal future of former President Luiz Inacio Lula da Silva, with the examination of the third and last appeal on the case, Valor Economico Online reported on 20 April. The plenary will decide whether the STF Second Chamber could in fact have recognised the bias of former judge Sergio Moro, after STF Justice Edson Fachin ruled that the 13th Court of Curitiba had no competence over the matter. Behind the scenes of the Court, the expectation is that most justices will uphold the decision of Fachin. In March, the STF Second Chamber ruled that Moro showed bias in his decision on Lula's criminal investigation.

Bolsonaro ratifies Army 'always' to act within law, respect Constitution

President Jair Bolsonaro said on 19 April that he will continue to operate "within" the provisions of the Brazilian Constitution, Valor Economico Online reported on 20 April. In a ceremony commemorating Army Day, the president stated that he considered the Army responsible for providing "support so that no one in the country tries to go beyond what the law allows". Bolsonaro quoted a military minister from a democratic government and ratified that he will not disrespect the Constitution. Speaking before Bolsonaro, Army Chief Edson Leal Pujol affirmed that the Army would remain devoted to the constitutional provisions.

Government strikes deal with Congress to 'partially' veto Budget Bill

The federal government and Congress reached an agreement to break the budget deadlock, Valor Economico Online reported on 20 April. The agreement finalised yesterday provided for the veto of 1.9bn US dollars in spending on congressional amendments. Government Secretariat Minister Flavia Arruda announced this amount during a conference promoted by XP Investimentos. Valor reportedly learned that to cut back on underestimated mandatory expenses, it will be necessary to veto other sections of the Budget Bill.

Brazil falls into 'red zone' of press freedom ranking

For the first time in 20 years, Brazil has entered the "red zone" of the Reporters Without Borders World Press Freedom Ranking, released on 20 April, Folha de Sao Paulo Online reported on 20 April. Brazil was classified, along with Bolivia, Nicaragua, Russia, the Philippines, India, and Turkey, as a nation where the situation for the work of the press is considered difficult. "We believe that it is an unworthy position for a great democracy like Brazil," Emmanuel Colombie, regional director for Latin America at the NGO Reporters Without Borders, told Folha. Previously, Brazil had been classified in the orange zone, where the press situation is considered sensitive.

Editorial says climate summit 'opportunity' to change perception on Brazil

O Estado de Sao Paulo Online published an editorial on 20 April saying the Climate Summit taking place this week in the United States is an opportunity for Brazil to change international perception regarding its relationship with the environment. The daily noted this event gives Brazil an opportunity to undertake "effective commitments" to environmental protection. O Estado de Sao Paulo said that Brazil's participation might help the country improve relations with other nations. According to the daily, a commitment to environment protection can facilitate Brazil's incorporation into the international scenario, generating many benefits, including commercial, for the country.

Business executives ask government to make commitments at climate summit

Business executives are pressuring the Brazilian Government to adopt more ambitious measures at the Leaders Summit on Climate convened by US President Joe Biden, O Globo Online reported on 20 April. The private sector is beginning to adopt parallel measures and agreements to "contain damage," which could minimise the negative effects of the federal authorities' environmental performance. The country's isolation on the climate issue has severe impacts for Brazilian companies. The business sector is reportedly doing its part, not only by positioning itself, but also by presenting practical proposals, with clear goals and steps. Marina Grossi, the president of the Brazilian Business Council for Sustainable Development (CEBDS), said they sent a letter to the Ministries of Economy, Environment, ***Agriculture*** and Foreign Affairs showing that the country will obtain economic and reputational gains if Brazil adopts a neutral ***emission*** commitment by 2050.

Bolsonaro vows to decide on party affiliation this month

President Jair Bolsonaro said that later this month he intends to define what party he will join to run for re-election in 2022, Valor Economico Online reported on 19 April. In a conversation with his supporters, Bolsonaro admitted that the chance of his party, the "Alliance for Brazil," becoming a reality is very small. On other occasions, the president had already complained about what he considers to be "excessive bureaucracy" to create a political party. Comparing the situation with 2018, when he decided to enter the Social Liberal Party (PSL) with just over six months to go before the election, Bolsonaro considers that the timeline will still be "good" if he defines his new party this month.

VP opposes Bolsonaro's call for foreign aid to combat deforestation

Three days before the US-hosted Leaders Summit on Climate and five days after President Bolsonaro requested help from the international community, Vice-President Hamilton Mourao said that Brazil cannot behave like a beggar, Valor Economico Online reported on 19 April. Last week, the Presidency disclosed a letter sent by Bolsonaro to US President Joe Biden calling for international aid to achieve ***targets*** for reducing carbon ***emissions***. The vice-president acknowledged that Brazil has responsibilities but recalled that the country represents a small percentage of global ***emissions***. Brazil is responsible for only 3 per cent of ***emissions*** in the world and of that 3 per cent, 40 per cent is deforestation, in other words, "1.2 per cent of global ***emissions*** are caused by deforestation here [in Brazil]," Mourao concluded .

Senate Covid-19 commission to initially probe ***removal*** of former health ministers

The leadership of the Parliamentary Inquiry Commission (CPI) investigating the federal government's handling of the Covid-19 pandemic wants to draw a timeline and start work by looking at the reasons that led to the ***removal*** of former Health Ministers Luiz Henrique Mandetta and Nelson Teich, Folha de Sao Paulo Online reported on 19 April. The CPI's goal is to determine whether President Jair Bolsonaro exerted pressure for the government to defend the use of hydroxychloroquine as treatment for Covid-19. This strategy has been discussed by Senator Omar Aziz, appointed CPI chair, with Renan Calheiros, who will act as rapporteur. They also want to scrutinise the chief executive's attempts to purchase Covid-19 vaccines and what led the government to refuse the offer to buy Pfizer jabs.

Bolsonaro to show willingness to reduce deforestation at US climate summit

President Jair Bolsonaro will adopt a moderate stance and signal to US President Joe Biden during the Climate Summit that he will expand operations to combat deforestation in the Amazon rainforest, Folha de Sao Paulo Online reported on 19 April. The president will again commit to end illegal deforestation in Brazil by 2030 and will invite foreign nations to help fight ***forest*** fires with [financial] resources. Sources close to Bolsonaro said the president will announce in his speech an increase in the budget of the Brazilian Institute of Environment and Renewable Natural Resources (Ibama) and of the Chico Mendes Institute for Biodiversity Conservation (ICMBio), federal environmental inspection bodies. The chief executive also hopes to increase federal government investments in surveillance equipment and vehicles.

Source: BBC Monitoring in Portuguese 1845 gmt 21 Apr 21

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[***Science, not sanctions, will save our planet***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62KD-3V71-F0JV-82K6-00000-00&context=1516831)

The Parliament Magazine (Online)

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**Highlight:** Hard facts correct European palm oil misperceptions - and point the way to a sustainable biofuel strategy, argues Dr Nafeez Ahmed.

**Body**

The world is confronted by two interrelated crises. The first is immediately urgent: ongoing deforestation is increasing the likelihood of future pandemics. As barriers between humans and wildlife decrease, greater interspecies contact means rising potential for dangerous disease transfer. The second is a systemic threat with terrible long-term repercussions.

In 2019, the EU effectively prohibited imports of palm oil for biodiesel because of its alleged contribution to deforestation. While technically this is not an outright ban, it disincentivises businesses from importing palm oil under a shift toward renewable energy.

"Sadly, sustainable palm oil - which has recently made significant environmental progress largely unacknowledged in the West - bears the brunt of European regulations"

This is unfortunate, given that palm oil in Malaysia has shifted toward a far more sustainable regulatory infrastructure which has successfully seen deforestation decline from a million acres per year to fewer than 250,000 acres, as an analysis by The Chain Reaction Research shows. As such, the EU's decision to ban the product is not just a short-sighted strategy, it's also self-defeating.

Careful examination of the evolution of the palm oil industry, particularly, but not only, in countries such Malaysia, reveals real green momentum. Malaysia's government has developed mandatory national regulation, through the Malaysian Sustainable Palm Oil (MSPO) metric; meaning that a transition to zero deforestation palm oil is already underway.

However, by banning palm oil, the EU is essentially forcing palm oil producers to believe there is no point in further sustainability investments. A ban provides greater incentives to producers to sell to other markets with less stringent environmental standards - if they have any at all. This is ultimately bad for the environment and does nothing to stop deforestation, even if it does not actually accelerate it.

This is not least because the palm oil ban has no scientific basis.

Overwhelmingly, peer-reviewed studies in leading scientific journals and associations - Nature Sustainability, the International Union for the Conservation of Nature, Current Biology, the Annual Review of Resource Economics - insist, time and again, that if consumers abandon palm oil, they will have no choice but to turn to alternative oilseeds.

These have greater environmental impact, using far more ***land***, water, fertiliser and pesticides, only to produce an equivalent amount of oil. To be unabashedly straightforward, the science proves that boycotting palm oil will devastate the environment, not protect it. Why then has Europe punished palm oil?

The palm oil ban may have been a protectionist move to shield its own biofuels industry despite significant scientific evidence of its environmental harms. There is some evidence suggesting that some of these biofuels may be of even worse quality than Malaysian and other sustainable palm oil; ***removing*** it from the equation therefore, while questionable from an environmental standpoint, certainly empowers the EU's own dirty industries. After all, the EU Green Deal stipulates reducing carbon ***emissions*** from vehicles.

The means to do this, Europe has proposed, is by turning to biofuels, albeit primarily from European rapeseed. This will purportedly provide for renewable fuels, thereby reducing fossil fuel dependency and carbon ***emissions***. Regrettably, however, most of the EU's biofuels consumption relies on rapeseed-derived ethanol.

In the journal Environment, Development, and Sustainability, we learn that rapeseed-derived ethanol emits such high levels of carbon ***emissions*** that it does not satisfy the EU's own sustainability criteria. Specifically, eight out of ten tests on local rapeseed biodiesel fail to show 35 percent greenhouse gas savings.

What is perhaps more galling and more concerning is the process of deforestation in the West. Recent research published by the journal Nature Research showed a worrying increase in rates of deforestation in the EU. Between 2016-18, for example, the loss of biomass due to harvesting increased by almost 70 percent compared with the previous four years.

The area of ***forest*** harvested also increased by 49 percent within a similar timeframe. The study blamed this increased deforestation rate on European demand for wood, including as a fuel. In fact, that "abrupt increase", as the article termed it, threatens to undermine the EU's own climate mitigation ***targets***. Unfortunately, the EU's focus is not where it should be. Rather than attend to domestic deforestation, the Union has blamed external commodities, foremost among them is palm oil.

In light of this evidence, one could be forgiven for believing that the EU's palm oil boycott is more concerned with shielding its biofuel industry from competitive alternatives than with preventing deforestation. This might help us to understand why palm oil is often viewed so much more negatively than other ***forest***-risk commodities in the EU market.

Palm oil is often lumped into the same category as these other ***forest***-risk commodities, including beef and soy. However, the latter two, consumption of which are increasing, are far less regulated and rarely, if ever, governed by national legislation or enforceable sanctions. They massively contribute to worldwide deforestation and are as such also helping to drive global warming.

Sadly, sustainable palm oil - which has recently made significant environmental progress largely unacknowledged in the West - bears the brunt of European regulations. Meanwhile, much as palm oil faces sanctions while alternative oil ethanol is given a free pass, beef and soy likewise receive almost no scrutiny. This is despite the fact that high-yield palm oil cultivation can produce more than 25 times as much oil as soy for the same area of farmland.

The biggest global driver of deforestation-induced carbon ***emissions*** is beef, which totals some 34 percent of ***emissions***. Statistics like these illustrate Europe has its priorities backwards. In fact, the EU-Mercosur trade deal has not received anywhere near the same level of scrutiny as palm oil, despite - as a recent CDP study finds - it being the most regulated ***forest***-risk commodity.

But there is evidence of change. A paper by the European Parliament's Directorate-General for External Policies of the Union conceded that it would be more effective and less costly if palm oil producers such as Indonesia and Malaysia implemented a moratorium on deforestation.

"The EU's decision to ban the product is not just a short-sighted strategy, it's also self-defeating"

Fortunately, in the instance of the Malaysian sustainability metric, MSPO, that is exactly what is taking place. MSPO became mandatory within Malaysia on 1 January 2020, with fines for non-compliant producers. Currently, nearly 90 percent of Malaysian producers are certified under the scheme. There have been immediate and tangible results. Over the last four years, Malaysia has experienced annual decreases in deforestation, which is in part attributable to MSPO.

In a similar vein, a recent report from the European Parliament's Committee on ***Agriculture*** and Rural Affairs argued in favour of 'inclusive partnerships' with the Global South against deforestation. One such approach could be a partnership arrangement with producers such as Malaysia, which are demonstrating verifiable progress in sustainable palm oil.

Europe should work with, not alienate, palm oil producers who have committed to sustainable production, and collaborate with the Global South to improve its adherence to environmental and human rights standards. Genuinely sustainable palm oil could serve as a clean bridge fuel, competitive with EU fuels like rapeseed, as we transition to post-carbon economies. Given the ongoing pandemic threat, the disturbing reality of deforestation and the looming disasters of climate change, we have no more time to waste.

This article was published as part of the Sustainability First supplement by the Center for Sustainable Palm Oil Studies (CSPO). The full supplement is available on: https://www.theparliamentmagazine.eu/magazine/issues/sustainability-first-supplement

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[***Federal Register: National Environmental Policy Act Implementing Procedures for the Bureau of Land Management (516 DM 11) Pages 79504 - 79517 [FR DOC #2020-27158]***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61GV-7HF1-F0YC-N1T9-00000-00&context=1516831)

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**Body**

Washington: Office of the Federal Register has issued the following notice:DEPARTMENT OF THE INTERIOROffice of the Secretary[LLWO210000.L1610000]National Environmental Policy Act Implementing Procedures for the Bureau of ***Land*** Management (516 DM 11)AGENCY: Office of the Secretary, Interior.[[Page 79505]]ACTION: Notice.-----------------------------------------------------------------------SUMMARY: Through this notice, the Department of the Interior (Department) announces a new categorical exclusion (CX) under the National Environmental Policy Act (NEPA) implementing procedures for the Bureau of ***Land*** Management (BLM) at Chapter 11 of Part 516 of the Departmental Manual.DATES: The categorical exclusion takes effect on December 10, 2020.ADDRESSES: The new CX can be found at the web address [*http://www.doi.gov/elips*](http://www.doi.gov/elips)/ at Series 31, Part 516, Chapter 11. The BLM has revised the Verification Report on the results of a Bureau of ***Land*** Management analysis of NEPA records and field verification for Pinyon-Juniper ***removal*** (Verification Report) in response to comments received; the public can review the revised Verification Report online at: [*https://go.usa.gov/xvPfT.FOR*](https://go.usa.gov/xvPfT.FOR) FURTHER INFORMATION CONTACT: Heather Bernier, Division Chief, Decision Support, Planning, and NEPA, at 303-239-3635, or [*hbernier@blm.gov*](mailto:hbernier@blm.gov) Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service (FRS) at 1-800-877-8339. The FRS is available 24 hours a day, 7 days a week, to leave a message or question with the above individual. You will receive a reply during normal business hours.SUPPLEMENTARY INFORMATION:Background NEPA requires Federal agencies to consider the potential environmental impacts of their proposed actions before deciding whether and how to proceed. The Council on Environmental Quality (CEQ) encourages Federal agencies to use CXs to protect the environment more efficiently by reducing the resources spent analyzing proposals that normally do not have significant environmental impacts, thereby allowing those resources to be focused on proposals that may have significant environmental impacts. See 40 CFR 1501.4, 1507.3(e)(2)(ii), and 1508.1(d). The appropriate use of CXs allows NEPA compliance, in the absence of extraordinary circumstances that merit further consideration, to be concluded without preparing either an environmental assessment (EA) or an environmental impact statement (EIS). See 40 CFR 1501.4 and 40 CFR 1508.1(d). The Department's revised NEPA procedures were published in the Federal Register on October 15, 2008 (73 FR 61292) and are codified at 43 CFR part 46. These procedures address policy as well as procedure in order to assure compliance with NEPA. Additional Department-wide NEPA policy may be found in part 516 of the Departmental Manual (516 DM), in chapters 1 through 4. The procedures for the Department's bureaus' NEPA procedures are published as chapters 7 through 15 of 516 DM. Chapter 11 of 516 DM (516 DM 11) covers the BLM's NEPA procedures. The BLM's NEPA procedures were last updated as announced in the Federal Register on May 1, 2020 (85 FR 25472). The current 516 DM 11 can be found at: [*https://elips.doi.gov/ELIPS/DocView.aspx?id=1721*](https://elips.doi.gov/ELIPS/DocView.aspx?id=1721). The BLM has been managing sagebrush ecosystems for greater sage-grouse, mule deer, and other species for over a decade, implementing pinyon pine and juniper tree (PJ) ***removal*** treatments to restore habitat mosaics within the landscape and address the various habitat needs of mule deer and sage-grouse. PJ encroachment poses a serious threat to the health of millions of acres of ***land*** under BLM management. Following years of experience ***removing*** these trees without significant effects, the BLM has determined that establishing a CX for the actions described more particularly herein is necessary for expediting maintenance of sagebrush habitats essential to mule deer and sage-grouse.Description of the Change The BLM developed this CX in response to the September 15, 2017, Secretary's Order 3356, Hunting, Fishing, Recreational Shooting, and Wildlife Conservation Opportunities and Coordination with States, Tribes and Territories, which directed the BLM to develop a CX for ``proposed projects that utilize common practices solely intended to enhance or restore habitat for species such as sage-grouse and/or mule deer'' (section 4(d)(5)). The BLM has developed this CX to be responsive to the direction from this Secretary's Order consistent with the goals of facilitating the enhancement and restoration of habitat for sage-grouse and/or mule deer. More specifically, the BLM developed this CX for the management of encroaching pinyon pine and juniper trees for the benefit of mule deer and sage-grouse habitats. The BLM's proposed CX and associated Verification Report were available for public review and comment for 30 days, beginning with the publication of a Federal Register notice on Friday, March 13, 2020, and ending on Monday, April 13, 2020 (85 FR 14700). The proposed CX provided for covered actions (and included examples of such activities) on up to 10,000 acres within sagebrush and sagebrush-steppe plant communities to manage pinyon pine and juniper trees for the benefit of mule deer or sage-grouse habitats. Paragraph (a) of the proposed CX included a list of activities that the CX did not cover, and paragraph (b) required documentation of ***land*** use plan decisions providing for protections of certain resources and resource uses. In response to the comments received, the BLM has revised the proposed text of the CX to clarify that the 10,000 acres may be contiguous or non-contiguous and added a definition of habitat for mule deer and sage-grouse. The BLM also revised paragraph (b) to clarify the requirement to include project design features consistent with ***land*** use plans (LUPs) or document how listed resource and resource uses will be appropriately addressed where no ***land*** use plan decisions apply. The BLM has additionally revised the Verification Report in response to the comments received to address clarifications, incorporate new literature, and support discussion of changes to the CX text. The BLM also has reviewed and revised, as appropriate, the Verification Report for consistency with the updated CEQ regulations at 40 CFR 1500-1508 (2020). 85 FR 43304 (July 16, 2020).Comments on the Proposed CX The BLM received a total of 3,903 comment submissions. The BLM received comments primarily through the BLM's online NEPA portal and comment platform, ePlanning, and by mail. Commenters invested considerable time and effort to submit comments on this proposal. Comments were submitted by State and local governments, environmental organizations, and private citizens. The BLM received comments both in support of the proposal and against the proposal, with both supportive and non-supportive comments also requesting revisions to the proposal. The BLM has summarized and provided responses to all substantive comments received in this Federal Register notice for public review. The substantive comments address six broad topics: The scope of the CX; the purpose of the CX; incorporation of site-specific considerations in the terms of the CX; clarifications on the BLM's use of the CX; adequacy of the analysis and review done to develop the proposed CX; and the appropriateness of the procedures the BLM used to establish the CX. The BLM has considered all comments received and has provided responses to[[Page 79506]]the substantive comments identified below.Scope of the CX Comment: The BLM received comments that requested clarification on what qualifies as sage-grouse or mule deer habitat, given that the Verification Report does not identify what criteria will be used to identify this habitat. The BLM received comments that suggested that the CX be limited to verifiable habitat polygons for sage-grouse and mule deer. Response: The September 15, 2017, Secretary's Order 3356, Hunting, Fishing, Recreational Shooting, and Wildlife Conservation Opportunities and Coordination with States, Tribes and Territories, directed the BLM to develop a proposed CX for ``proposed projects that utilize common practices solely intended to enhance or restore habitat for species such as sage-grouse and/or mule deer.'' Consequently, this CX applies specifically to the management of PJ to enhance and restore mule deer and sage-grouse habitats, not for other species' habitats that might also include PJ. For the purpose of this CX, habitat for sage-grouse and/or mule deer is any area on BLM-managed ***land*** that is currently or formerly occupied by sage-grouse and/or mule deer, or is reasonably likely to be occupied if PJ is removed, as determined by BLM wildlife professionals. Comment: The BLM received comments that requested the BLM clarify the 10,000-acre treatment area described in the Verification Report, specifically (1) whether the authorization is for 10,000 acres over a larger area or some acres of treatment within a 10,000-acre area, and (2) the expectation that treatments be a mosaic of treated and untreated patches, and the rationale for this pattern. The comments provided several scientific references noting that large expanses of conifer-free habitat are most beneficial for sage-grouse and requested that the BLM consider these references in determining the appropriate scope of the CX. Response: The Verification Report states that ``while this CX would authorize 10,000 acres of treatment, the BLM expects the treatments to be scattered across the landscape rather than in a large contiguous block.'' The BLM has added language to section 1.A.c (The size of each project) of the Verification Report to clarify that ``[e]valuation areas in the EAs were larger than the ultimate proposed treatment areas'' and ``[t]herefore, while this CX would authorize 10,000 acres of treatment, the BLM expects the treatments (up to 10,000 combined acres per project) to be scattered across the landscape rather than in a large contiguous block; however, this is not a requirement of the CX, as there may be circumstances where treatment of 10,000 contiguous acres would be beneficial for sage-grouse.'' The BLM considered the references provided and determined that no changes were needed to the Verification Report or the CX language. Comment: The BLM received comments that requested the CX be modified to include seeding of non-natives, the application of herbicides, and chaining (a method of vegetation ***removal*** that involves two tractors pulling heavy chains in a ``U'' or ``J'' shaped pattern to pull over and uproot trees), given that many projects completed in the area relied on these methods and were evaluated in EAs that reached Findings of No Significant Impact (FONSIs), and therefore could support establishment of this CX as including these methods. The BLM received comments that provided several scientific references noting the benefits of these actions and requested that the BLM modify the scope of the CX. Response: The BLM considered suggestions to allow for the use of seeding of non-native species, the use of herbicides, and chaining, and determined that these actions would not be added to the CX, for the same reasons they were not included in the proposed CX, as described in the Verification Report. The Methods section of the Verification Report (under 1.B.b) states ``actions that were proposed for the CX as a preliminary matter were eliminated if they were not supported by NEPA analysis. This means that if the type of treatment and activities were not analyzed as elements of the projects listed in Table 1, they were removed as a covered action in the CX.'' The use of non-native plant seeds or sources and chaining were not analyzed as elements of the projects evaluated in the EAs reviewed. In addition, as noted in the same section of the Verification Report, ``[a]ctivities such as the construction of temporary roads and the application of herbicides or pesticides that were rarely proposed in the EAs and, therefore, had no comprehensive record of effects across projects, were also removed from the CX.'' Therefore, these activities are not included within the scope of this CX. Comment: The BLM received comments that requested that, in addition to PJ, the proposed CX should also include Douglas fir and limber pine in its treatment of conifer encroachment if the CX aims to improve mule deer and sage-grouse habitat on a broad scale. Response: Establishing a CX requires that the BLM evaluate the environmental impacts of the types of action proposed for the CX to determine if there is evidence that such action normally does not result in significant impacts across all landscapes where it would be appropriate to apply. The Verification Report documents the findings from BLM EAs and research that support the ***removal*** of PJ as a category of action that normally does not result in significant effects. At the time of developing this CX, the BLM was only able to find one EA in one ecoregion that evaluated the ***removal*** of Douglas fir in conjunction with PJ to support mule deer and sage-grouse habitats. The BLM determined that the one EA representing one ecoregion did not provide sufficient information at this time regarding the impacts of ***removal*** of Douglas fir or limber pine for the benefit of mule deer and sage-grouse habitat across multiple landscapes that justify including activities ***removing*** these species in the CX. Therefore, the BLM did not include ***removal*** of these species in this CX. Comment: The BLM received comments that requested language be added to the CX stating that it may not be used within certain specially designated ***lands***, as values protected under these designations would be compromised by projects implemented on the basis of the CX. The comments pointed to the National Landscape Conservation System and other specially designated areas, including National Scenic and Historic Trail (NSHT) rights-of-way. The comment further stated that, without excluding NSHTs, projects would be in direct contradiction with the policies for the management of the NSHTs. Response: The BLM has determined it is not necessary to explicitly exclude special designations in the text of the CX. PJ vegetation may require management in areas both within and outside of specially designated areas; therefore, the BLM intends the CX to extend to these areas generally, and to non-specially designated public ***lands***. Management of specially designated areas, like all public ***lands***, is governed by LUPs. The LUP applicable to a specially designated area will help define the applicability of the CX by delineating what kinds of protective measures, such as visual resource management buffers, are in place and what desired resource conditions constrain the projects in that area, which ensure compliance with BLM[[Page 79507]]policy and management direction. Should the BLM rely on this CX for NEPA compliance, this reliance must include documentation regarding these protective measures, to ensure both LUP conformance and suitability for reliance on the CX. Reliance on the CX would also be subject to review of the DOI's list of extraordinary circumstances. If such extraordinary circumstances were present, the BLM would consider whether there are circumstances that lessen the impacts or other conditions sufficient to avoid significant effects such that it may still apply the CX, or determine that preparation of an EA or EIS is appropriate. Comment: The BLM received comments that recommended the BLM incorporate changes to the language pertaining to old-growth woodlands in the CX to require specific detection and evaluation methods, provide stronger protections, and provide an exemption for the ***removal*** of predator perches. Response: As stated in the Verification Report, old growth trees would be protected (not removed) during projects supported by the CX, and so there are no stronger protections to provide. It would not be appropriate for the BLM to require specific detection and evaluation methods for identifying old-growth trees; instead, the BLM would continue to utilize the best professional scientific methods available and appropriate to the site-specific location at the time of project implementation. The BLM is not aware of information that supports an exemption to allow ***removal*** of predator perches and has not revised the CX to identify any such exemption. Comment: The BLM received comments that requested additions or modifications to the CX parameters in order to prevent two CX-supported projects from being applied contiguously, in order to prevent large swaths of ***land*** being treated in multiple projects. Response: The BLM has determined it unnecessary to define in the CX a prohibition of the use of this CX for NEPA compliance in any geographical or temporal scope in relation to additional uses of the CX. The use of any CX is subject to review of the DOI extraordinary circumstances in order to determine if any extraordinary circumstances are present that would result in significant effects and, therefore, preclude use of the CX to comply with NEPA. An established CX category of actions do not have significant impacts when projects are designed to the specifications of the category and review of the proposed action determines that there are no extraordinary circumstances present that may result in the project having significant effects. If the proposed action, conducted adjacent to other similar projects, would trigger any of the extraordinary circumstances, the BLM would not be able to rely on the CX for NEPA compliance absent circumstances that lessen the impacts or other conditions sufficient to avoid significant effects. Where extraordinary circumstances are present, and there are no circumstances that lessen impacts or other conditions sufficient to avoid significant effects, the BLM would proceed with the appropriate level of NEPA review other than a CX, in accordance with 40 CFR 1501.3 and 43 CFR 46.205 For example, the effects of contiguous PJ treatments may fall under the extraordinary circumstance that considers whether the project may ``have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks'' (43 CFR 46.215(d)). Comment: The BLM received comments that requested additions or modifications to the CX parameters to specifically require limitations related to pinyon jay colonies, soil erosion, and biological soil crusts. Response: The BLM considered each of the suggestions regarding additions or modifications to the CX parameters and determined that no changes were needed. Proposed actions, regardless of their level of NEPA review (CX, EA, EIS) must conform to the approved LUP. In implementing actions in conformance with LUPs, the BLM identifies project design features to define the parameters of the project, including any protective measures needed to ensure LUP conformance or to reduce adverse effects based on the site-specific circumstances. If the proposed action is the subject of an EA or EIS, the EA or EIS evaluates the project including those parameters. If the proposed action designed to meet the requirements of the LUP, including incorporating any resource protective measures, also meets the parameters of the CX, and no extraordinary circumstances preclude application of the CX, the BLM can rely on a CX. Because LUPs are, themselves, region-specific, different LUPs have different objectives, and impose different resource management constraints on actions that can be taken in the area they cover.CX Purpose Comment: The BLM received comments that requested the BLM expand the list of species that could be benefited by projects under the CX and highlight the other ecological benefits associated with PJ management in the Verification Report, such as watershed hydrologic function, expansion of herbaceous forage production, benefits to sagebrush-obligate songbirds, and increased plant diversity. The comments included several scientific references noting these other ecological benefits and requested that the BLM consider these references in determining the appropriate scope of the activities included under the CX. Response: The BLM considered each of the requests and determined that no changes were needed to the Verification Report or the CX language. While authorizing projects covered by this CX may have incidental benefits to other species and resources, the purpose of this CX is to streamline implementation of projects to benefit mule deer and sage-grouse habitats, as directed in Secretary's Order 3356. Comment: The BLM received comments requesting that the BLM specify that the CX applies only to specific PJ tree species described by the relevant ***land*** use plan. Response: The BLM is not relying on LUPs to define the tree species included in the scope of this CX. The text of the CX states that it is only available for use of the ***removal*** of PJ species. In the CX as finalized, the BLM has addressed the relationship between proposed actions and LUPs in paragraph 1(b) of this CX to ensure project design features are identified as appropriate and in conformance with the applicable LUP. As stated in the Introduction of the Verification Report, regardless of the level of NEPA review, the BLM's actions are guided by LUPs on BLM administered public ***lands***. The LUPs identify where and under what conditions management activities can occur consistent with plan decisions. Therefore, regardless of the terms of any particular CX, the proposed action would also be constrained by any limits written into the applicable LUP. For example, if a BLM LUP prohibits the ***removal*** of certain species of PJ, any proposed action would preclude such ***removal*** and reliance on this CX would not be appropriate. The BLM has revised paragraph (b) of the CX to clarify the requirement to document how the scope of the project addresses any needed protections when no LUP decisions apply. Comment: The BLM received comments that stated the BLM already has an established CX that meets the stated purpose of this proposed CX (DM Part 516, Chapter 11.9, Section D (10)) and under this existing CX, projects other than prescribed burning are[[Page 79508]]limited to 1,000 acres in size and are not permitted in wilderness areas or wilderness study areas. The BLM received comments that stated that the BLM has not acknowledged this existing CX or explained why this existing CX is not adequate. Response: The comments are correct that there is a CX listed at DM Part 516, Chapter 11.9, Section D (10) that addresses certain vegetation management activities. However, under guidance issued in 2009, in BLM Instruction Memorandum No. 2009-199, use of that CX by the BLM has been discontinued permanently, as agreed to in a settlement of Western Watersheds Project v. Lane, No. 07-cv-394-BLW by the United States in U.S District Court for the District of Idaho in July of 2009.Site-Specific Considerations Comment: The BLM received comments that the BLM should only allow Phase III ***removal*** treatments on a case-by-case, site-specific basis, given that state and transition models demonstrate more risk than reward with Phase III ***removal***. These comments further recommended the BLM exercise caution prior to allowing these treatment types, keeping in mind that, in order to benefit sage-grouse and potentially avoid creating ``biological sinks,'' all trees within the treatment perimeter would need to be removed. Response: ``Phase III'' referenced by the comment is the most advanced stage of PJ woodland encroachment into formerly sagebrush-dominated habitat. As defined in the Glossary of the Verification Report, Phase III woodlands are characterized by trees comprising over two-thirds of cover in biomass, with the tree canopy dominating ecological processes. The EAs relied upon in establishing this CX, described in Appendices A and B in the Verification Report, included PJ ***removal*** in all three phases of PJ encroachment (Phases I, II, and III). Projects authorized in reliance on this CX for NEPA compliance must demonstrate a benefit to sage-grouse or mule deer habitat. If, based on site-specific conditions, the BLM finds that a Phase III ***removal*** meets all the necessary requirements for the use of this CX (meets the scope of the proposed CX, was designed specifically for the purposes of benefiting sage-grouse or mule deer and habitat, focuses solely on removed PJ, is in conformance with relevant LUPs, and no extraordinary circumstances preclude application of the CX), then use of this CX for NEPA compliance to authorize the ***removal*** would be appropriate. Comment: The BLM received comments stating that the BLM's statutory obligation to comply with any governing LUP is not sufficient to ensure there will be no impacts. Comments stated that site-specific analysis must be applied to PJ ***removal*** projects, and that the BLM must ensure that proper constraints are explicit in the CX language itself, rather than relying on LUP conformance requirements to constrain the use of this CX. Response: Although any actions taken by the BLM must conform to the applicable LUP, the BLM has not relied on requirements for actions to conform with LUPs in establishing this CX. The BLM has developed a specific scope of actions and required components for the inclusion of project design features consistent with LUP decisions and relied upon existing NEPA analysis and scientific research to determine that this scope is appropriate to ensuring no significant effects would occur. The establishment of a CX does not imply that no effects would occur--indeed, the purpose of the proposed actions covered by the CX is to have a beneficial effect on mule deer and sage-grouse habitats. The scope of the CX is defined to identify parameters that constrain the action such that it would not result in significant effects. Reliance on the CX would also be subject to review for extraordinary circumstances that, if present, would preclude reliance on the CX for a particular project approval. In implementing actions in conformance with LUPs, the BLM identifies project design features to define the parameters of the project, including any protective measures needed to ensure LUP conformance or to reduce adverse effects based on the site-specific circumstances. The BLM defines and refines the action proposed regardless of the level of NEPA compliance, including for projects supported by CXs. The BLM develops LUPs for specific regions of the country in coordination with a public engagement process. These LUPs vary based on the environmental conditions and objectives for the region. Therefore, while the proposed CX points to the category of project design feature to include, the applicable LUPs, which BLM would consult during project implementation, provide regionally appropriate and site-specific design features for resource protection for individual projects proposed. The Verification Report evaluated previously implemented actions that incorporated project design features according to management direction in the relevant LUP and found that those projects do not cause significant environmental effects. The BLM has revised the text of the CX at paragraph (b) to clarify that a proposed action covered by the CX must include project design features providing protections consistent with the decisions of the applicable LUPs.Use of the CX Comment: The BLM received comments stating that the CX could be misused to increase forage for livestock grazing operations and requested that the BLM add language to the CX restricting projects where livestock grazing is permitted. In addition, the BLM received comments that suggested the BLM analyze grazing management in the Verification Report and the effects of grazing (such as an increase in cheatgrass and damage to biological soil crusts) on the habitat restoration goals that are the purpose for establishing the proposed CX. The comments provided several scientific references noting the effects of grazing and recommended that the BLM consider and incorporate the relevant scientific references documenting these effects in the Verification Report. Response: Projects authorized in reliance on this CX for NEPA compliance must demonstrate a benefit to sage-grouse or mule deer habitat, not livestock. If, based on site-specific conditions, the BLM finds that the proposed action is designed specifically for the purposes of benefiting sage-grouse or mule deer and habitat, focuses solely on ***removal*** of PJ, is in conformance with relevant LUPs, and there are no extraordinary circumstances requiring preparation of an EA or EIS, then use of this CX for NEPA compliance to authorize the ***removal*** would be appropriate regardless of whether increases to livestock forage occur as a result. The BLM analyzed and considered the effects on grazing management of PJ treatments. Appendix A and Appendix B of the Verification Report describe the anticipated effects of PJ treatments described in the EAs used to support the CX, which included (1) temporary loss in areas available for livestock grazing, (2) short-term decreases in forage availability, (3) long-term minor improvements in forage availability, and (4) loss of shade trees that could concentrate livestock. These effects were not anticipated to be significant, and after-action observation revealed they were not. As noted in Appendix B of the Verification Report, ***removal*** of livestock grazing is usually not required as part of PJ ***removal*** treatments unless site-specific protection is needed for seedings, revegetation, or where[[Page 79509]]required by ***land*** use plans. Other design features to reduce the effects on livestock grazing, if needed, typically include pasture deferments or modifications to grazing systems. Due to limited vegetation and soil disturbance caused by these PJ management projects, described in the Methods sections 1.B(f) and 2.A(d) of the Verification Report, these measures adequately provide for post-treatment recovery in areas subject to livestock grazing.Analysis and Review of the CX Comment: The BLM received comments that the BLM has not demonstrated that it has adequately monitored past vegetation ***removal*** projects to ensure that the treatments do not cause significant, long-term damage to overall ecosystem health. Comments stated the Verification Report did not include adequate detail regarding how the BLM collected and analyzed information and data related to the 18 EAs relied on in the Verification Report to support its conclusions. Response: The BLM engages in routine monitoring, either for specific projects or as part of overall ***land*** health monitoring, to evaluate the effectiveness of projects. Providing separate compilations of detailed monitoring data for the projects identified is one possible way to support establishment of a CX but is not necessary to justify the establishment of this CX. The Administrative Process section of the Verification Report describes the methods by which an agency can establish a CX, and the introduction to the Methods section describes the methods BLM employed to validate this CX. These included (1) evaluating effects of implementing PJ ***removal*** projects for which the BLM prepared EAs and FONSIs, and (2) reviewing scientific literature and citing research findings from peer-reviewed published studies. Comment: The BLM received comments that the BLM failed to analyze the cumulative impacts of the proposed CX, because the BLM did not include its methodology or any quantified results supporting its conclusory statements in the Verification Report. The commenters requested the BLM assess cumulative impacts on a programmatic level and ensure that impacts are assessed at a level of detail such that useful data can be generated to facilitate review. Response: Commenters are conflating the analysis required when a CX is established with the consideration required when an agency relies on an established CX to support a proposed action. In its updated regulations, CEQ requires agencies to identify all effects of a proposed action that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action. In evaluating effects of PJ treatments, the BLM examined data and evidence per the CEQ's guidance for establishing a new CX, including analyzing previously implemented actions and their observed environmental consequences. In so doing, as documented in the Findings section of the Verification Report, based on effects analyses in the relevant EAs and post-implementation monitoring, ``[n]o [significant impacts] were predicted in the BLM EAs and FONSIs for the activities included in the proposed CX for PJ control, the observed post-implementation effects were similar to or less impactful than the effects predicted in the EAs/FONSIs, and there were no unanticipated impacts from the treatments.'' Based on the evidence, the specific category of actions described in the CX consistently do not produce significant environmental impacts, and the BLM considered and analyzed potential effects from PJ treatments in the Verification Report. Comment: The BLM received comments that stated that the BLM failed to analyze the potential for large-scale ***removal*** of pinyon trees within a PJ woodland to create juniper-only communities. The comments referred to a scientific source noting the effects of PJ ***removal*** and subsequent alteration of PJ communities and recommended that the BLM consider and incorporate its results in the Verification Report. Response: In conducting its review and analysis to establish the CX, the BLM considered large scale ***removal*** of PJ and possible alteration of PJ communities. The BLM reviewed the scientific source submitted with comments regarding possible transformation of PJ communities and found that the scientific source cited is specific to chaining treatments and treatments that have been reseeded using non-native species, neither of which could be authorized under the CX. The proposed CX language in the Verification Report (section 1(1) under the Introduction) specifically states that covered actions under the CX ``shall not include: (a) Cutting of old-growth trees; seeding or planting of non-native species; chaining; pesticide or herbicide application; broadcast burning; jackpot burning; construction of new temporary or permanent roads; or construction of other new permanent infrastructure.'' Therefore, the cited information, with its focus on chaining, is not relevant to the establishment of this CX. Comment: The BLM received comments that the BLM failed to include in the narratives in the Methods section of the Verification Report the effects on soil erosion and biological soil crusts, even though those effects appeared in Appendix A, and stated that the discussions of scientific literature provide conflicting summaries from the sources cited regarding soils. Response: Section 1.B.f (``Observed environmental consequences of projects as implemented--Soil Disturbance'') under the Methods section of the Verification Report presents actual effects observed on the ground after project implementation, whereas Appendix A lists the potential effects as described in the Environmental Consequences sections of the EAs relied upon in establishing this CX. When post-implementation observations did not detect the effects, those effects were not noted, and thus would be absent from the section, as was the case with soil effects. Appendix B of the Verification Report provides a summary of predicted (potential) effects on soils noted in the EAs, followed by the validated (observed on the ground) effects, under the Soils/Vegetation section of the table. Section 2.A.d, under the Peer-reviewed scientific research findings, describes potential effects of the PJ ***removal*** methods supported under the CX on soil erosion and biological soil crusts. The BLM has reviewed the findings of Redmond et al. 2013 and determined that they are appropriately summarized in the Verification Report. Comment: The BLM received comments that the Verification Report fails to adequately consider the potentially significant effects of the proposed CX on pinyon jays and does not adequately support its findings in the Verification Report regarding impacts on pinyon jays and PJ-obligate species from PJ ***removal***. The comments provided scientific references noting the potential impacts of PJ ***removal*** on these species and recommended that the BLM consider and incorporate relevant scientific references documenting these effects in the Verification Report. Response: The BLM has considered the effects of the actions covered by the CX on pinyon jays. The BLM has reviewed the findings in the scientific references provided by the comments (i.e , Somershoe et al. 2020, Boone et al. 2018, and Johnson et al. 2019) and has concluded that the findings do not conclusively indicate that pinyon jays would experience significant impacts due to PJ ***removal*** treatments. As[[Page 79510]]Somershoe et al. 2020 notes, ``[t]he effects of thinning treatments on pinyon jays have been studied, but little information is available about the effects of woodland ***removal***, especially in the Great Basin.'' The few studies cited in Somershoe et al. 2020 are site-specific and do not support a finding that pinyon jays would experience negative impacts at a landscape-scale from PJ ***removal***. The commenter does not cite to any other references to support the stance that best available science indicates that the implementation of projects supported under this CX could have significant impacts on pinyon jays. Comment: The BLM received comments that recommended the BLM include additional research in the Verification Report to better encompass the benefits of PJ management for big game species, specifically, research highlighting the need to focus on forage and nutrition, not thermal cover, for elk management, and research demonstrating that treatments to ***remove*** PJ in sagebrush/sage-steppe systems would greatly improve forage for big game, including Cook et al. 1998; Cook et al. 2005, Sorensen et al. 2020, Roerick et al. 2019, and Maestas et al. 2019. Response: The BLM's review of the scientific literature provided by the commenter supports the BLM's finding in the Verification Report that forage abundance and availability for mule deer is considered to be an equal, if not more important, indicator of the quality of winter range for big game than thermal and hiding cover. Likewise, the beneficial effects of PJ ***removal*** to other big game species, including elk, are discussed in the Verification Report. Therefore, the BLM has made no changes in the Verification Report relative to this comment. Comment: The BLM received comments indicating that, by citing regional unpublished habitat guidelines and studies (specifically Watkins et al. (2007) and Cox et al. (2009)) to generalize the entire array of ecosystems managed by the BLM nationwide, the BLM is not consulting the best available science. Response: The mule deer habitat guidelines (Watkins et al. 2007; Cox et al. 2009) are based on a substantial number of peer-reviewed mule deer studies, Ph.D dissertations, and M.S theses, and state agency verification reports from across a wide geographic area in the Colorado Plateau and Intermountain West. In addition to these guidelines, the BLM reviewed and has relied upon recent published literature, such as Jones (2019) and Miller et al. (2005), as described in the Verification Report (section 2.A.c, Mule Deer). The BLM finds that these represent the best available science. Comment: The BLM received comments that most western Native American Tribes rely heavily on pinyon nut harvests and other use of natural resources on public ***lands***, and reliance on large-scale CXs concerning mechanical reduction or elimination of such resources without an opportunity for public review and comment on such actions as is provided through the EA process ignores the potential adverse effects on Native American communities and people and the associated environmental justice concerns. Response: The BLM has considered the issues raised. As stated in the Verification Report, while Tribes are generally supportive of PJ treatments for the restoration of ecological health and reduction of the risks that catastrophic wildfire presents to cultural resources, the BLM acknowledges in the Verification Report that there are potential risks to cultural resources from PJ treatment projects. These risks would be substantially reduced by requirements to conduct field inventories/surveys, consult with Tribes and state and Tribal historic preservation offices, and implement appropriate impact avoidance and minimization measures. These measures are often referenced in applicable LUPs, and even when they are not, compliance with legal requirements such as the National Historic Preservation Act (NHPA) and the Federal Government's requirements for government-to-government consultation apply to all BLM projects independent of requirements for compliance with NEPA. The importance of pinyon nut harvests to Tribal interests would be addressed at the time of project proposal, regardless of the level of NEPA review completed. Common project design features include full-avoidance or restricting treatment methods to hand-treatment only within and adjacent to sites and measures that mask cultural sites and preclude physical intrusion. In some areas, cultural sites coincide with the presence of old-growth timber, areas that could not be disturbed in projects supported by the CX. For the establishment of CXs, the CEQ NEPA regulations require consultation with CEQ and publication of the proposed CX for comment, as the BLM has done here. See 40 CFR 1507.3(e)(2). CEQ does not require any public review for the application of a CX to a proposed action once the CX has been established. Although public involvement is not required to determine that a project qualifies for a CX, the BLM NEPA Handbook does identify that the BLM can elect to involve the public when relying on a CX to support an action. The BLM also notes that many public ***land*** management programs administered by the BLM, such as ***land*** tenure adjustment and public ***land*** grazing management, have their own independent public involvement requirements. Comment: The BLM received comments that the failure to consider carbon sequestration in PJ ***forests*** and the potential for loss of the carbon if the ***forests*** are removed invalidates the BLM's claim that there are no significant environmental impacts from the management activities that could be supported by the proposed CX. Comments note that ***removing*** tens of thousands of acres of public ***forests***, if not hundreds of thousands of acres, could greatly increase carbon ***emissions*** and thus climate change impacts. The comments provided scientific references noting carbon sequestration benefits and the value of vegetated ***land*** uses in storing carbon. Response: The BLM has considered the effect of covered projects on carbon sequestration and greenhouse gases. The PJ ***removal*** projects evaluated in the EAs and after-action observation relied on to validate the CX were of similar or greater acreages than the 10,000-acre CX limit and neither the EAs nor the after-action observation identified that these projects would or did result in significant effects on carbon sequestration and greenhouse gases. Furthermore, the scientific references provided in the comments offered no specific evidence that PJ ***removal*** projects caused significant effects on carbon sequestration and greenhouse gases. Therefore, the BLM has considered the potential effects of carbon sequestration during the validation process for this CX. Comment: The BLM received comments that the Verification Report referenced water in the professional opinions sections (Appendices B and C) under Methods (section 1), but not in the section with Peer-reviewed research findings, professional opinions and reports (Methods section 2), specifically, information about the benefits of PJ ***removal*** for improving the quantity of water on the landscape. The comments provided several scientific references noting these benefits and recommended that the BLM consider and incorporate relevant scientific references documenting these effects in the Verification Report. Response: The BLM has reviewed the scientific studies submitted by the[[Page 79511]]commenters and has included updates in the Verification Report (section 2.A.f ), summarizing the findings in Ochoa et al. 2019 and other research studies (Kormos et al. 2017, reviewed in Miller et al. 2019 and Williams et al. 2019) indicating that western juniper control can increase water availability. Comment: The BLM received comments that the Verification Report does not adequately analyze the potential impacts of PJ treatments on bat species (including BLM-identified sensitive bat species, such as the fringed bat) and does not sufficiently incorporate data suggesting the importance of PJ habitat to bat species. The comments provided several scientific references noting the importance of PJ habitat for bat species and the potential effects of PJ treatments on bat species and recommended that the BLM consider and incorporate relevant scientific references documenting these effects in the Verification Report. Response: The BLM analyzed the potential impacts of PJ ***removal*** on wildlife species, including bat species, in the EAs used to support the CX, and found that the activities proposed to be covered by the CX would not cause significant environmental effects on these species. The projects included identification of habitat within the project areas for BLM sensitive species (which include many bat species), the northern long-eared bat (a species listed as Threatened under the Endangered Species Act), and other bat species. Where potential habitats were identified in the project areas, the BLM conducted surveys for bats as indicated by LUP management direction and BLM protocols. The analyses recognized that some bats utilize cavities in snags and forage for aerial insects over PJ and sagebrush woodlands, and therefore, juniper reduction would negatively affect some species (e.g , the silver-haired and long-legged myotis) and positively affect other species (California and hoary bats) depending on their habitat needs. Over the long term, analyses concluded that the reduction in fuel loads from PJ ***removal*** would be beneficial by reducing the risk of future large-scale wildfire. None of the EAs identified the potential for significant effects on bats. When implementing projects covered by this CX, the BLM will conduct the same types of inventories and provide protections for bats, like other wildlife, as required by LUPs and BLM protocols for federally listed and BLM sensitive species. Since the EAs themselves documented scientific literature on bats, including the reference provided by the commenter (Chung-MacCoubrey 2005), as well as many other wildlife species, the BLM did not update the Verification Report. Comment: The BLM received comments that suggested the Verification Report's analysis of the potential for invasive plant species expansion after PJ treatment is unsubstantiated, saying, for example, that the Verification Report inaccurately determined that cheatgrass always decreases over time, even if it initially increases post-treatment, despite none of the studies cited in the Verification Report supporting this conclusion. The comments provided several scientific references noting the effects of PJ ***removal*** on cheatgrass and other invasive species and recommended that the BLM consider and incorporate relevant scientific references documenting these effects in the Verification Report. Response: The Verification Report acknowledges that the ``literature indicates that PJ ***removal*** activities often increase the abundance of invasive annual grasses, with cheatgrass being a focus of much of the research'' (Methods section 2.A.b), and ``that with the current level of understanding, the advance of invasive species, whether pre-existing or new, may be an outcome of PJ treatment'' (Findings section). The Verification Report discusses the complex relationships among treatment types, site conditions, pre-existing vegetation composition, and vegetative outcomes from PJ ***removal*** in section 2.A.a and focuses on invasive species research results in section 2.A.b, many showing increase of cheatgrass after treatments. The Findings section of the Verification Report concludes that after the types of PJ treatments in the CX, ``native sagebrush and sage-steppe vegetative composition and forage production improve despite the presence of invasive plant species.'' The BLM considered the references provided, many of which were used in the Verification Report, and determined that the Verification Report analyzed the issues brought up by the comments. Comment: The BLM received comments that the Verification Report inaccurately determined that understory plants predominantly increase after treatment, and the BLM failed to consider several scientific references that came to different conclusions in determining the appropriate scope of the CX. Comments also pointed to the concept of site resistance and resilience (Chambers et al., 2014) and stated it contradicts the conclusion that native vegetation and forage production improve despite the presence of invasive plants. Response: The BLM recognizes that while outliers may exist in the larger body of scientific knowledge, the BLM accurately depicted the results of the research in that the literature focused most clearly on the types of mechanical PJ ***removal*** covered by the CX and the effect on understory vegetation. The BLM reviewed the literature and citations included with the comments and determined that some readers may have misinterpreted results when cheatgrass was observed to increase at the same time as native plants. To clarify, cheatgrass and other non-native plants often increased at the same time as more desirable native plants, as documented in section 2.A.b of the Verification Report, but that result does not contradict the benefits of and the literature's conclusions that ``an increase in understory cover and density, including increased richness and cover of perennial and annual grasses and native forbs'' occurs after PJ treatments. These findings of post-treatment vegetation responses do not contradict the concept of site resistance and resilience, which looks at pre-treatment conditions to predict vegetative outcomes and is summarized in section 2.A.b the Verification Report: ``researchers have increasingly noted that perennial native herbaceous species are a primary determinant of site resilience to disturbance and management treatments or resistance to cheatgrass and exotic forbs under some site conditions.'' The comments do not specify why this concept invalidates the scientific research results cited in the Verification Report. The BLM carefully reviewed the literature evaluated in the Verification Report to find the results of the specific PJ ***removal*** treatments covered by the CX, discrete and distinct from the results of burning, chaining, or cabling, which are not included. Therefore, the BLM accurately summarized the scientific literature cited in the Verification Report relative to understory vegetation and found no reason to change the scope of the CX or revise the Verification Report. Comment: The BLM received comments that the Verification Report inaccurately determines that the overwhelming result of PJ treatments is that they have positive effects on soils, soil erosion, and hydrological function, and noted that research shows that PJ ***forest*** ecosystems are complex and depend on the interaction of a variety of factors, and management must be carefully planned according to individual site characteristics on a site-specific basis. The comments provided[[Page 79512]]a list of literature citations for the BLM's review and consideration in support of their statements. Response: The BLM has reviewed all literature provided by the commenters. The BLM acknowledges that PJ ***forest*** ecosystems are complex and has updated section 2.A.d of the Verification Report to add to the description of the Williams et al. 2018 summary that ecohydrological impacts of treatments on PJ woodlands largely depend on: (1) The degree to which perturbations alter vegetation and ground cover structure, (2) the initial conditions, and (3) inherent site attributes. The BLM also notes that LUPs address heterogeneity among sites. Comment: The BLM received comments that stated the two literature reviews cited in the Verification Report improperly informed consideration of cumulative effects of PJ ***removal*** projects (Jones 2019 and Miller et al. 2019), given that these sources: Aggregate data and observations from multiple reports on individual research projects; draw generalizations from the body of research; and fail to explicitly address the cumulative impacts of many such projects in proximity across the landscape on a wider scale. Comments included several scientific references noting the cumulative impacts of PJ treatments and recommended that the BLM consider and incorporate relevant scientific references documenting these effects in the Verification Report. Response: The revised CEQ regulations require agencies to identify all effects that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action. Although CEQ's regulations specifically do not require evaluation of cumulative effects, see 40 CFR 1508.1(g)(3), the BLM nevertheless utilized evaluations and observations of previously implemented projects to determine the environmental effects from the activities covered by the CX to address such effects. Those evaluations and observations led to the findings stated in the Verification Report that the specific categories of actions described in the CX consistently would not cause significant environmental effects, whether the activities were to be implemented individually or in combination. The literature review supported this finding (``informed the consideration of cumulative effects'') in that the aggregated studies pertaining to specific resources (soils, vegetation, etc.) over space and time did not reveal significant effects. The BLM did not rely solely on the aggregated trend data in Jones (2019) to identify effects from the relevant PJ ***removal*** treatments. The literature review in the Verification Report presents scientific data directly from numerous research projects representing different situational circumstances, and these data provided the basis for the BLM's conclusions. One of the references provided by comments cited the results of sagebrush ***removal*** treatments, which would not occur under the CX, and is therefore not relevant to PJ ***removal***. Based on the relevant studies focused on the PJ ***removal*** activities specified in the CX, the BLM did not find the reasonably foreseeable effects to be highly uncertain or potentially significant. The BLM has determined that its statements are supported by the scientific references cited in the Verification Report. Comment: The BLM received comments that the BLM incorrectly summarized the findings in the peer-reviewed literature section in the Verification Report regarding the impacts of PJ ***removal*** on sage-grouse. The comments referred to several scientific references cited within Jones (2019) for PJ treatment effects on sage-grouse and recommended that the BLM consider and incorporate additional findings from these references in the Verification Report. Response: In one of the examples provided by the comments, Jones (2019) summarized that ``[o]f the five studies of PJ treatment effects on sage-grouse, three showed positive effects and two showed non-significant effects.'' (Note that ``significant'' in this context refers to statistical significance such that ``non-significant'' conveys a neutral result.) Therefore, all five of these studies had no proven negative effects. The other Jones (2019) example provided by the comments referred to 11 studies of sagebrush treatment effects; however, sagebrush treatments (***removing*** sagebrush) are not included in this CX, and those results are therefore not relevant. Comment: The BLM received comments that the BLM incorrectly determined in the Verification Report that PJ mechanical treatments have variable effects on deer and elk use of sage-steppe ecosystems, given that the literature cited in the Verification Report found that mechanical treatments have a mostly negative or statistically non-significant effect on mule deer and elk. The commenter provided a list of literature citations for the BLM's review and consideration in support of their statements. Response: In the Verification Report (section 2.A.c, Mule Deer), the BLM summarizes findings of studies cited by Bombaci and Pejchar (2016) and Jones (2019) that mechanical treatments have variable effects on deer and elk use of sage-steppe ecosystems. Notably, Bombaci and Pejchar (2016) found that the proportions of negative, positive, and non-significant results (statistically non-significant, therefore, neutral for these purposes) were similar following mechanical ***removal*** and thinning treatments. Jones (2019) concluded that ``mechanical treatments have variable effects on deer and elk use of sage-steppe ecosystems both seasonally and annually, ranging from decreased use to increased use'' and ``treatments were found to improve forage values, sometimes at the expense of cover used for other daily and seasonal needs.'' The BLM therefore concludes that its determination that PJ mechanical treatments have variable effects on deer and elk use of sage-steppe ecosystems was correct. Comment: The BLM received comments that the BLM did not adequately evaluate the impacts of landscape-scale disturbance to PJ woodlands on wildlife species that inhabit and depend on these woodlands (including obligate bird species, semi-obligate bird species, and mammals), as well as on migration corridors and wildlife-dependent recreational activities. Response: The BLM has considered impacts of the kinds of treatments included in this CX on PJ obligate species. The BLM has updated the Verification Report (section 2.A.c, Other Birds and Mammals) to clarify that ``Research of bird species responses to PJ ***removal*** have been relatively consistent in reporting that use of the treated areas by sagebrush-associated species increased after PJ treatments, while use by PJ woodland species, including pinyon jay nests, decreased (Johnson et al. 2018; Jones 2019).'' Relative to other wildlife-related effects, Appendix B of the Verification Report provides a summary of environmental consequences of the actions included in the CX by resource, including impacts on wildlife and recreation. The commenter does not provide any further information or scientific sources to demonstrate how the BLM failed to evaluate landscape-scale disturbance impacts from PJ ***removal*** treatments. Comment: The BLM received comments suggesting that the BLM improperly used mitigated FONSIs to support the proposed CX and that not all project design features contained in the referenced EAs were included in the proposed CX. Response: Consistent with CEQ's guidance, Establishing, Applying, and Revising Categorical Exclusions under[[Page 79513]]the National Environmental Policy Act (Nov. 23, 2010), mitigated FONSIs can support development of a CX when measures are included as part of the CX. The actions included in the Verification Report to support the CX were selected based on BLM's review of EAs and FONSIs that incorporate project design features developed to ensure conformance with LUPs and reduce adverse effects, which has been shown to be an effective process in developing PJ ***removal*** projects that have no significant impacts. Comment: The BLM received comments that questioned the Verification Report's assumption that projects with NEPA completed after 2016 have not been implemented and stated that there are numerous projects where NEPA was completed after 2016 and implementation has occurred. The comments suggested that because these are more recent projects, they would be more representative of the types of projects being implemented in the future. Comments also stated that the number of projects used are not sufficient to draw a conclusion that there have been no significant environmental impacts from the actions that would be covered in the CX and requested that the BLM analyze all PJ management projects to make this determination. Response: The Methods section of the Verification Report details the methodology the BLM used to identify the evaluated EAs. While the BLM relied on an ePlanning query of projects from 2012 to 2016, the BLM also contacted all offices with EAs analyzing the types of actions that would be covered by this CX and asked questions regarding the status of NEPA analysis and implementation status of projects for which the BLM had already reached a decision. Based on this feedback from offices, the BLM utilized information in the Verification Report only from those projects that were completed to a point that all actions authorized had been implemented, such that monitoring and observations of the effects and effectiveness of the actions were available. While the BLM found projects where NEPA was completed after 2016, implementation of these projects was not complete or was so recently completed that any post-implementation impacts were not yet observable. Although BLM did not limit the inclusion of any EAs by date, use of these criteria resulted in the most recent EAs included in the Verification Report to be dated in 2016 and prior. Comment: The BLM received comments that the BLM should not rely on programmatic EAs to conclude that significant impacts would not result from PJ ***removal*** projects, given that programmatic EAs usually do not analyze site-specific impacts associated with future projects. In addition, comments stated that the BLM should not rely on EAs tiered to an EIS to conclude that significant impacts would not result from PJ projects implemented under an EIS, given that tiered EAs rely on the analysis, mitigations, and constraints set forth in the EIS, and therefore do not demonstrate an absence of significant impacts. Comments also stated that the BLM cannot rely on 6 of the projects included in the Verification Report because the EAs fail to demonstrate that the projects will not result in significant impacts and suggested that 12 projects are too few to provide a basis for the BLM's determination that this category of projects will not result in significant impacts. Response: While 3 of the 18 EAs that the BLM reviewed for the CX were large-scale, programmatic analyses, the other 15 were management-unit implementation-level projects. It is important to note that the programmatic EAs did identify specific locations and specific acreages to be treated and, despite awareness that all of the areas would be treated (within the same potential timeframe), the BLM did not find any reason to prepare an EIS for potential significant effects from these treatments. Further, all projects implemented under the programmatic EAs had additional documentation of NEPA adequacy to evaluate if the effects would exceed those disclosed in the programmatic EA. All EAs evaluated in the Verification Report have supported implemented projects that demonstrate that the actions identified did not result in significant impacts at the site-specific implementation level. Further, the Verification Report referenced EAs that analyzed activities proposed for this CX, without including the results of analyses that grouped mechanical PJ ***removal*** with other management activities (such as jackpot burning, broadcast burning, road building, etc.). None of the EAs reviewed and utilized to support the establishment of this CX tiered to an EIS analysis in order to conclude that the project would not have significant effects beyond those disclosed in an EIS. Comment: The BLM received comments that the BLM should not have excluded those projects supported by an EIS, where potentially significant impacts were disclosed, and major issues and actions addressed are similar to those addressed in the EAs used to support the CX in the Verification Report. Response: As noted in the Verification Report, the PJ ***removal*** projects evaluated through EISs are quite different in size and scope from the projects evaluated through EAs; most notably the EIS-supported projects encompassed far more acres or included activities not proposed for coverage in this CX, or both. Consequently, the results of the EIS analyses are not appropriately applied to the specific type and scope of activities authorized by this CX given their dissimilarity. Comment: The BLM received comments that the actions covered by this CX are not the same as the actions analyzed in the EAs, and the Verification Report fails to recognize that the EAs addressed a number of site-specific issues (such as old-growth, roads, wilderness values, soil erosion, and impacts to wildlife) through project refinement, alternatives analysis, expert agency consultation, and mitigation. Comments concluded that the proposed CX should be updated to account for site-specific differences to ensure that PJ management does not result in significant environmental impacts. Response: As noted in the comments, the PJ ***removal*** actions evaluated in the EAs all included some form of manual or mechanical cutting, combined with various methods of spreading or disposal of debris, including yarding and piling, pile burning or log ***removal***, lop/scatter, and mastication with mulching. Appendix A includes a cross-reference for which type of actions included in this CX were evaluated in each EA. This process allowed iterative refining of the scope of the CX. The CX includes that suite of activities found not to have significant effects in the EAs evaluated. All projects implemented under the CX will be in conformance with the relevant LUP. In implementing actions in conformance with LUPs, the BLM identifies project design features to define the parameters of the project, including any protective measures needed to ensure LUP conformance or to reduce adverse effects based on the site-specific circumstances. The BLM defines and refines the action proposed regardless of the level of NEPA review, including for projects covered by CXs. Conditions that would require actions or considerations beyond those identified as within the scope of this CX would require preparation of either an EA or an EIS, as appropriate. Comment: The BLM received comments that the BLM inappropriately relied on projects designed to be implemented over several years, given that the impacts resulting from a project[[Page 79514]]implemented in one discrete time period instead of over a multi-year phased period are different. Response: As noted in the comments, several of the EAs and after-action observation relied on to substantiate the CX stated that implementation (treatment on all acres evaluated in the EA) may take place over a span of several years. However, the analyses for these EAs did not assume phased-in effects over time and were thus conducted as if the total proposed acreage would be implemented at the same time, as indicated by the footnotes in the Verification Report (Appendix A--Section 2). Therefore, the predicted and verified impacts from the projects analyzed in these EAs are comparable to projects that will be implemented under the CX. Comment: The BLM received comments that the 18 projects analyzed in the Verification Report are not enough and are not representative geographically or ecologically of BLM-managed ***lands*** across the country, given that the types and intensities of impacts resulting from a category of projects may vary depending on geographic or ecological conditions. The comments also questioned the BLM's selection process for projects, noting that, in searching for PJ management projects on the BLM ePlanning website, 41 projects have a status of ``complete'' that meet the Verification Report's search criteria; however, these projects were not included in the BLM's analysis. Other comments requested adding EAs from Idaho and Nevada to better represent the range of PJ ***removal*** projects, including the Central Basin and Range area, and to include maintenance actions (not defined) that may be needed after a PJ ***removal*** project. Response: The Methods section of the Verification Report details the methodology the BLM used to identify the projects supported by EAs to evaluate, resulting in selection of projects throughout the ecoregions where the BLM is implementing PJ ***removal*** actions. The BLM utilized information in the Verification Report only from those projects that were completed to a point that all actions authorized had been implemented and monitoring and observations of the effects and effectiveness of the actions were available. While the BLM found projects where NEPA was completed after 2016, implementation of these projects was not complete or was so recently completed that any post-implementation impacts were not yet observable. Note that while the BLM relied on a query of projects in ePlanning from 2012 to 2016, the BLM also reached out to BLM field and state office program leads to identify additional similar projects that may have been completed prior to 2012. As stated in the Verification Report, the goal of the query process was to collect representative BLM environmental analysis information from NEPA documents for each action, in order to provide an objective assessment of the overall environmental effects from all actions proposed for inclusion in the CX across the geographic spectrum. Although the BLM did not identify any projects in the Central Basin and Range area, the BLM identified and evaluated 18 EAs representing a broad geographical range from 6 states (Arizona, California, Colorado, Montana, Oregon, and Utah) that authorized the same or similar actions to those described in the proposed CX. The BLM also included peer-reviewed research findings, professional opinions, and reports in the Verification Report that examined effects of the same or similar actions to those described in the CX from a comprehensive geographic spectrum, including studies in the Central Great Basin. In combination, the EAs and research examined in the Verification Report are inclusive of ecoregions across BLM ***lands*** where PJ ***removal*** projects have occurred and will likely occur. Relative to ``maintenance'' activities, the CX can be used for the covered activities whether the activity is considered ``maintenance'' of a prior project or not, if all criteria for using the CX apply. Comment: The BLM received comments that the Programmatic EIS for Fuel Breaks and the Tri-state Fuel Breaks projects are not juniper treatment projects and should not be used as examples supporting this CX. Response: The referenced EISs were not used as examples to support the CX. They were mentioned in the Verification Report only to help identify thresholds of significance in defining the scope of the CX by identifying actions and treatment sizes that were not appropriate to include in the CX terms. As the Verification Report states, the projects in those EISs encompassed far more acres and included and analyzed activities not included in this CX. Comment: The BLM received comments that requested clarification on ``extraordinary circumstances,'' and how they are interpreted and used in the Verification Report. Specifically, the comments recommended that the BLM more clearly state the interpretation of extraordinary circumstances in the Verification Report, identify how extraordinary circumstances should limit applicability for proposed projects that take place adjacent to or in close proximity to previously implemented projects to avoid cumulative impacts (43 CFR 46.215(f)), and acknowledge that, if any of the extraordinary circumstances listed in the BLM's regulations are present, the action should be presumed to have a significant effect. Response: The CEQ Regulations at 40 CFR 1507.3(e)(2)(ii) require agency NEPA procedures to provide for extraordinary circumstances in which a normally excluded action may have a significant environmental effect and require additional analysis. Any action that is normally categorically excluded must be evaluated to determine whether any of the extraordinary circumstances in 43 CFR 46.215 are present; \1\ if they are present, further analysis and environmental documentation must be prepared for the action. Pursuant to 40 CFR 1501.4(b)(1), agencies may categorically exclude a proposed action when an environmental resource or condition identified as a potential extraordinary circumstance is present if the agency determines that there are circumstances that lessen the impacts or other conditions sufficient to avoid significant effects. Where extraordinary circumstances are present, and there are no circumstances that lessen impacts or other conditions sufficient to avoid significant effects, the BLM would proceed with the appropriate level of NEPA review other than a CX, in accordance with 40 CFR 1501.3 and 43 CFR 46.205 For example, the effects of contiguous PJ treatments may fall under the extraordinary circumstance that considers whether the project may ``have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks'' (43 CFR 46.215(d)).--------------------------------------------------------------------------- \1\ To the extent that any existing agency NEPA procedure is inconsistent with CEQ's new rule implementing NEPA, CEQ's new rule controls, unless there is a clear and fundamental conflict with the requirements of another statute. See 40 CFR 1507.3(a).---------------------------------------------------------------------------CX Establishment Procedures Comment: The BLM received comments that stated that establishment of the new CX constitutes a ``major Federal action'' under NEPA, as it constitutes a new agency policy and procedure, and a NEPA review is required to determine whether it is ``significant.'' In evaluating the significance of the impact of establishing this CX, the BLM received comments that stated that the BLM must consider both the context of the action as well as the intensity. Another[[Page 79515]]commenter concluded that in deciding not to prepare an environmental analysis of the proposed CX, the BLM has failed to take the obligated ``hard look'' at potential environmental impacts and is not fulfilling its obligation to comply with the procedural requirements of NEPA to the fullest extent possible. Response: The commenters conflate the process of establishing a CX as a part of an agency's NEPA procedures with the process of conducting environmental review of a proposed major Federal action. The establishment of a CX as a part of an agency's NEPA procedures is largely administrative, and distinct from the analysis required for a proposed major Federal action. Heartwood, Inc. v. United States ***Forest*** Service, 230 F.3d 947, 954 (7th Cir. 2000) (***Forest*** Service is not required to prepare an EA or EIS prior to promulgating a CX). In establishing the proposed CX, the Department is following CEQ's procedural regulations, which include publishing the notice of the proposed CX in the Federal Register for public review and comment, considering public comments, and consulting with the CEQ to obtain CEQ's written determination of conformity with NEPA and the CEQ regulations. See 40 CFR 1507.3(b)(2). To substantiate the proposed CX as a category of actions that do not normally have a significant effect on the human environment, the BLM also has developed the Verification Report, an administrative record to support the category of actions to be covered by the CX. This analysis includes a review of multiple environmental documents in which actions that would fall under the proposed CX have been found to not have a significant effect on the human environment. In evaluating the significance of the impact of activities that would fall under the CX, the BLM considered the significance of such actions consistent with 40 CFR 1501.3(b).\2\ The BLM properly determined that the actions covered by the proposed CX do not rise to the level of a significance that would warrant preparation of an EIS or EA to support implementation of such action. Additionally, the Verification Report documents how the BLM has experience taking a sufficiently close look at the potential impacts of actions proposed for coverage by the CX and has determined, based on this experience as well as additional evidence, that in general these impacts do not rise to the level of significance, and therefore, the BLM can rely on a CX to support taking these kinds of actions.--------------------------------------------------------------------------- \2\ The BLM notes that CEQ revised its regulations to move the definition of ``Significantly'' to 40 CFR 1501.3(b) and revise the provisions that formerly addressed context and intensity. See 85 FR 43,332.--------------------------------------------------------------------------- Comment: The BLM received comments that stated that the BLM must complete a programmatic consultation with both the U.S Fish and Wildlife Service and the National Marine Fisheries Service (the Services) to identify the potential harms resulting from the establishment of the CX pursuant to Section 7 of the Endangered Species Act (ESA). Response: As described in the comment response above, the administrative procedure of establishing a CX is different from relying on a CX for NEPA compliance to support a proposed action. To the extent that establishment of this CX is subject to the requirements of Section 7 of the ESA, the action has no effect on listed species or critical habitat. Since the ESA imposes its own requirements independent of NEPA's requirements, projects the BLM may pursue in reliance on this CX to implement PJ treatments would be subject to review under Section 7 of ESA and, if the parameters of the proposed action and site-specific conditions require, appropriate consultation with the Services would occur. Comment: The BLM received comments that stated that the importance of PJ habitat for pinyon jays is one example of an unresolved conflict under section 102(2)(E) of NEPA, and pursuant to the CEQ regulations, even if the BLM determines that it does not need to prepare an EIS per section 102(2)(C) of NEPA. The BLM received comments that stated that it ``must still prepare an EA that outlines reasonable alternatives to the proposed CX.'' The BLM received comments that provided several scientific references noting the impacts of PJ ***removal*** treatments on pinyon jays and stated that the BLM failed to consider these in determining the appropriate scope of the CX. Response: In each case where the BLM is proposing a treatment of PJ vegetation, the BLM would need to consider the appropriate level of NEPA compliance (whether CX, EA, or EIS) to support that proposed action. If the proposed action involved unresolved conflicts, then the BLM would not be able to rely on a CX, because the presence of unresolved conflicts is an extraordinary circumstance (43 CFR 46.215(c)). In establishing the CX, the BLM analyzed the relevant scientific literature regarding the importance of PJ habitat for pinyon jays, including the references submitted, and determined that the references submitted did not substantially change the current analysis of the potential impacts of PJ treatments on pinyon jays included in the Verification Report. Comment: The BLM received comments that stated that the BLM's proposed CX violates the limitations in relation to total acreage, use in wilderness areas, and requirements for monitoring and maintenance plans established for it through the ***Agriculture*** Improvement Act of 2018 (2018 Farm Bill), and that the BLM must be consistent with the defined limitations identified in the law. Response: The 2018 Farm Bill CX directed by Congress is a distinct and different CX from this BLM administratively established CX. In order to establish this CX, the BLM must comply with the CEQ's requirements for establishing NEPA procedures at 40 CFR 1507.3, including consulting with the CEQ and publishing the proposed CX for comment. The BLM has followed the CEQ's Final Guidance for Federal Departments and Agencies on Establishing, Applying, and Revising Categorical Exclusions under the National Environmental Policy Act (75 FR 75628, Dec. 6, 2010). Though at a broad level, the two CXs hold similar purposes to provide for the management of mule deer and sage-grouse habitat, the BLM has developed this administratively established CX with different specific parameters to the scope of actions authorized and limitations on treatment acres and locations. The BLM considered the effects of previously implemented actions of the type proposed for inclusion in the proposed CX and the NEPA analyses prepared to evaluate the impacts of such actions. Most of these actions were evaluated in EAs, for which a FONSI was reached. The BLM established the 10,000-acre size for this CX because it was well within the bounds of acres analyzed in the BLM's EAs for which FONSIs were reached, yet is near the upper limit of what many BLM offices can plan for and treat from an operational standpoint, given their capacity (as constrained by labor and budgets). Finally, the effects of the larger projects were evaluated to be the same as those of the smaller projects. There were no differences in effects at the larger treatment sizes that would suggest further limiting the acreage of a treatment that could be conducted in reliance on the CX. The BLM considered the effects of previously implemented actions of the type proposed for coverage by the CX and the NEPA analysis prepared to evaluate the impacts of such actions,[[Page 79516]]including the impacts to wilderness values. The Department's NEPA regulations require that any action approved or authorized in reliance upon a CX established by the BLM must consider extraordinary circumstances (43 CFR 46.205 and 46.215). Therefore, the BLM would evaluate PJ ***removal*** projects for extraordinary circumstances and determine whether reliance on a CX would be appropriate. The BLM's assessment showed that there have been no occurrences where observed impacts from the types of actions included in the CX have disqualified any areas from findings of wilderness characteristics, including size, naturalness, and opportunities for solitude. Further, the BLM is required to comply with applicable wilderness and wilderness study area policies when implementing any actions in such areas. The BLM has a robust monitoring program for terrestrial and aquatic conditions and trends across BLM-managed ***land***. The data collected through this rigorously applied program allows the BLM to monitor the effects of the actions of the type to be included in the CX. There is nothing in this CX that precludes the inclusion of site-specific monitoring for a proposed action. The BLM can include additional monitoring parameters in a proposed action approved in reliance on this CX when it would be appropriate to do so. Furthermore, maintenance of the effectiveness of treatments or re-treatments is important and can be included in any proposed action approved in reliance on the CX. Comment: The BLM received comments that stated that the BLM's proposed CX does not incorporate the provisions relating to the management of mule deer and sage-grouse habitat established for it through the 2018 Farm Bill, and that the BLM must be consistent with the defined actions identified in the law. Response: The 2018 Farm Bill CX directed by Congress is a distinct and different CX from this BLM administratively established CX. The guidelines and maps referenced in the 2018 Farm Bill CX are useful tools for the BLM but are not the only means to identify mule deer or sage-grouse habitat. Under the Federal ***Land*** Policy and Management Act (FLPMA), the BLM manages the public ***land*** according to LUPs developed for specific planning areas, and all actions taken must conform to the applicable LUP. LUPs in areas of mule deer or sage-grouse habitat generally address desired conditions for these habitats and prescribe the constraints under which actions must take place to meet those conditions in the planning area. Here, any action taken, regardless of level of NEPA review (CX, EA, EIS) must be conducted in conformance with the applicable LUP (which addresses where the needs of the different habitats may conflict), and reliance on the CX requires that the project be conducted to benefit mule deer or sage-grouse habitat. Comment: The BLM received comments that stated that the BLM's proposed CX violates the provisions of the 2018 Farm Bill by excluding actions allowed through the 2018 Farm Bill such as the use of non-native seeding, chaining, herbicide application, and temporary road construction, and that the BLM must be consistent with the defined actions identified in the law. Response: The 2018 Farm Bill CX directed by Congress is a distinct and different CX from this BLM administratively established CX. The scope of actions included in the 2018 Farm Bill CX directed by Congress is different than the scope of actions included in this CX developed in response to Secretary's Order 3356. For example, the only element of the 2018 Farm Bill CX that allows for the use of non-native seedings is for the purpose of emergency stabilization, which is not an action covered by this CX. The other actions included in the 2018 Farm Bill CX but not the proposed CX were deemed to be beyond the scope of the agency's objectives for this CX.Categorical Exclusion The Department and the BLM find the category of actions described in the CX normally does not have a significant effect on the quality of the human environment. This finding is based on the analysis and information presented in the Verification Report to establish this CX. The BLM's review of the available literature demonstrates that the activities covered by this CX would not cause significant environmental effects. As discussed in the Methods section of the Verification Report, the BLM has analyzed the effects of many PJ ***removal*** projects in EAs and has monitored post-implementation results. All associated NEPA documents were reviewed to determine the scope of environmental consequences anticipated to result from the proposed actions. There were no instances where any of the evaluated projects would have resulted in a need to complete an EIS. Often, through application of design features, environmental effects are minimized to the degree that resource issues were eliminated from further analysis due to application of these project elements. While long-term benefits of reducing fuel loading and improving sagebrush-steppe habitats (PJ treatments) are primarily beneficial, neutral, or result in no effect findings, there are documented instances of adverse, residual environmental consequences associated with implementation of these treatments. The BLM has concluded that these environmental consequences are not significant based on the EA analyses, which are summarized by resources in the Methods section of the Verification Report for soil disturbance, soil moisture, invasive plants, wildlife, PJ obligate species, visual resource, big game species, wilderness characteristics, cultural artifacts, tribal resources, air quality, and biomass. These conclusions have been validated by post-implementation observation of professional ***land*** managers. In addition to the BLM's review of completed EAs and projects as implemented, the BLM's review of the available scientific literature demonstrates that the activities covered by this new CX would not normally cause significant environmental effects. As discussed in detail in the Verification Report Methods section, the research overwhelmingly shows that PJ ***removal*** restores ecosystem values associated with the rebound of native shrubs (including sagebrush), perennial grasses, and forbs, even when there may be a component of non-native forbs and annual grasses. Despite the expectation that annual grasses (e.g , exotics like cheatgrass) often increase after PJ treatment, the current literature shows that the native plant communities reestablish after mechanical PJ ***removal*** treatments, becoming dominant (over nonnative species) either within the first growing season after treatment or within a few years. The BLM's experience with implementing and monitoring these types of projects mirrors the scientific literature; taken together, they support establishment of this CX, providing the evidence that this type and scope of PJ ***removal*** treatment can be categorically excluded from further detailed analysis. As described in detail in the Verification Report, establishment of this new CX would not have significant impacts on the human environment, and its use, like that of other administratively established CXs, would be subject to extraordinary circumstances review. The intent of this CX is to improve the efficiency of the environmental review process for the management of PJ for the benefit of mule deer and sage-grouse habitat. Each proposed action must be reviewed for extraordinary circumstances that could preclude the[[Page 79517]]use of this CX. The list of extraordinary circumstances under which a normally excluded action would potentially require further analysis and documentation to determine whether preparation of an EA or EIS is necessary is found at 43 CFR 46.215 If a proposed PJ management project is within the activity described in this CX, then these ``extraordinary circumstances'' will be considered in the context of the proposed project to determine if there are circumstances that lessen the impacts or other conditions sufficient to avoid significant effects, or they indicate the potential for effects that merit additional consideration in an EA or EIS. If any of the extraordinary circumstances indicate such potential, the CX would not be used, and an EA or EIS would be prepared.Amended Text for the Departmental Manual 516 DM 11 at Section. 11.9 J. Habitat Restoration: (1) Covered actions on up to 10,000 acres (contiguous or non-contiguous) within sagebrush and sagebrush-steppe plant communities to manage pinyon pine and juniper trees for the benefit of mule deer or sage-grouse habitats. For the purpose of this CX, habitat for mule deer or sage-grouse is any area on BLM-managed ***land*** that is currently or formerly occupied by mule deer or sage-grouse, or is reasonably likely to be occupied if pinyon pine or juniper trees are removed. Covered actions include: Manual or mechanical cutting (including lop-and-scatter); mastication and mulching; yarding and piling of cut trees; pile burning; seeding or manual planting of seedlings of native species; and ***removal*** of cut trees for commercial products, such as sawlogs, specialty products, or fuelwood, or non-commercial uses. Such activities: (a) Shall not include: Cutting of old-growth trees; seeding or planting of non-native species; chaining; pesticide or herbicide application; broadcast burning; jackpot burning; construction of new temporary or permanent roads; or construction of other new permanent infrastructure. (b) Shall require inclusion of project design features providing for protections of the following resources and resource uses consistent with the decisions in the applicable ***land*** use plan in the documentation of the categorical exclusion. If no ***land*** use plan decisions apply, documentation of the categorical exclusion shall identify how the following resources and resource uses are to be appropriately addressed: (i) Specifications for management of mule deer habitat; (ii) Specifications for management of sage-grouse habitat; (iii) Specifications for erosion control measures; (iv) Criteria for minimizing or remedying soil compaction; (v) Types and extents of logging system constraints (e.g , seasonal, location, extent); (vi) Extent and purpose of seasonal operating constraints or restrictions; (vii) Criteria to limit spread of weeds; (viii) Size of riparian buffers or riparian zone operating restrictions; and (ix) Operating constraints and restrictions for pile burning. Authority: NEPA, the National Environmental Policy Act of 1969, as amended (42 U.S.C 4321 et seq.); E.O 11514, March 5, 1970, as amended by E.O 11991, May 24, 1977; and CEQ regulations (40 CFR 1500-1508).Stephen G. Tryon,Director, Office of Environmental Policy and Compliance.[FR Doc. 2020-27158 Filed 12-9-20; 8:45 am]BILLING CODE 4331-84-P

**Load-Date:** December 11, 2020

**End of Document**



[***House of Commons - 9:20 PM GMT***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60D6-T7S1-DY08-30FJ-00000-00&context=1516831)

TVEyes - BBC Parliament

July 20, 2020 Monday

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**Section:** U.K. NATIONAL

**Length:** 845 words

**Highlight:** Live proceedings of the House of Commons.

**Body**

**Speech to text transcript:**[[2]](#footnote-3)1

Brazil. Between January and March alone, Amazon deforestation was up 51% compared to Lester, roughly the size of New York City. In April, it was up 71%. It's not just the places that we hear most about, just one example, in May, in Thailand from eight men were arrested for the ***removing*** a rosewood tree from a wildlife century, that tree loans with $17,000. Poaching a pause on patrols and nature reserves and indigenous territories combined with mass job losses are seen as driving this increase in illegal logging. It will happily give way.

The press and the media are full of these stories. I noticed over the weekend, one of the stories that was going, that they don't have the finances any more to actually pay for the... Is it the right honourable gentleman's intention to ask the Minister perhaps to look at helping them finance that so they can then pay the Rangers to police the parks and thereby reserve and protect the animals. The honourable generally makes an important. -- important point. That's one of the things I would like to see this country do. I will come back to that just a moment. It is because we do have a significant aid budget in this country, Madam Deputy Speaker, and though we have financial pressures at home, and although there are particular challenges even with the budget link to our national income, the fact is I do think we need to act on these threats, both for the short term and the long-term. In the short term, improving the support we provide for conservation projects, as the honourable gentleman rightly says coming can help communities affected by job losses and coronavirus. They can help prevent the people turning to poaching and illegal trafficking to make up for lost income. We need to prevent those crimes from being from a friendly, the only way you can keep your family on the straight and narrow, keep your family alive and keep them fed. Of course my matters for the long-term as well. Because biodiversity gains and sustainable development projects will contribute to global efforts to reduce carbon ***emissions*** to keep global temperatures down. So we have to also make sure that we look after conservation for all of our futures as well. That's why my message to the Minister tonight is I want the government to ensure the support that we provide for conservation projects and in particular right now and ecotourism is nonexistent, the support we provide for habitat restoration is sustained and increased in the coming years. I think habitat restoration is one of the things we have right now that has long-term and short-term impact. So I want to step up the support and other ***forest*** areas where they have been lost in the past. I know it can be done, I have seen it done, helping poorer countries restore ***forest*** areas, but I just ***forest***, also mangrove swamps for example can direct economic benefits for the surrounding communities through poverty alleviation, improving food security and also, of course, providing opportunities for recreation and tourism. In some places, the moderation of extreme events. Equally importantly, spending money restoring natural habitats provides a refuge for endangered species, and the risk of biodiversity. Around 80-90% of Madagascar's animal and plant species is... It's a real garden of Eden still, but it's lost over a fifth of its tree cover since 2001, driven primarily by ***agricultural*** expansion. That process of habitat loss needs to be reversed, and if we restore issued ***land*** restoration and diversify what they do come everyone benefits, that's where our budgets can play a dual role in helping to root you might alleviate poverty and creating economic opportunity but also, crucially, looking after biodiversity and natural terrain. The Minister of course knows we actually have a good track record in this country, it's not like we're doing nothing in this area, we are doing plenty. The UK is contributed to the creation of nature protection zones across the world from equivalent to the size of Brazil. Partnership working Indonesia choose attacked the Sumatran Tigers has helped create 60,000 jobs. To counter deforestation and boost ***forest*** and biodiversity conservation, the partnership with ***forests*** and supporting the RSP B and local conservation partners in Liberia. -- to develop a market for ***forest*** friendly cocoa. Madam Deputy Speaker, I think right now, it is still time for us to step up to the plate even more, and I know this year the drop in GDP will affect our aid budgets, but they have also been rising steadily in recent years, and so we do I think have the scope to focus more effort onto conservations projects. It's in our national interest to do so for Sophos --. And I commend our right honourable friend for this debate this evening, it's extremely relevant and vital at this time. Does he agree with me that the aid budget should be used across the world, particularly in some of our British Overseas

**Load-Date:** July 20, 2020

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[***Advanced biofuels show real promise for replacing some fossil fuels***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60RH-RJX1-F0YC-N3YW-00000-00&context=1516831)

Impact News Service

September 1, 2020 Tuesday

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**Length:** 1183 words

**Body**

London: Lancaster University, UK Government has issued the following news release:

Biofuel and bioenergy systems are integral to scenarios for displacing fossil fuel use and producing negative ***emissions*** through carbon capture and storage. But the net greenhouse gas mitigation benefit of these systems has been controversial, due to concerns around carbon losses from changes in ***land*** use and foregone sequestration benefits from alternative ***land*** uses.

A new study led by Colorado State University - involving an interdisciplinary team of plant scientists, ecologists and engineers, including Professor Steve Long of Lancaster Environment Centre – has predicted significant climate benefits stemming from the use of advanced biofuel technologies. Accounting for all of the carbon flows in biofuel systems and comparing them to those in grasslands and ***forests***, the team found that there are clear strategies for biofuels to have a net carbon benefit.

One of the first studies to look at both current and future carbon-negative biofuels, ‘Robust paths to net greenhouse gas mitigation and negative ***emissions*** via advanced biofuels’, has been published inProceedings of the National Academy of Sciences.

Professor Long said: “About 70% of plant biomass including crop and forestry wastes is made of celluloses, polymers of sugars, which if released may then be fermented and processed to advanced biofuels, including jet fuelsand degradable bio-products.Nature has found a multitude of ways to release these sugars from celluloses, and it is only a matter of time and effort, before these can be harnessed industrially in a viable way.

“New technologies always attract their critics and as former Speaker of the US House of Representatives, Sam Rayburn, said: “Any jackass can kick down a barn, but it takes a good carpenter to build one.”However, in the case of cellulosic fuels, the kicking started as soon as the first piece of wood was in place, such was the threat of this realizable source to the status quo.Here we provide the quantitatively reasoned case as to why development should continue, not simply as a means to provide a truly renewable source of biofuel but, when combined with carbon capture and storage, a means to actually ***remove*** CO2 from the atmosphere at scale and in a viable manner.”

Dr John Field, research scientist at Colorado State University, said that it has been a challenge for the biofuel industry to demonstrate commercial viability for cellulosic biofuels, created using nonedible parts of plants. Switchgrass, a native grass that grows in many parts of North America, is a leading candidate for the sustainable production of plant material.

The research team used modelling to simulate switchgrass cultivation, cellulosic biofuel production and carbon capture and storage, tracking ecosystem and carbon flows. Scientists then compared this modelling to alternative ways to store carbon on the ***land***, including growing ***forest*** or grassland.

Carbon capture and storage technology is being used by at least one facility in Illinois that is processing corn as a conventional biofuel to create ethanol, but these systems are not yet widespread. As part of the study, researchers created models to simulate what this would look like at a cellulosic biofuel refinery.

'What we found is that around half of the carbon in the switchgrass that comes into the refinery becomes a by-product that would be available for carbon capture and storage,' said Dr Field. The resulting by-product streams of high-purity carbon dioxide would not require much separation or clean-up before being stored underground.

The research team analysed three contrasting U.S case studies and found that on ***land*** where farmers or ***land*** managers were transitioning out of growing crops or maintaining pastures for grazing, cultivating switchgrass for cellulosic ethanol production had a per-hectare mitigation potential comparable to reforestation and several-fold greater than grassland restoration.

Using switchgrass can be particularly helpful in parts of the country where planting more trees is not an option.

'In the (American) Great Plains, prairie is the more natural cover,' said Dr Field. 'Those systems don't suck up as much carbon as a ***forest*** system does. If you start putting biofuels in the mix, they have two-and-a-half times the carbon benefits over grasslands. If you're in an area where grassland would be the native cover, there's a clear advantage to using biofuels.'

Scientists said because of the current delays in tackling climate change, it's imperative to take a more proactive stance on biofuels and other negative ***emissions*** technologies if countries like the U.S want to limit the impacts of global warming to 1.5 degrees Celsius above pre-industrial levels.

'If we want to hit that goal, we really have to deploy alternatives to fossil fuel use as quickly as we can,' said Dr Field. There is also a need to clean up carbon pollution from the atmosphere and walk back historic ***emissions***, he added.

Cleaning up carbon pollution is an idea that has been widely discussed since the Paris Agreement was established within the United Nations Framework Convention on Climate Change in 2016.

There are different ways to accomplish this clean-up, with the simplest idea to grow trees to store more carbon on the ***land***.

Other alternatives are outlined and analysed in the study, including the use of carbon-negative biofuels. Plants pull carbon out of the atmosphere to grow and the carbon is used to build plant tissues.

If that plant material is harvested and converted to energy, some of the resulting carbon dioxide byproduct can be captured and pumped underground into storage in depleted oil wells or other geological formations, instead of sending it back into the atmosphere.

Likewise, cellulosic biofuels are attractive because they could help reduce fossil fuel use in aviation, shipping and trucking, all fields that are challenging to move to electricity.

Moving forward, the research team hopes to expand on its modelling, scaling it up.

'A lot of the pieces for future use of advanced biofuels exists at some small scale,' said Dr Field. 'The trick is putting all of these pieces together and making sure we continue to have support so it can thrive and take off, even when gas prices are relatively low, like now.'

This research was funded in part by the National Institute of Food and ***Agriculture*** - U.S Department of ***Agriculture***, the U.S Department of Energy via the Center for Bioenergy Innovation, and the São Paulo Research Foundation in Brazil.

Additional study co-authors including Tom Richard and Erica Smithwick (The Pennsylvania State University), Hao Cai and Michael Wang (Argonne National Laboratory), Mark Laser (Dartmouth College), David LeBauer (University of Arizona), Stephen Long (University of Illinois at Urbana-Champaign, Lancaster University), Keith Paustian (CSU), Zhangcai Qin (Argonne National Laboratory, Sun Yat-sen University, Southern Marine Science and Engineering Guangdong Laboratory), John Sheehan (University of Campinas, CSU) and Pete Smith (University of Aberdeen).

**Load-Date:** September 2, 2020

**End of Document**



[***USDA Announces Targeted Signup Period to Support Climate-Smart Agriculture and Forestry in Georgia***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6314-6JH1-JDG9-Y3CN-00000-00&context=1516831)

Impact News Service

June 24, 2021 Thursday

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**Length:** 849 words

**Body**

Washington: US Department of ***Agriculture*** has issued the following news release:

The U.S Department of ***Agriculture*** (USDA) is holding a ***targeted*** signup to support climate-smart ***agriculture*** and forestry through voluntary conservation practices in 10 states, including Georgia. This assistance, available through theEnvironmental Quality Incentives Program (EQIP), will help ***agricultural*** producers plan and implement voluntary conservation practices that sequester carbon, reduce greenhouse gas ***emissions*** and mitigate the impacts of climate change on working ***lands***.

Signup in Georgia opens on June 24, 2021 with an application deadline of July 15, 2021. USDA’s Natural Resources Conservation Service (NRCS), which administers EQIP, selected states based on demonstrated demand for additional support for climate-smart practices. This pilot approach will be expanded through a comprehensive effort across all states and programs to support farmers, ranchers and ***forest*** landowners in fiscal year 2022.

“***Agricultural*** producers are the best stewards of our ***lands*** and waters, and they play a critical role in climate change mitigation,” said Terrance O. Rudolph, state conservationist for NRCS in Georgia. “We will use this EQIP signup to deliver support for implementing critical climate-smart conservation practices to our producers. By working with our partner groups across the state, we are striving to ensure funds are equitably distributed, including to our historically underserved producers. ”

EQIP and ***Targeted*** Climate Change Mitigation

Through EQIP, NRCS provides ***agricultural*** producers and landowners with financial assistance and one-on-one technical support to plan and implement voluntary conservation practices. The outcomes are a benefit for producers and the environment, with producers conserving natural resources and delivering environmental benefits while building resiliency to strengthen their working ***land***.

While NRCS offers a broad array of conservation practices, the agency identifies a sub-set as critical for reducing greenhouse gas ***emissions***, sequestering carbon and ultimately mitigating the impacts of climate change. These climate-smart conservation practices will be prioritized in this ***targeted*** EQIP signup period and support systems for:

* Building soil health.

1. Improving nitrogen management.
2. Enhancing grazing and pasture management.
3. Improving agroforestry, forestry and upland wildlife habitat.

Producers can visitNRCS’s EQIP webpagefor a list of the specific climate-smart conservation practices and are encouraged to contact the NRCS office at theirlocal USDA Service Centerfor more information about priority conservation practices in Georgia.

In addition to Georgia, producers in Arkansas, Florida, Michigan, Minnesota, Mississippi, Montana, North Carolina, Pennsylvania and Wisconsin can also apply for this current funding opportunity.

How to Apply

NRCS will rank applications for funding based on expected climate change mitigation benefits. Producers can contact the NRCS office at theirlocal USDA Service Centerto learn more about the selection process for awarding contracts. Priority conservation categories in Georgia include soil health, nutrient management, livestock, forestry, and wildlife management.

Additional information about this ***targeted*** EQIP signup is available atnrcs.usda.gov/eqip. Georgia producers and landowners are encouraged to work with their local NRCS office to begin the application process and submit all application materials by July 15, 2021. USDA encourages historically underserved producers and landowners to apply and will work with partner groups to ensure funds are equitably distributed. While certain USDA offices may be closed to visitors because of the pandemic, Service Center staff continue to work with ***agricultural*** producers via phone, email and other digital tools.

Under the Biden-Harris Administration, USDA is engaged in a whole-of-government effort to combat the climate crisis and conserve and protect our nation’s ***lands***, biodiversity and natural resources including our soil, air and water. Through conservation practices and partnerships, USDA aims to enhance economic growth and create new streams of income for farmers, ranchers, producers and private foresters. Successfully meeting these challenges will require USDA and our agencies to pursue a coordinated approach alongside USDA stakeholders, including State, local and Tribal governments.

USDA touches the lives of all Americans each day in so many positive ways. In the Biden-Harris Administration, USDA is transforming America’s food system with a greater focus on more resilient local and regional food production, fairer markets for all producers, ensuring access to healthy and nutritious food in all communities, building new markets and streams of income for farmers and producers using climate smart food and forestry practices, making historic investments in infrastructure and clean energy capabilities in rural America, and committing to equity across the Department by ***removing*** systemic barriers and building a workforce more representative of America.

**Load-Date:** June 27, 2021

**End of Document**



[***USDA Announces Targeted Signup Period to Support Climate-Smart Agriculture and Forestry in Mississippi***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6314-6JH1-JDG9-Y3CT-00000-00&context=1516831)

Impact News Service

June 24, 2021 Thursday

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**Length:** 862 words

**Body**

Washington: US Department of ***Agriculture*** has issued the following news release:

The U.S Department of ***Agriculture*** (USDA) is holding a ***targeted*** signup to support climate-smart ***agriculture*** and forestry through voluntary conservation practices in 10 states, including Mississippi. This assistance, available through theEnvironmental Quality Incentives Program (EQIP), will help ***agricultural*** producers plan and implement voluntary conservation practices that sequester carbon, reduce greenhouse gas ***emissions*** and mitigate the impacts of climate change on working ***lands***.

Signup in Mississippi opens on June 24, 2021 with an application deadline of July 16, 2021. USDA’s Natural Resources Conservation Service (NRCS), which administers EQIP, selected states based on demonstrated demand for additional support for climate-smart practices. This pilot approach will be expanded through a comprehensive effort across all states and programs to support farmers, ranchers, and ***forest*** landowners in fiscal year 2022.

“***Agricultural*** producers are the best stewards of our ***lands*** and waters, and they play a critical role in climate change mitigation,” said Kurt Readus, NRCS State Conservationist in Mississippi. “We will use this EQIP signup to deliver support for implementing critical climate-smart conservation practices to our producers. By working with our partner groups across the state, we are striving to ensure funds are equitably distributed, including to our historically underserved producers. ”

EQIP and ***Targeted*** Climate Change Mitigation

Through EQIP, NRCS provides ***agricultural*** producers and landowners with financial assistance and one-on-one technical support to plan and implement voluntary conservation practices. The outcomes are a benefit for producers and the environment, with producers conserving natural resources and delivering environmental benefits while building resiliency to strengthen their working ***land***.

While NRCS offers a broad array of conservation practices, the agency identifies a sub-set as critical for reducing greenhouse gas ***emissions***, sequestering carbon, and ultimately mitigating the impacts of climate change. These climate-smart conservation practices will be prioritized in this ***targeted*** EQIP signup period and support systems for:

* Building soil health.

1. Improving nitrogen management.
2. Improving livestock waste management systems.
3. Enhancing grazing and pasture management.
4. Improving agroforestry, forestry, and upland wildlife habitat.
5. Improving conservation management for rice production.

Producers can visitNRCS’s EQIP webpagefor a list of the specific climate-smart conservation practices and are encouraged to contact the NRCS office at theirlocal USDA Service Centerfor more information about priority conservation practices in Mississippi.

In addition to Mississippi, producers in Arkansas, Florida, Georgia, Michigan, Minnesota, Montana, North Carolina, Pennsylvania, and Wisconsin can also apply for this current funding opportunity.

How to Apply

NRCS will rank applications for funding based on expected climate change mitigation benefits. Producers can contact the NRCS office at theirlocal USDA Service Centerto learn more about the selection process for awarding contracts. Priority conservation categories in Mississippi include Soil Health, Grazing, and Forestry.

Additional information about this ***targeted*** EQIP signup is available atnrcs.usda.gov/eqip. Mississippi producers and landowners are encouraged to work with their local NRCS office to begin the application process and submit all application materials by July 16, 2021. USDA encourages historically underserved producers and landowners to apply and will work with partner groups to ensure funds are equitably distributed. While certain USDA offices may be closed to visitors because of the pandemic, Service Center staff continue to work with ***agricultural*** producers via phone, email, and other digital tools.

Under the Biden-Harris Administration, USDA is engaged in a whole-of-government effort to combat the climate crisis and conserve and protect our nation’s ***lands***, biodiversity and natural resources including our soil, air, and water. Through conservation practices and partnerships, USDA aims to enhance economic growth and create new streams of income for farmers, ranchers, producers, and private foresters. Successfully meeting these challenges will require USDA and our agencies to pursue a coordinated approach alongside USDA stakeholders, including State, local and Tribal governments.

USDA touches the lives of all Americans each day in so many positive ways. In the Biden-Harris Administration, USDA is transforming America’s food system with a greater focus on more resilient local and regional food production, fairer markets for all producers, ensuring access to healthy and nutritious food in all communities, building new markets and streams of income for farmers and producers using climate smart food and forestry practices, making historic investments in infrastructure and clean energy capabilities in rural America, and committing to equity across the Department by ***removing*** systemic barriers and building a workforce more representative of America.

**Load-Date:** June 27, 2021

**End of Document**



[***Federal Register: Payment Limitation and Payment Eligibility Pages 52033 - 52041 [FR DOC #2020-18148]***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60NT-GPY1-JDG9-Y4BK-00000-00&context=1516831)

Impact News Service

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**Body**

Washington: Office of the Federal Register has issued the following notice:DEPARTMENT OF AGRICULTURECommodity Credit Corporation7 CFR Part 1400[Docket ID CCC-2019-0007]RIN 0560-AI49Payment Limitation and Payment EligibilityAGENCY: Commodity Credit Corporation and Farm Service Agency, USDA.ACTION: Final rule.-----------------------------------------------------------------------SUMMARY: This rule implements the mandatory changes required by the ***Agriculture*** Improvement Act of 2018 (2018 Farm Bill) and other changes made by the Farm Service Agency (FSA) on behalf of CCC. Specifically, the mandatory changes update program applicability and payment limitations; and specify that the Secretary may approve a waiver of the average adjusted gross income (AGI) limitation for participants of certain conservation contracts administered by FSA and the Natural Resources Conservation Service (NRCS) on environmentally sensitive ***land***. Also, the mandatory changes expand the definition of ``family member'' to include first cousins, nieces, and nephews. This rule also includes changes that make minor clarifications and updates throughout part 1400.DATES: Effective: August 20, 2020.FOR FURTHER INFORMATION CONTACT: Paul Hanson, telephone: (202) 720-4189, email: [*paul.hanson@usda.gov*](mailto:paul.hanson@usda.gov) Persons with disabilities who require alternative means for communication should contact the USDA ***Target*** Center at (202) 720-2600 (voice).SUPPLEMENTARY INFORMATION:Background This rule amends 7 CFR part 1400 to implement changes made by the 2018 Farm Bill; (Pub. L. 115-334) as well as makes certain changes, as explained below. This rule updates the applicable programs and payment limitations in 7 CFR 1400.1 to reflect current policy and changes made by the 2018 Farm Bill. FSA administers the regulations in 7 CFR part 1400 on behalf of CCC.Payment Limitations The 2018 Farm Bill and this rule create two separate payment limitations for the Noninsured Crop Disaster Assistance Program (NAP). Previously, a person or legal entity was subject to a $125,000 payment limitation regardless of the level of NAP coverage obtained. For 2019 and subsequent years, the 2018 Farm Bill provides a separate per crop year maximum per person and legal entity limitation of either $125,000 for payments to those who purchased basic 50/55 NAP coverage or $300,000 for payments to those who purchased buy-up coverage. The 2018 Farm Bill increased the payment limitation for the Emergency Conservation Program (ECP) to $500,000 per program per disaster event. The 2018 Farm Bill officially removed LDPs and MLGs from the combined payment limit. This rule ***removes*** the payment limits for Marketing Loan Gains (MLG), Loan Deficiency Payments (LDP), and the Emergency Assistance for Livestock, Honeybees and Farm Raised Fish Program (ELAP) as mandated by the 2018 Farm Bill (section 1703(a)(2) and section 1501(e) respectively).Waiver of AGI Limitation for Environmentally Sensitive ***Land*** of Special Significance The 2018 Farm Bill does not change the AGI limitation of $900,000 for certain programs; however, it does authorize the Secretary to waive the AGI limitation for participants of certain conservation contracts administered by FSA or NRCS when the Secretary determines that environmentally sensitive ***land*** of special significance will be protected because of the waiver. The waiver authority allows FSA and NRCS the discretion, on a case-by-case basis, to provide benefits to producers who may not otherwise meet the AGI[[Page 52034]]requirements on environmentally sensitive ***land*** of special significance. This rule defines ``environmentally sensitive ***land*** of special significance'' in Sec. 1400.3 FSA and the NRCS identified specific critical resources warranting protection through enrollment in its definition. This rule also adds provisions in Sec. 1400.500(f) to specify how a request for a waiver must be submitted and what it must include.Definition of Family Member FSA is expanding the definition of ``family member'' as mandated by the 2018 Farm Bill to include first cousin, niece, and nephew. This change expands the definition to allow farming operations to qualify for additional payment limitations for an existing farming operation under the rules for a substantive change, which are specified in Sec. 1400.104 Furthermore, joint operations that included a first cousin, niece, or nephew were previously determined to be farming operations comprised of non-family members. With this change, a joint operation comprised of the newly expanded definition of family members would no longer be subject to the limitation of members qualifying on a management contribution alone, which increases the number of additional individuals eligible for payment within joint operations comprised solely of family members.Other Changes This rule makes several changes to the definitions in 7 CFR 1400.3 This rule amends the definitions of ``active personal management,'' and ``significant contribution'' as it relates to management in 7 CFR 1400.3 and ***removes*** the definitions of ``active personal management,'' ``significant contribution of active personal management,'' and ``significant contribution of the combination of active personal labor and active personal management'' previously in subpart G so that consistent definitions of the terms are used throughout part 1400. This rule also makes minor clarifications to the terms ``interest in the farming operation'' and ``lawful alien.'' It adds a new definition of ``livestock'' for the purposes of part 1400, for which ``livestock'' includes animals that are considered eligible livestock under the Livestock Indemnity Program (LIP). This change is intended to clarify which species qualify as livestock and ensure that the animals considered to be ``livestock'' under part 1400 is consistent with the administration of other FSA programs. This rule moves the provisions for revocable trusts from Sec. 1400.100 (subpart B, Payment Limitation) to Sec. 1400.7 (subpart A, General Provisions) because they are general provisions applicable to all of part 1400 and not just to the payment limitation provisions. This rule amends the provisions in Sec. 1400.102 to clarify that the policy that a state or political subdivision or one of its agencies is not eligible for payments or benefits under the programs in Sec. 1400.1 This rule also clarifies that the exception in Sec. 1400.102(b) applies only to payments or benefits under the ***Agriculture*** Risk Coverage (ARC) and Price Loss Coverage (PLC) programs. This rule amends Sec. 1400.104(a) to ***remove*** the reference to ``legal entities.'' This change aligns the regulation with current language in the 2018 Farm Bill. This rule amends Sec. 1400.104(a)(3) to ***remove*** ``base acres'' and add ``***land*** used for ***agricultural*** production.'' The addition of 20 percent or more ***land*** used for ***agricultural*** production will be recognized as a substantive change in the farming operation and will take into consideration ***land*** used for annual crop production as well as grazing ***lands***. This rule is making a change in amending Sec. 1400.104(a)(5) to specify that a change in ownership by sale or gift of livestock can be recognized as a substantive change in the farming operation, in addition to a sale or gift of ***land***, which already exists in the rule, such that the sale or gift of livestock can result in the application of additional payment limits under 7 CFR part 1400. The addition of livestock as an element for consideration used in determining whether a substantive change has occurred takes into consideration all of the aspects of a farming operation including but not limited to ***land*** but also livestock and the value of the ***land*** or livestock to a farming operation. Further, this change is appropriate as substantive change rules apply to all programs subject to payment limitation, including Livestock Forage Disaster Program (LFP). This rule amends Sec. 1400.106 to specify that payment limitations apply to both direct and indirect payments, subject to the attribution provisions in Sec. 1400.105 This change is a clarification of and therefore codification of current policy and does not alter the way FSA applies payment limitations. This rule moves the cash rent tenant provisions of subpart D to subpart C, in Sec. 1400.214, which contains the payment eligibility requirements. This rule makes a technical correction to the provision in the regulation that indicated a legal entity's or joint operation's eligible capital, ***land***, or equipment could not be acquired as a result of a loan made to, guaranteed by, cosigned by, or secured by any person, legal entity or joint operation that has an interest in the farming operation, including the legal entity's or joint operation's members. The technical correction ***removes*** the legal entity's or joint operation's members from the provision and relies on ``interest in the farming operation'' to define the qualifying contribution. This rule makes minor changes to update the regulatory language throughout part 1400. These changes are intended to make the regulation easier to understand and do not affect program implementation.Effective Date, Notice and Comment, and Paperwork Reduction Act As specified in 7 U.S.C 9091, the regulations to implement the provisions of Title I and the administration of Title I of the 2018 Farm Bill are exempt from the notice and comment provisions of the Administrative Procedure Act (5 U.S.C 553) and the Paperwork Reduction Act (in 44 U.S.C chapter 35). Section 9091 further directs the Secretary to use the authority in 5 U.S.C 808 related to congressional review and delay in the effective date. The Administrative Procedure Act (5 U.S.C.553) provides that the 30-day delay in the effective date provision does not apply when the rule involves specified actions, including matters relating to benefits. This rule governs the eligibility provisions for programs providing benefits to farmers and ranchers and therefore that exemption applies to this rule. Therefore, this rule is effective upon publication in the Federal Register.Executive Orders 12866, 13563, 13771 and 13777 Executive Order 12866, ``Regulatory Planning and Review,'' and Executive Order 13563, ``Improving Regulation and Regulatory Review,'' direct agencies to assess all costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). Executive Order 13563 emphasized the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. The requirements in Executive Orders 12866 and 13563 for the analysis of costs and benefits apply to rules that are determined to be significant. Executive[[Page 52035]]Order 13777, ``Enforcing the Regulatory Reform Agenda,'' established a federal policy to alleviate unnecessary regulatory burdens on the American people. The Office of Management and Budget (OMB) designated this rule as significant under Executive Order 12866 and therefore, OMB reviewed this rule. The costs and benefits of this rule are summarized below. The full cost benefit analysis is available on regulations.gov. Executive Order 13771, ``Reducing Regulation and Controlling Regulatory Costs,'' requires that, in order to manage the costs required to comply with Federal regulations, that for every new significant or economically significant regulation issued, the new costs must be offset by savings from deregulatory actions. OMB guidance in M-17-21, dated April 5, 2017, specifies that ``transfers'' are not covered by Executive Order 13771.Cost Benefit Analysis Summary The cost benefit analysis evaluated changes to payment limits and payment eligibility mandated by the 2018 Farm Bill along with two other changes the rule is making in the regulation. This rule implements those changes by amending the regulations in 7 CFR part 1400. We estimate that the changes will increase Farm Program outlays by about $21.2 million per year. The largest increases are from elimination of the payment limit for ELAP and a new separate payment limit for those producers who choose buy-up coverage under NAP.Regulatory Flexibility Act The Regulatory Flexibility Act (5 U.S.C 601-612), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA, Pub. L. 104-121), generally requires an agency to prepare a regulatory flexibility analysis of any rule whenever an agency is required by the Administrative Procedure Act or any other law to publish a proposed rule, unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. This rule is not subject to the Regulatory Flexibility Act because USDA is not required by Administrative Procedure Act or any law to publish a proposed rule for this rulemaking.Environmental Review The environmental impacts of this final rule have been considered in a manner consistent with the provisions of the National Environmental Policy Act (NEPA, 42 U.S.C 4321-4347), the regulations of the Council on Environmental Quality (40 CFR parts 1500-1508), and the FSA regulations for compliance with NEPA (7 CFR part 799). FSA has determined that the provisions identified in this final rule are administrative in nature, intended to clarify the mandatory requirements of the programs, as defined in the 2018 Farm Bill, and do not constitute a major Federal action that would significantly affect the quality of the human environment, individually or cumulatively. As this rule presents administrative clarifications only, it is categorically excluded under Sec. 799.31(3)(i)) issuing minor technical corrections to regulations, handbooks, and internal guidance, as well as amendments to them; therefore, FSA will not prepare an environmental assessment or environmental impact statement for this regulatory action.Executive Order 12372 Executive Order 12372, ``Intergovernmental Review of Federal Programs,'' requires consultation with State and local officials that would be directly affected by proposed Federal financial assistance. The objectives of the Executive Order are to foster an intergovernmental partnership and a strengthened Federalism, by relying on State and local processes for State and local government coordination and review of proposed Federal financial assistance and direct Federal development. For reasons specified in the final rule related notice to 7 CFR part 3015, subpart V (48 FR 29115, June 24, 1983), the programs and activities within this rule are excluded from the scope of Executive Order 12372 which requires intergovernmental consultation with State and local officials.Executive Order 12988 This rule has been reviewed under Executive Order 12988, ``Civil Justice Reform.'' This rule will not preempt State or local laws, regulations, or policies unless they represent an irreconcilable conflict with this rule. The changes mandated by the 2018 Farm Bill were effective for the 2019 crop year. Other changes in this rule will not have retroactive effect. Before any judicial actions may be brought regarding the provisions of this rule, the administrative appeal provisions of 7 CFR parts 11 and 780 must be exhausted.Executive Order 13132 This rule has been reviewed under Executive Order 13132, ``Federalism.'' The policies contained in this rule do not have any substantial direct effect on States, on the relationship between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of government, except as required by law. Nor does this rule impose substantial direct compliance costs on State and local governments. Therefore, consultation with the States is not required.Executive Order 13175 This rule has been reviewed in accordance with the requirements of Executive Order 13175, ``Consultation and Coordination with Indian Tribal Governments.'' Executive Order 13175 requires Federal agencies to consult and coordinate with Tribes on a government-to-government basis on policies that have Tribal implications, including regulations, legislative comments or proposed legislation, and other policy statements or actions that have substantial direct effects on one or more Indian Tribes, on the relationship between the Federal Government and Indian Tribes or on the distribution of power and responsibilities between the Federal Government and Indian Tribes. The USDA Office of Tribal Relations (OTR) has assessed the impact of this rule on Indian Tribes and determined that this rule does have significant Tribal implications. OTR has determined that further Tribal consultation under Executive Order 13175 is not required at this time. Tribal consultation for this rule was included in the 2018 Farm Bill consultation held on May 1-2, 2019, at the National Museum of American Indian, in Washington, DC, and on June 26-27, 2019, in Sparks, NV. The portion of the Tribal consultation relative to this rule was conducted by Bill Northey, USDA Under Secretary for the Farm Production and Conservation mission area, as part of the Title I session. No comments regarding this rule were raised. If a Tribe requests additional consultation, FSA and CCC will work with OTR to ensure meaningful consultation is provided where changes, additions, and modifications are not expressly mandated by law.The Unfunded Mandates Reform Act of 1995 Title II of the Unfunded Mandates Reform Act of 1995 (UMRA, Pub. L. 104-4) requires Federal agencies to assess the effects of their regulatory actions of State, local, and Tribal governments or the private sector. Agencies generally must prepare a written statement, including cost benefits analysis, for proposed and final rules with Federal mandates that may[[Page 52036]]result in expenditures of $100 million or more in any 1 year for State, local or Tribal governments, in the aggregate, or to the private sector. UMRA generally requires agencies to consider alternatives and adopt the more cost effective or least burdensome alternative that achieves the objectives of the rule. This rule contains no Federal mandates, as defined in Title II of UMRA, for State, local and Tribal governments or the private sector. Therefore, this rule is not subject to the requirements of sections 202 and 205 of UMRA.E-Government Act Compliance FSA and CCC are committed to complying with the E-Government Act, to promote the use of the internet and other information technologies to provide increased opportunities for citizen access to Government information and services, and for other purposes.Federal Assistance Programs The title and number of the Federal Domestic Assistance Programs found in the Catalog of Federal Domestic Assistance to which this rule applies are:10.051--Commodity Loans and Loan Deficiency Payments10.069--Conservation Reserve Program10.088--Livestock Indemnity Program10.089--Livestock Forage Disaster Program10.091--Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish Program10.092--Tree Assistance Program10.113--***Agriculture*** Risk Coverage10.112--Price Loss Coverage10.451--Noninsured Assistance10.912--Environmental Quality Incentives Program10.917--***Agricultural*** Management AssistanceList of Subjects in 7 CFR Part 1400 ***Agriculture***, Grant programs--***agriculture***, Loan programs--***agriculture***, Natural resources, Price support programs. For the reasons discussed above, CCC amends 7 CFR part 1400 as follows:PART 1400--PAYMENT LIMITATION AND PAYMENT ELIGIBILITY01. The authority citation continues to read as follows: Authority: 7 U.S.C 1308, 1308-1, 1308-2, 1308-3, 1308-3a, 1308-4, and 1308-5; and Title I, Pub. L. 115-123.Subpart A--General Provisions02. Amend Sec. 1400.1 as follows:0a. Revise paragraph (a)(1);0b. In paragraph (a)(6), ***remove*** the word ``and'';0c. In paragraph (a)(7), ***remove*** the period and add ``; and'' in its place;0d. Redesignate paragraph (a)(8) as paragraph (a)(9);0e. Add new paragraph (a)(8);0f. In newly redesignated paragraph (a)(9), ***remove*** the reference ``Subparts C, D, and G'' and add ``Subparts C and G'' in its place and ***remove*** ``through (7)'' and add ``through (8)'' in its place;0g. In paragraph (b)(1), ***remove*** ``(5),'';0h. In paragraph (b)(3), ***remove*** the reference ``Paragraph (a)(6)'' and add the references ``Paragraphs (a)(5) and (6)'' in its place and ***remove*** the word ``and'' at the end of the paragraph;0i. In paragraph (b)(4), ***remove*** the period and add ``; and'' in its place;0j. Add paragraph (b)(5); and0k. Revise paragraph (f). The additions and revisions read as follows.Sec. 1400.1 Applicability. (a) \* \* \* (1) The ***Agriculture*** Risk Coverage (ARC) and Price Loss Coverage (PLC) Programs, part 1412 of this chapter;\* \* \* \* \* (8) The Emergency Conservation Program (ECP) and Emergency ***Forest*** Restoration Program (EFRP) in part 701 of this title.\* \* \* \* \* (b) \* \* \* (5) Paragraph (a)(8) of this section on a per disaster event basis.\* \* \* \* \* (f) The following amounts are the limitations on payments per person or legal entity for the applicable period for each payment or benefit. Table 1 to Paragraph (f)------------------------------------------------------------------------ Limitation per person or legal Payment or benefit entity ($)------------------------------------------------------------------------(1) Price Loss Coverage, ***Agriculture*** 125,000 per program year. Risk Coverage payments (other than Peanuts).(2) Price Loss Coverage and 125,000 per program year. ***Agriculture*** Risk Coverage payments for Peanuts.(3) CRP annual rental payments........ 50,000 per program year.(4) NAP payments (i) basic 50/55 NAP coverage...... 125,000 per crop year. (ii) Buy-up NAP coverage.......... 300,000 per crop year.(5) LFP............................... 125,000 per program year.(6) CSP \1\........................... 200,000.(7) EQIP \2\.......................... 450,000.(8) AMA program....................... 50,000 per fiscal year.(9) ECP............................... 500,000 per disaster event.(10) EFRP............................. 500,000 per disaster event.------------------------------------------------------------------------\1\ The $200,000 limitation is the total amount a person or legal entity can receive directly or indirectly in the aggregate under all CSP contracts entered into during fiscal years 2019 through 2023.\2\ The $450,000 limitation is the total amount of cost share and incentive payments a person or legal entity can receive directly or indirectly, under all EQIP contracts (excluding Conservation Incentive Contracts) in the aggregate entered into during the period of either: Fiscal years 2014 through 2018, or fiscal years 2019 through 2023.Sec. 1400.2 [Amended]03. Amend Sec. 1400.2 as follows:0a. In paragraph (c) introductory text, ***remove*** the word ``such'' and add the words ``the county'' in its place;0b. In paragraph (c)(1), ***remove*** the word ``such'' and add the word ``the'' in its place;0c. In paragraph (f), ***remove*** the words ``such determinations'' and add the words ``the determinations'' in their place and ***remove*** the words ``such year'' and add the words ``the applicable year'' in their place; and0d. In paragraph (h), ***remove*** the words ``such reviews'' and add ``the reviews'' in their place.[[Page 52037]]04. Amend Sec. 1400.3(b) as follows:0a. Revise the definitions of ``Active personal management'' and ``Capital'';0b. Add the definition of ``Environmentally sensitive ***land*** of special significance'' in alphabetical order;0c. In the definition of ``Equipment'', ***remove*** the words ``Such equipment'' and add the words ``The equipment'' in their place and ***remove*** the words ``such equipment'' each time they appear and add the words ``the equipment'' in their place;0d. In the definition of ``Family member'', ***remove*** the words ``spouse, or'' and add the words ``first cousin, niece, nephew, spouse, or'' in their place;0e. In the definition of ``Farming operation'', ***remove*** the words ``such person'' and add the words ``the person'' in their place;0g. ***Remove*** the definition of ``Interest in a farming operation'';0h. Add the definition of ``Interest in the farming operation'' in alphabetical order;0i. In the definition of ``***Land***'', ***remove*** the word ``Such'' and add the word ``The'' in its place, ***remove*** the words ``If such'' and add the words ``If the'' in their place, and ***remove*** the words ``crop or crop proceeds, such'' and add ``farming operation, the'' in their place;0j. In the definition of ``Lawful alien'', ***remove*** the words ``a valid Alien Registration Receipt Card'' and add the words ``appropriate valid credentials'' in their place;0k. Add the definition of ``Livestock'' in alphabetical order;0l. In the definition of ``Sharecropper'', ***remove*** the words ``such crop'' and add the words ``the crop'' in their place and ***remove*** the words ``the provision of such labor'' and add the word ``work'' in their place; and0m. Revise the definition of ``Significant contribution''. The additions and revisions read as follows:Sec. 1400.3 Definitions.\* \* \* \* \* (b) \* \* \* Active personal management means personally providing and participating in activities considered critical to the profitability of the farming operation and performed under one or more of the following categories: (1) Capital, which includes: (i) Arranging financing and managing capital; (ii) Acquiring equipment; (iii) Acquiring ***land*** or negotiating leases; (iv) Managing insurance; and (v) Managing participation in USDA programs; (2) Labor, which includes hiring and managing of hired labor; and (3) Agronomics and marketing, which includes: (i) Selecting crops and making planting decisions; (ii) Acquiring and purchasing crop inputs; (iii) Managing crops (that is, whatever managerial decisions are needed with respect to keeping the growing crops living and healthy--soil fertility and fertilization, weed control, insect control, irrigation if applicable) and making harvest decisions; and (iv) Pricing and marketing of crop production.\* \* \* \* \* Capital means the funding provided by a person or legal entity to the farming operation for the operation to conduct farming activities. In determining whether a person or legal entity has independently contributed capital, in the form of funding, to the farming operation, the capital must have been derived from a fund or account separate and distinct from that of any other person or legal entity with an interest in the farming operation. Capital does not include the value of any labor or management that is contributed to the farming operation or any outlays for ***land*** or equipment. A capital contribution must be a direct out-of-pocket input of a specified sum or an amount borrowed by the person or legal entity and does not include advance program payments.\* \* \* \* \* Environmentally sensitive ***land*** of special significance means ***land*** offered for enrollment or adjacent to the ***land*** offered for enrollment that contains, or through enrollment will address, critical resources including, but not limited to: (1) Habitat for threatened, endangered, or at-risk species; (2) Historical or cultural resources; (3) Native grasslands; (4) Unique wetlands; (5) Rare, unique, or related soils; and (6) Critical groundwater recharge areas.\* \* \* \* \* Interest in the farming operation means any of the following: (1) Owner, lessor, or lessee of the ***land*** in the farming operation; (2) An interest in the ***agricultural*** products, commodities, or livestock produced by the farming operation; or (3) A member of a joint operation that is an owner, lessor, or lessee of the ***land*** in the farming operation or has an interest in the ***agricultural*** products, commodities, or livestock produced by the farming operation.\* \* \* \* \* Livestock means those animals included in Sec. 1416.304(a) of this chapter.\* \* \* \* \* Significant contribution means the provision of the following to a farming operation: (1) ***Land***, capital, or equipment: (i) For ***land***, capital, or equipment contributed independently by a person or legal entity, a contribution that has a value at least equal to 50 percent of the person's or legal entity's commensurate share of the total: (A) Value of the capital necessary to conduct the farming operation; (B) Rental value of the ***land*** necessary to conduct the farming operation; or (C) Rental value of the equipment necessary to conduct the farming operation; or (ii) If the contribution by a person or legal entity consists of any combination of ***land***, capital, and equipment, the combined contribution must have a value at least equal to 30 percent of the person's or legal entity's commensurate share of the total value of the farming operation. (2) For active personal labor, an amount contributed by a person or members, stockholders, or partners of a legal entity to the farming operation that is described by the smaller of the following: (i) 1,000 hours per calendar year; or (ii) 50 percent of the total hours that would be necessary to conduct a farming operation that is comparable in size to the person's or legal entity's commensurate share in the farming operation. (3) For active personal management, includes activities performed by a person, with a direct or indirect ownership interest in the farming operation or a legal entity, on a regular, continuous, and substantial basis to the farming operation and meets at least one of the following to be considered significant: (i) Performs at least 25 percent of the total management hours required for the farming operation on an annual basis; or (ii) Performs at least 500 hours of management annually for the farming operation. (4) With respect to a combination of active personal labor and active personal management, when neither contribution by itself meets the requirement of paragraphs (2) and (3) of this definition, a combination of active personal labor and active personal management that, when made together:[[Page 52038]] (i) Is critical to the profitability of the farming operation; (ii) Is performed on a regular, continuous, and substantial basis; and (iii) Meets the following required number of hours: Table 1 to Paragraph (4)(iii) of the Definition of Significant Contribution------------------------------------------------------------------------ Combination of active personal labor and active personal management minimum requirement for a significant contribution------------------------------------------------------------------------- Meets the minimumManagement contribution Labor contribution in threshold for in hours hours significant contribution, in hours------------------------------------------------------------------------ 475 75 550 450 100 550 425 225 650 400 250 650 375 375 750 350 400 750 325 425 750 300 550 850 275 575 850 250 600 850 225 625 850 200 650 850 175 675 850 150 800 950 125 825 950 100 850 950 75 875 950 50 900 950 25 925 950------------------------------------------------------------------------\* \* \* \* \*05. Amend Sec. 1400.5 as follows:0a. In paragraph (b) introductory text, ***remove*** the word ``Such'' and add the words ``Examples of'' in its place;0b. In paragraph (b)(3) introductory text, ***remove*** the words ``Indicators of such business arrangement'' and add the words ``Examples of business arrangements or acts'' in their place;0c. In paragraph (c), ***remove*** the words ``such person'' and add ``the person'' in their place, ***remove*** the words ``for such'' and add the word ``the'' in their place, and add the words ``perpetrated or'' after the words ``device was''; and0d. Revise paragraph (d) introductory text. The revision reads as follows:Sec. 1400.5 Denial of program benefits.\* \* \* \* \* (d) A person or legal entity that lies or perpetuates fraud, commits fraud, or participates in equally serious actions for the benefit of the person or legal entity, or the benefit of any other person or legal entity, to exceed the applicable limit on payments or the requirements of this part will be subject to a 5-year denial of all program benefits. Examples of equally serious actions include, but are not limited to:\* \* \* \* \*05. Revise Sec. 1400.6(a) to read as follows:Sec. 1400.6 Joint and several liability. (a) Any legal entity, including joint operations, and any member of a legal entity determined to have knowingly participated in a scheme or device, or other equally serious actions to evade the payment limitation provisions in this part, or that has the purpose of evading the provisions of this part, will be jointly and severally liable for any amounts determined to be payable as the result of the scheme or device, or other examples of equally serious actions mentioned in this section or in Sec. 1400.5, including amounts necessary to recover the payments.\* \* \* \* \*06. Add Sec. 1400.7 to read as follows:Sec. 1400.7 Revocable trust. A revocable trust and the grantor will be considered to be the same person under this part.Sec. 1400.8 [Amended]07. In Sec. 1400.8, ***remove*** the word ``such'' both times it appears and add the word ``the'' in its place.Sec. 1400.9 [Amended]08. In Sec. 1400.9(a) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place.Subpart B--Payment LimitationSec. 1400.100 [Removed and Reserved]09. ***Remove*** and reserve Sec. 1400.100 Sec. 1400.101 [Amended]010. Amend Sec. 1400.101 as follows:0a. In paragraph (a), ***remove*** the words ``such a'' and add the words ``the'' in their place;0b. In paragraph (b)(2), ***remove*** the words ``such minor'' and add the words ``the minor'' in their place;0c. In paragraph (b)(3) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place; and0d. In paragraph (c), ***remove*** the word ``such'' and add the word ``the'' in its place.Sec. 1400.102 [Amended]011. Amend Sec. 1400.102 as follows:0a. In paragraph (a), ***remove*** the reference ``Sec. 1400.1(a)(1)'' and add ``Sec. 1400.1'' in its place;0b. In paragraph (b) introductory text, ***remove*** the reference ``Sec. 1400.1'' and add the reference ``Sec. 1400.1(a)(1)'' in its place; and0c. In paragraph (c), ***remove*** the word ``such'' and add the word ``the'' in its place.Sec. 1400.103 [Amended]012. In Sec. 1400.103(a), ***remove*** the words ``such an'' and add the word ``the'' in their place and ***remove*** the words ``such organization'' and add the words ``the organization'' in their place.Sec. 1400.104 [Amended]013. Amend Sec. 1400.104 as follows:0a. In paragraph (a) introductory text, ***remove*** the words ``or legal entities'';0b. In paragraph (a)(1), ***remove*** the words ``such an'' and add the word ``the'' in their place;[[Page 52039]]0c. In paragraph (a)(3) introductory text, ***remove*** the words ``base acres not'' and add the words ``***land*** used for ***agricultural*** production not'' in their place and ***remove*** the words ``total base acres'' and add the words ``total ***land***'' in their place;0d. In paragraph (a)(3)(i), ***remove*** the words ``such an increase in base acres'' and add ``the increase in ***agricultural*** ***land***'' in their place;0e. In paragraph (a)(3)(ii), ***remove*** the words ``base acres'' and add the words ``***agricultural*** ***land***'' in their place;0f. In paragraph (a)(4), ***remove*** ``such'' each time it appears and add the word ``the'' in its place;0g. In paragraphs (a)(4)(i) through (iv), ***remove*** the comma and add a semicolon in its place;0h. In paragraph (a)(5) introductory text, add the words ``or livestock'' after the words ``gift of ***land***'' both times they appear and ***remove*** the word ``such'' and add the word ``the'' in its place;0i. In paragraph (a)(5)(i), ***remove*** the words ``such ***land***'' and add the words ``the ***land*** or livestock'' in their place and ***remove*** the comma and add a semicolon in its place;0j. In paragraph (a)(5)(ii), add the words ``or livestock'' after the words ``of ***land***'', ***remove*** the words ``the ***land***'s fair'' and add the words ``***land***'s or livestock's fair'' in their place, and ***remove*** the comma and add a semicolon in its place;0k. In paragraph (a)(5)(iii), ***remove*** the words ``the ***land***'' and add the words ``the ***land*** or livestock'' in their place and ***remove*** ``such ***land***,'' and add ``the ***land*** or livestock;'' in its place;0l. In paragraph (a)(5)(iv), ***remove*** the comma and add a semicolon in its place;0m. In paragraph (a)(5)(v), ***remove*** the words ``the ***land***'' and add the words ``the ***land*** or livestock'' in their place; and0n. In paragraph (b), ***remove*** the words ``or legal entities''.Sec. 1400.105 [Amended]014. In Sec. 1400.105(d) introductory text, ***remove*** the words ``or legal entity's''.Sec. 1400.106 [Amended]015. In Sec. 1400.106(a), ***remove*** the words ``Payments'' and add the words ``Direct or indirect payments'' in its place and add the words ``and will be determined in accordance with Sec. 1400.105'' at the end of the paragraph.Subpart C--Payment EligibilitySec. 1400.201 [Amended]016. Amend Sec. 1400.201 as follows:0a. In paragraph (a), ***remove*** the word ``such'' and add the word ``the'' in its place; and0b. In paragraph (d)(3), ***remove*** the words ``such a'' and add the word ``the'' in their place.017. Amend Sec. 1400.202 as follows:0a. In paragraph (c) introductory text, ***remove*** the words ``such capital'' and add the words ``the capital'' in their place; and0b. Revise paragraph (c)(1). The revision reads as follows:Sec. 1400.202 Persons.\* \* \* \* \* (c) \* \* \* (1) To meet the requirements of paragraph (a)(1)(i) of this section, must be contributed directly by the person and must not be acquired as a result of a loan made to, guaranteed, co-signed, or secured by any other person, joint operation, or legal entity that has an interest in the farming operation; and\* \* \* \* \*018. Amend Sec. 1400.203 as follows:0a. In paragraph (a)(1)(ii)(C), ***remove*** the word ``such'' and add the word ``the'' in its place;0b. In paragraph (b) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place both time it appears;0c. Revise paragraph (b)(1);0d. In paragraph (b)(2) introductory text, ***remove*** ``(a)(3)'' and add ``(3)'' in its place and ***remove*** the words ``as defined''; and0e. In paragraph (c), ***remove*** ``(b)(3)'' and add ``(3)'' in its place and ***remove*** the word ``such'' to add the word ``the'' in its place. The revision reads as follows:Sec. 1400.203 Joint operations.\* \* \* \* \* (b) \* \* \* (1) To meet the requirements of paragraph (a)(1)(i) of this section, and if contributed directly by the joint operation, must not be acquired as a loan made to, guaranteed, co-signed, or secured by any person, legal entity, or other joint operation that has an interest in the farming operation; and\* \* \* \* \*019. Amend Sec. 1400.204 as follows:0a. In paragraph (a)(2)(iii), ***remove*** the word ``such'' and add the word ``the'' in its place;0b. In paragraph (d) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place; and0c. Revise paragraph (d)(1). The revision reads as follows:Sec. 1400.204 Limited partnerships, limited liability partnerships, limited liability companies, corporations, and other similar legal entities.\* \* \* \* \* (d) \* \* \* (1) To meet the requirements of paragraph (a)(1) of this section, must be contributed directly by the legal entity and must not be acquired as a loan made to, guaranteed, co-signed, or secured by any person, legal entity, or joint operation that has an interest in the farming operation, as defined in this part; and\* \* \* \* \*020. Amend Sec. 1400.205 as follows:0a. In paragraph (e) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place; and0b. Revise paragraph (e)(1). The revision reads as follows:Sec. 1400.205 Trusts.\* \* \* \* \* (e) \* \* \* (1) To meet the requirements of paragraph (a) of this section, must be contributed directly by the trust and must not be acquired as a loan made to, guaranteed, co-signed, or secured by any person, legal entity, or joint operation that has an interest in the farming operation, as defined in this part; and\* \* \* \* \*021. Amend Sec. 1400.206 as follows:0a. In paragraph (b) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place; and0b. Revise paragraph (b)(1). The revision reads as follows:Sec. 1400.206 Estates.\* \* \* \* \* (b) \* \* \* (1) To meet the requirements of paragraph (a) of this section, must be contributed directly by the estate and must not be acquired as a loan made to, guaranteed, co-signed, or secured by any person, legal entity, or joint operation that has an interest in the farming operation, as defined in this part; and\* \* \* \* \*Sec. Sec. 1400.207, 1400.208, 1400.209, 1400.210, 1400.212, and 1400.213 [Amended]022. In Sec. Sec. 1400.207 through 1400.213, ***remove*** the word ``such'' and add the word ``the'' in its place in the following places:0a. In Sec. 1400.207(a) introductory text, (a)(1), and (b);0b. In Sec. 1400.208(b)(1) and (2);0c. In Sec. 1400.209(a) and (b)(2) and (3);0d. In Sec. 1400.210;0e. In Sec. 1400.212; and0f. In Sec. 1400.213 [[Page 52040]]023. Add Sec. 1400.214 to read as follows:Sec. 1400.214 Cash rent tenants. (a) Any tenant that is actively engaged in farming in accordance with the provisions of this subpart and conducts a farming operation in which the tenant rents the ***land*** for cash, for a crop share guaranteed as to the amount of the commodity, or by any arrangement in which the tenant does not compensate the landlord by cash or a crop share, and receives benefits, with respect to the ***land*** under a program specified in Sec. 1400.1(a)(1) and (2) will not be eligible to receive any payment with respect to the cash-rented ***land*** unless the tenant independently makes a significant contribution to the farming operation of: (1) Active personal labor; or (2) Significant contributions of both active personal management and equipment. (b) If the equipment is leased by the tenant from: (1) The landlord, then the lease must reflect the fair market value of the equipment leased with a payment schedule considered reasonable and customary for the area; or (2) The same person or legal entity that is providing hired labor to the farming operation, then the contracts for the lease of the equipment and for the hired labor must be two separate contracts. (c) If the equipment is leased by the tenant from the landlord, or from the same person or legal entity that is providing hired labor to the farming operation, then the tenant must exercise complete control over the leased equipment during the entire current crop year. Complete control is defined as exclusive access and use by the tenant. (d) If the cash rent tenant is a joint operation, then each member or their spouse must make a significant contribution of active personal labor or active personal management as specified in Sec. 1400.203(a)(1)(ii) to be considered eligible for the member's share of the program payments received by the joint operation on the cash rented ***land***. (e) If the cash rent tenant is a legal entity, then a significant contribution of active personal labor or active personal management must be made to the legal entity as specified in Sec. 1400.204(a)(2) for the legal entity to be considered eligible for the program payments on the cash rented ***land***.Subpart D [Removed and Reserved]024. ***Remove*** and reserve subpart D, consisting of Sec. 1400.301 Subpart E--Foreign PersonsSec. 1400.401 [Amended]025. Amend Sec. 1400.401 as follows:0a. In paragraph (a), ***remove*** the words ``such person'' and add the words ``the person'' in their place both times they appear, ***remove*** the words ``such farm'' and add the words ``the farm'' in their place, ***remove*** the words ``such an'' and add the word ``that'' in their place, and ***remove*** ``these regulations'' and adds ``the regulations in this subpart'' in its place;0b. In paragraph (b)(1), ***remove*** the words ``such a legal'' and add the words ``the legal'' in their place and ***remove*** the words ``such legal'' and add the words ``the legal'' in their place;0c. In paragraph (b)(2) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place;0d. In paragraph (b)(3), ***remove*** the words ``in such'' and add ``in'' in their place;0e. In paragraph (b)(4), ***remove*** the words ``in such'' and add the word ``in'' in their place and ***remove*** the words ``such payment'' and add the words ``the payment'' in their place; and0f. In paragraph (b)(5), ***remove*** the words ``such percentage'' and add the words ``the percentage'' in their place, ***remove*** the words ``such stock'' and add the words ``the stock'' in their place, and ***remove*** the words ``such class'' and add the word ``class'' in their place.Sec. 1400.402 [Amended]026. Amend Sec. 1400.402 as follows:0a. In paragraph (a)(1), ***remove*** the word ``such'' and add the word ``the'' in its place;0b. In paragraph (a)(2), ***remove*** the word ``Such'' and add the word ``The'' in its place; and0c. In paragraph (b), ***remove*** the words ``Such written'' and add the word ``Written'' in their place and ***remove*** ``such'' and add ``the'' in its place.Subpart F--Average Adjusted Gross Income Limitation027. Amend Sec. 1400.500 as follows:0a. In paragraph (c), ***remove*** the word ``such'' and add the word ``the'' in its place; and0b. Add paragraph (f). The addition reads as follows:Sec. 1400.500 Applicability.\* \* \* \* \* (f) The Administrator or NRCS Chief may waive the limitation under this section on a case-by-case basis for the protection of environmentally sensitive ***land*** of special significance. A waiver request must be in writing and: (1) Show that use of conservation program funding on or adjacent to environmentally sensitive ***land*** of special significance is critical to the success of a project that provides conservation benefits to multiple producers or landowners in a community, watershed, or other geographic area; (2) Demonstrate that the proposed action achieves enduring protection of environmentally sensitive ***land*** of special significance through use of a long-term agreement that is greater than 15 years in duration or through use of a deed restriction on the ***land***; or (3) Present evidence that otherwise demonstrates, as determined by the Administrator or the NRCS Chief, that the waiver is necessary to address the critical natural resources referenced in the definition of environmentally sensitive ***land*** of special significance.Sec. 1400.501 [Amended]028. Amend Sec. 1400.501 as follows:0a. In paragraph (a)(2), ***remove*** the word ``such'' and add the word ``the'' in its place; and0b. In paragraph (b), ***remove*** the word ``such'' and add the word ``this'' in its place.Sec. 1400.503 [Amended]029. In Sec. 1400.503, ***remove*** the word ``such'' each time it appears and add the word ``the'' in its place.Subpart G--Additional Payment Eligibility Provisions for Joint Operations and Legal Entities Comprised of Non-Family Members or Partners, Stockholders, or Persons With an Ownership Interest in the Farming OperationSec. 1400.601 [Removed and Reserved]030. ***Remove*** and reserve Sec. 1400.601 Sec. 1400.602 [Amended]033. Amend Sec. 1400.602 as follows:0a. In paragraphs (a)(1) and (2) introductory text, ***remove*** the word ``such'' each time it appears;0b. In paragraph (a)(3) introductory text, ***remove*** the words ``one such'' and add the word ``one'' in their place and ***remove*** the words ``with such'' and add the words ``with that'' in their place; and[[Page 52041]]0c. In paragraphs (b) and (e), ***remove*** the word ``such'' each time it appears and add the word ``the'' in its place.Richard Fordyce,Administrator, Farm Service Agency.Robert Stephenson,Executive Vice President, Commodity Credit Corporation.[FR Doc. 2020-18148 Filed 8-19-20; 4:15 pm]BILLING CODE 3410-05-P

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[***Federal Register: Payment Limitation and Payment Eligibility Pages 52033 - 52041 [FR DOC #2020-18148]***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60NT-GPY1-JDG9-Y4C7-00000-00&context=1516831)

Impact News Service

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Washington: Office of the Federal Register has issued the following notice:DEPARTMENT OF AGRICULTURECommodity Credit Corporation7 CFR Part 1400[Docket ID CCC-2019-0007]RIN 0560-AI49Payment Limitation and Payment EligibilityAGENCY: Commodity Credit Corporation and Farm Service Agency, USDA.ACTION: Final rule.-----------------------------------------------------------------------SUMMARY: This rule implements the mandatory changes required by the ***Agriculture*** Improvement Act of 2018 (2018 Farm Bill) and other changes made by the Farm Service Agency (FSA) on behalf of CCC. Specifically, the mandatory changes update program applicability and payment limitations; and specify that the Secretary may approve a waiver of the average adjusted gross income (AGI) limitation for participants of certain conservation contracts administered by FSA and the Natural Resources Conservation Service (NRCS) on environmentally sensitive ***land***. Also, the mandatory changes expand the definition of ``family member'' to include first cousins, nieces, and nephews. This rule also includes changes that make minor clarifications and updates throughout part 1400.DATES: Effective: August 20, 2020.FOR FURTHER INFORMATION CONTACT: Paul Hanson, telephone: (202) 720-4189, email: [*paul.hanson@usda.gov*](mailto:paul.hanson@usda.gov) Persons with disabilities who require alternative means for communication should contact the USDA ***Target*** Center at (202) 720-2600 (voice).SUPPLEMENTARY INFORMATION:Background This rule amends 7 CFR part 1400 to implement changes made by the 2018 Farm Bill; (Pub. L. 115-334) as well as makes certain changes, as explained below. This rule updates the applicable programs and payment limitations in 7 CFR 1400.1 to reflect current policy and changes made by the 2018 Farm Bill. FSA administers the regulations in 7 CFR part 1400 on behalf of CCC.Payment Limitations The 2018 Farm Bill and this rule create two separate payment limitations for the Noninsured Crop Disaster Assistance Program (NAP). Previously, a person or legal entity was subject to a $125,000 payment limitation regardless of the level of NAP coverage obtained. For 2019 and subsequent years, the 2018 Farm Bill provides a separate per crop year maximum per person and legal entity limitation of either $125,000 for payments to those who purchased basic 50/55 NAP coverage or $300,000 for payments to those who purchased buy-up coverage. The 2018 Farm Bill increased the payment limitation for the Emergency Conservation Program (ECP) to $500,000 per program per disaster event. The 2018 Farm Bill officially removed LDPs and MLGs from the combined payment limit. This rule ***removes*** the payment limits for Marketing Loan Gains (MLG), Loan Deficiency Payments (LDP), and the Emergency Assistance for Livestock, Honeybees and Farm Raised Fish Program (ELAP) as mandated by the 2018 Farm Bill (section 1703(a)(2) and section 1501(e) respectively).Waiver of AGI Limitation for Environmentally Sensitive ***Land*** of Special Significance The 2018 Farm Bill does not change the AGI limitation of $900,000 for certain programs; however, it does authorize the Secretary to waive the AGI limitation for participants of certain conservation contracts administered by FSA or NRCS when the Secretary determines that environmentally sensitive ***land*** of special significance will be protected because of the waiver. The waiver authority allows FSA and NRCS the discretion, on a case-by-case basis, to provide benefits to producers who may not otherwise meet the AGI[[Page 52034]]requirements on environmentally sensitive ***land*** of special significance. This rule defines ``environmentally sensitive ***land*** of special significance'' in Sec. 1400.3 FSA and the NRCS identified specific critical resources warranting protection through enrollment in its definition. This rule also adds provisions in Sec. 1400.500(f) to specify how a request for a waiver must be submitted and what it must include.Definition of Family Member FSA is expanding the definition of ``family member'' as mandated by the 2018 Farm Bill to include first cousin, niece, and nephew. This change expands the definition to allow farming operations to qualify for additional payment limitations for an existing farming operation under the rules for a substantive change, which are specified in Sec. 1400.104 Furthermore, joint operations that included a first cousin, niece, or nephew were previously determined to be farming operations comprised of non-family members. With this change, a joint operation comprised of the newly expanded definition of family members would no longer be subject to the limitation of members qualifying on a management contribution alone, which increases the number of additional individuals eligible for payment within joint operations comprised solely of family members.Other Changes This rule makes several changes to the definitions in 7 CFR 1400.3 This rule amends the definitions of ``active personal management,'' and ``significant contribution'' as it relates to management in 7 CFR 1400.3 and ***removes*** the definitions of ``active personal management,'' ``significant contribution of active personal management,'' and ``significant contribution of the combination of active personal labor and active personal management'' previously in subpart G so that consistent definitions of the terms are used throughout part 1400. This rule also makes minor clarifications to the terms ``interest in the farming operation'' and ``lawful alien.'' It adds a new definition of ``livestock'' for the purposes of part 1400, for which ``livestock'' includes animals that are considered eligible livestock under the Livestock Indemnity Program (LIP). This change is intended to clarify which species qualify as livestock and ensure that the animals considered to be ``livestock'' under part 1400 is consistent with the administration of other FSA programs. This rule moves the provisions for revocable trusts from Sec. 1400.100 (subpart B, Payment Limitation) to Sec. 1400.7 (subpart A, General Provisions) because they are general provisions applicable to all of part 1400 and not just to the payment limitation provisions. This rule amends the provisions in Sec. 1400.102 to clarify that the policy that a state or political subdivision or one of its agencies is not eligible for payments or benefits under the programs in Sec. 1400.1 This rule also clarifies that the exception in Sec. 1400.102(b) applies only to payments or benefits under the ***Agriculture*** Risk Coverage (ARC) and Price Loss Coverage (PLC) programs. This rule amends Sec. 1400.104(a) to ***remove*** the reference to ``legal entities.'' This change aligns the regulation with current language in the 2018 Farm Bill. This rule amends Sec. 1400.104(a)(3) to ***remove*** ``base acres'' and add ``***land*** used for ***agricultural*** production.'' The addition of 20 percent or more ***land*** used for ***agricultural*** production will be recognized as a substantive change in the farming operation and will take into consideration ***land*** used for annual crop production as well as grazing ***lands***. This rule is making a change in amending Sec. 1400.104(a)(5) to specify that a change in ownership by sale or gift of livestock can be recognized as a substantive change in the farming operation, in addition to a sale or gift of ***land***, which already exists in the rule, such that the sale or gift of livestock can result in the application of additional payment limits under 7 CFR part 1400. The addition of livestock as an element for consideration used in determining whether a substantive change has occurred takes into consideration all of the aspects of a farming operation including but not limited to ***land*** but also livestock and the value of the ***land*** or livestock to a farming operation. Further, this change is appropriate as substantive change rules apply to all programs subject to payment limitation, including Livestock Forage Disaster Program (LFP). This rule amends Sec. 1400.106 to specify that payment limitations apply to both direct and indirect payments, subject to the attribution provisions in Sec. 1400.105 This change is a clarification of and therefore codification of current policy and does not alter the way FSA applies payment limitations. This rule moves the cash rent tenant provisions of subpart D to subpart C, in Sec. 1400.214, which contains the payment eligibility requirements. This rule makes a technical correction to the provision in the regulation that indicated a legal entity's or joint operation's eligible capital, ***land***, or equipment could not be acquired as a result of a loan made to, guaranteed by, cosigned by, or secured by any person, legal entity or joint operation that has an interest in the farming operation, including the legal entity's or joint operation's members. The technical correction ***removes*** the legal entity's or joint operation's members from the provision and relies on ``interest in the farming operation'' to define the qualifying contribution. This rule makes minor changes to update the regulatory language throughout part 1400. These changes are intended to make the regulation easier to understand and do not affect program implementation.Effective Date, Notice and Comment, and Paperwork Reduction Act As specified in 7 U.S.C 9091, the regulations to implement the provisions of Title I and the administration of Title I of the 2018 Farm Bill are exempt from the notice and comment provisions of the Administrative Procedure Act (5 U.S.C 553) and the Paperwork Reduction Act (in 44 U.S.C chapter 35). Section 9091 further directs the Secretary to use the authority in 5 U.S.C 808 related to congressional review and delay in the effective date. The Administrative Procedure Act (5 U.S.C.553) provides that the 30-day delay in the effective date provision does not apply when the rule involves specified actions, including matters relating to benefits. This rule governs the eligibility provisions for programs providing benefits to farmers and ranchers and therefore that exemption applies to this rule. Therefore, this rule is effective upon publication in the Federal Register.Executive Orders 12866, 13563, 13771 and 13777 Executive Order 12866, ``Regulatory Planning and Review,'' and Executive Order 13563, ``Improving Regulation and Regulatory Review,'' direct agencies to assess all costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). Executive Order 13563 emphasized the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. The requirements in Executive Orders 12866 and 13563 for the analysis of costs and benefits apply to rules that are determined to be significant. Executive[[Page 52035]]Order 13777, ``Enforcing the Regulatory Reform Agenda,'' established a federal policy to alleviate unnecessary regulatory burdens on the American people. The Office of Management and Budget (OMB) designated this rule as significant under Executive Order 12866 and therefore, OMB reviewed this rule. The costs and benefits of this rule are summarized below. The full cost benefit analysis is available on regulations.gov. Executive Order 13771, ``Reducing Regulation and Controlling Regulatory Costs,'' requires that, in order to manage the costs required to comply with Federal regulations, that for every new significant or economically significant regulation issued, the new costs must be offset by savings from deregulatory actions. OMB guidance in M-17-21, dated April 5, 2017, specifies that ``transfers'' are not covered by Executive Order 13771.Cost Benefit Analysis Summary The cost benefit analysis evaluated changes to payment limits and payment eligibility mandated by the 2018 Farm Bill along with two other changes the rule is making in the regulation. This rule implements those changes by amending the regulations in 7 CFR part 1400. We estimate that the changes will increase Farm Program outlays by about $21.2 million per year. The largest increases are from elimination of the payment limit for ELAP and a new separate payment limit for those producers who choose buy-up coverage under NAP.Regulatory Flexibility Act The Regulatory Flexibility Act (5 U.S.C 601-612), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA, Pub. L. 104-121), generally requires an agency to prepare a regulatory flexibility analysis of any rule whenever an agency is required by the Administrative Procedure Act or any other law to publish a proposed rule, unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. This rule is not subject to the Regulatory Flexibility Act because USDA is not required by Administrative Procedure Act or any law to publish a proposed rule for this rulemaking.Environmental Review The environmental impacts of this final rule have been considered in a manner consistent with the provisions of the National Environmental Policy Act (NEPA, 42 U.S.C 4321-4347), the regulations of the Council on Environmental Quality (40 CFR parts 1500-1508), and the FSA regulations for compliance with NEPA (7 CFR part 799). FSA has determined that the provisions identified in this final rule are administrative in nature, intended to clarify the mandatory requirements of the programs, as defined in the 2018 Farm Bill, and do not constitute a major Federal action that would significantly affect the quality of the human environment, individually or cumulatively. As this rule presents administrative clarifications only, it is categorically excluded under Sec. 799.31(3)(i)) issuing minor technical corrections to regulations, handbooks, and internal guidance, as well as amendments to them; therefore, FSA will not prepare an environmental assessment or environmental impact statement for this regulatory action.Executive Order 12372 Executive Order 12372, ``Intergovernmental Review of Federal Programs,'' requires consultation with State and local officials that would be directly affected by proposed Federal financial assistance. The objectives of the Executive Order are to foster an intergovernmental partnership and a strengthened Federalism, by relying on State and local processes for State and local government coordination and review of proposed Federal financial assistance and direct Federal development. For reasons specified in the final rule related notice to 7 CFR part 3015, subpart V (48 FR 29115, June 24, 1983), the programs and activities within this rule are excluded from the scope of Executive Order 12372 which requires intergovernmental consultation with State and local officials.Executive Order 12988 This rule has been reviewed under Executive Order 12988, ``Civil Justice Reform.'' This rule will not preempt State or local laws, regulations, or policies unless they represent an irreconcilable conflict with this rule. The changes mandated by the 2018 Farm Bill were effective for the 2019 crop year. Other changes in this rule will not have retroactive effect. Before any judicial actions may be brought regarding the provisions of this rule, the administrative appeal provisions of 7 CFR parts 11 and 780 must be exhausted.Executive Order 13132 This rule has been reviewed under Executive Order 13132, ``Federalism.'' The policies contained in this rule do not have any substantial direct effect on States, on the relationship between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of government, except as required by law. Nor does this rule impose substantial direct compliance costs on State and local governments. Therefore, consultation with the States is not required.Executive Order 13175 This rule has been reviewed in accordance with the requirements of Executive Order 13175, ``Consultation and Coordination with Indian Tribal Governments.'' Executive Order 13175 requires Federal agencies to consult and coordinate with Tribes on a government-to-government basis on policies that have Tribal implications, including regulations, legislative comments or proposed legislation, and other policy statements or actions that have substantial direct effects on one or more Indian Tribes, on the relationship between the Federal Government and Indian Tribes or on the distribution of power and responsibilities between the Federal Government and Indian Tribes. The USDA Office of Tribal Relations (OTR) has assessed the impact of this rule on Indian Tribes and determined that this rule does have significant Tribal implications. OTR has determined that further Tribal consultation under Executive Order 13175 is not required at this time. Tribal consultation for this rule was included in the 2018 Farm Bill consultation held on May 1-2, 2019, at the National Museum of American Indian, in Washington, DC, and on June 26-27, 2019, in Sparks, NV. The portion of the Tribal consultation relative to this rule was conducted by Bill Northey, USDA Under Secretary for the Farm Production and Conservation mission area, as part of the Title I session. No comments regarding this rule were raised. If a Tribe requests additional consultation, FSA and CCC will work with OTR to ensure meaningful consultation is provided where changes, additions, and modifications are not expressly mandated by law.The Unfunded Mandates Reform Act of 1995 Title II of the Unfunded Mandates Reform Act of 1995 (UMRA, Pub. L. 104-4) requires Federal agencies to assess the effects of their regulatory actions of State, local, and Tribal governments or the private sector. Agencies generally must prepare a written statement, including cost benefits analysis, for proposed and final rules with Federal mandates that may[[Page 52036]]result in expenditures of $100 million or more in any 1 year for State, local or Tribal governments, in the aggregate, or to the private sector. UMRA generally requires agencies to consider alternatives and adopt the more cost effective or least burdensome alternative that achieves the objectives of the rule. This rule contains no Federal mandates, as defined in Title II of UMRA, for State, local and Tribal governments or the private sector. Therefore, this rule is not subject to the requirements of sections 202 and 205 of UMRA.E-Government Act Compliance FSA and CCC are committed to complying with the E-Government Act, to promote the use of the internet and other information technologies to provide increased opportunities for citizen access to Government information and services, and for other purposes.Federal Assistance Programs The title and number of the Federal Domestic Assistance Programs found in the Catalog of Federal Domestic Assistance to which this rule applies are:10.051--Commodity Loans and Loan Deficiency Payments10.069--Conservation Reserve Program10.088--Livestock Indemnity Program10.089--Livestock Forage Disaster Program10.091--Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish Program10.092--Tree Assistance Program10.113--***Agriculture*** Risk Coverage10.112--Price Loss Coverage10.451--Noninsured Assistance10.912--Environmental Quality Incentives Program10.917--***Agricultural*** Management AssistanceList of Subjects in 7 CFR Part 1400 ***Agriculture***, Grant programs--***agriculture***, Loan programs--***agriculture***, Natural resources, Price support programs. For the reasons discussed above, CCC amends 7 CFR part 1400 as follows:PART 1400--PAYMENT LIMITATION AND PAYMENT ELIGIBILITY01. The authority citation continues to read as follows: Authority: 7 U.S.C 1308, 1308-1, 1308-2, 1308-3, 1308-3a, 1308-4, and 1308-5; and Title I, Pub. L. 115-123.Subpart A--General Provisions02. Amend Sec. 1400.1 as follows:0a. Revise paragraph (a)(1);0b. In paragraph (a)(6), ***remove*** the word ``and'';0c. In paragraph (a)(7), ***remove*** the period and add ``; and'' in its place;0d. Redesignate paragraph (a)(8) as paragraph (a)(9);0e. Add new paragraph (a)(8);0f. In newly redesignated paragraph (a)(9), ***remove*** the reference ``Subparts C, D, and G'' and add ``Subparts C and G'' in its place and ***remove*** ``through (7)'' and add ``through (8)'' in its place;0g. In paragraph (b)(1), ***remove*** ``(5),'';0h. In paragraph (b)(3), ***remove*** the reference ``Paragraph (a)(6)'' and add the references ``Paragraphs (a)(5) and (6)'' in its place and ***remove*** the word ``and'' at the end of the paragraph;0i. In paragraph (b)(4), ***remove*** the period and add ``; and'' in its place;0j. Add paragraph (b)(5); and0k. Revise paragraph (f). The additions and revisions read as follows.Sec. 1400.1 Applicability. (a) \* \* \* (1) The ***Agriculture*** Risk Coverage (ARC) and Price Loss Coverage (PLC) Programs, part 1412 of this chapter;\* \* \* \* \* (8) The Emergency Conservation Program (ECP) and Emergency ***Forest*** Restoration Program (EFRP) in part 701 of this title.\* \* \* \* \* (b) \* \* \* (5) Paragraph (a)(8) of this section on a per disaster event basis.\* \* \* \* \* (f) The following amounts are the limitations on payments per person or legal entity for the applicable period for each payment or benefit. Table 1 to Paragraph (f)------------------------------------------------------------------------ Limitation per person or legal Payment or benefit entity ($)------------------------------------------------------------------------(1) Price Loss Coverage, ***Agriculture*** 125,000 per program year. Risk Coverage payments (other than Peanuts).(2) Price Loss Coverage and 125,000 per program year. ***Agriculture*** Risk Coverage payments for Peanuts.(3) CRP annual rental payments........ 50,000 per program year.(4) NAP payments (i) basic 50/55 NAP coverage...... 125,000 per crop year. (ii) Buy-up NAP coverage.......... 300,000 per crop year.(5) LFP............................... 125,000 per program year.(6) CSP \1\........................... 200,000.(7) EQIP \2\.......................... 450,000.(8) AMA program....................... 50,000 per fiscal year.(9) ECP............................... 500,000 per disaster event.(10) EFRP............................. 500,000 per disaster event.------------------------------------------------------------------------\1\ The $200,000 limitation is the total amount a person or legal entity can receive directly or indirectly in the aggregate under all CSP contracts entered into during fiscal years 2019 through 2023.\2\ The $450,000 limitation is the total amount of cost share and incentive payments a person or legal entity can receive directly or indirectly, under all EQIP contracts (excluding Conservation Incentive Contracts) in the aggregate entered into during the period of either: Fiscal years 2014 through 2018, or fiscal years 2019 through 2023.Sec. 1400.2 [Amended]03. Amend Sec. 1400.2 as follows:0a. In paragraph (c) introductory text, ***remove*** the word ``such'' and add the words ``the county'' in its place;0b. In paragraph (c)(1), ***remove*** the word ``such'' and add the word ``the'' in its place;0c. In paragraph (f), ***remove*** the words ``such determinations'' and add the words ``the determinations'' in their place and ***remove*** the words ``such year'' and add the words ``the applicable year'' in their place; and0d. In paragraph (h), ***remove*** the words ``such reviews'' and add ``the reviews'' in their place.[[Page 52037]]04. Amend Sec. 1400.3(b) as follows:0a. Revise the definitions of ``Active personal management'' and ``Capital'';0b. Add the definition of ``Environmentally sensitive ***land*** of special significance'' in alphabetical order;0c. In the definition of ``Equipment'', ***remove*** the words ``Such equipment'' and add the words ``The equipment'' in their place and ***remove*** the words ``such equipment'' each time they appear and add the words ``the equipment'' in their place;0d. In the definition of ``Family member'', ***remove*** the words ``spouse, or'' and add the words ``first cousin, niece, nephew, spouse, or'' in their place;0e. In the definition of ``Farming operation'', ***remove*** the words ``such person'' and add the words ``the person'' in their place;0g. ***Remove*** the definition of ``Interest in a farming operation'';0h. Add the definition of ``Interest in the farming operation'' in alphabetical order;0i. In the definition of ``***Land***'', ***remove*** the word ``Such'' and add the word ``The'' in its place, ***remove*** the words ``If such'' and add the words ``If the'' in their place, and ***remove*** the words ``crop or crop proceeds, such'' and add ``farming operation, the'' in their place;0j. In the definition of ``Lawful alien'', ***remove*** the words ``a valid Alien Registration Receipt Card'' and add the words ``appropriate valid credentials'' in their place;0k. Add the definition of ``Livestock'' in alphabetical order;0l. In the definition of ``Sharecropper'', ***remove*** the words ``such crop'' and add the words ``the crop'' in their place and ***remove*** the words ``the provision of such labor'' and add the word ``work'' in their place; and0m. Revise the definition of ``Significant contribution''. The additions and revisions read as follows:Sec. 1400.3 Definitions.\* \* \* \* \* (b) \* \* \* Active personal management means personally providing and participating in activities considered critical to the profitability of the farming operation and performed under one or more of the following categories: (1) Capital, which includes: (i) Arranging financing and managing capital; (ii) Acquiring equipment; (iii) Acquiring ***land*** or negotiating leases; (iv) Managing insurance; and (v) Managing participation in USDA programs; (2) Labor, which includes hiring and managing of hired labor; and (3) Agronomics and marketing, which includes: (i) Selecting crops and making planting decisions; (ii) Acquiring and purchasing crop inputs; (iii) Managing crops (that is, whatever managerial decisions are needed with respect to keeping the growing crops living and healthy--soil fertility and fertilization, weed control, insect control, irrigation if applicable) and making harvest decisions; and (iv) Pricing and marketing of crop production.\* \* \* \* \* Capital means the funding provided by a person or legal entity to the farming operation for the operation to conduct farming activities. In determining whether a person or legal entity has independently contributed capital, in the form of funding, to the farming operation, the capital must have been derived from a fund or account separate and distinct from that of any other person or legal entity with an interest in the farming operation. Capital does not include the value of any labor or management that is contributed to the farming operation or any outlays for ***land*** or equipment. A capital contribution must be a direct out-of-pocket input of a specified sum or an amount borrowed by the person or legal entity and does not include advance program payments.\* \* \* \* \* Environmentally sensitive ***land*** of special significance means ***land*** offered for enrollment or adjacent to the ***land*** offered for enrollment that contains, or through enrollment will address, critical resources including, but not limited to: (1) Habitat for threatened, endangered, or at-risk species; (2) Historical or cultural resources; (3) Native grasslands; (4) Unique wetlands; (5) Rare, unique, or related soils; and (6) Critical groundwater recharge areas.\* \* \* \* \* Interest in the farming operation means any of the following: (1) Owner, lessor, or lessee of the ***land*** in the farming operation; (2) An interest in the ***agricultural*** products, commodities, or livestock produced by the farming operation; or (3) A member of a joint operation that is an owner, lessor, or lessee of the ***land*** in the farming operation or has an interest in the ***agricultural*** products, commodities, or livestock produced by the farming operation.\* \* \* \* \* Livestock means those animals included in Sec. 1416.304(a) of this chapter.\* \* \* \* \* Significant contribution means the provision of the following to a farming operation: (1) ***Land***, capital, or equipment: (i) For ***land***, capital, or equipment contributed independently by a person or legal entity, a contribution that has a value at least equal to 50 percent of the person's or legal entity's commensurate share of the total: (A) Value of the capital necessary to conduct the farming operation; (B) Rental value of the ***land*** necessary to conduct the farming operation; or (C) Rental value of the equipment necessary to conduct the farming operation; or (ii) If the contribution by a person or legal entity consists of any combination of ***land***, capital, and equipment, the combined contribution must have a value at least equal to 30 percent of the person's or legal entity's commensurate share of the total value of the farming operation. (2) For active personal labor, an amount contributed by a person or members, stockholders, or partners of a legal entity to the farming operation that is described by the smaller of the following: (i) 1,000 hours per calendar year; or (ii) 50 percent of the total hours that would be necessary to conduct a farming operation that is comparable in size to the person's or legal entity's commensurate share in the farming operation. (3) For active personal management, includes activities performed by a person, with a direct or indirect ownership interest in the farming operation or a legal entity, on a regular, continuous, and substantial basis to the farming operation and meets at least one of the following to be considered significant: (i) Performs at least 25 percent of the total management hours required for the farming operation on an annual basis; or (ii) Performs at least 500 hours of management annually for the farming operation. (4) With respect to a combination of active personal labor and active personal management, when neither contribution by itself meets the requirement of paragraphs (2) and (3) of this definition, a combination of active personal labor and active personal management that, when made together:[[Page 52038]] (i) Is critical to the profitability of the farming operation; (ii) Is performed on a regular, continuous, and substantial basis; and (iii) Meets the following required number of hours: Table 1 to Paragraph (4)(iii) of the Definition of Significant Contribution------------------------------------------------------------------------ Combination of active personal labor and active personal management minimum requirement for a significant contribution------------------------------------------------------------------------- Meets the minimumManagement contribution Labor contribution in threshold for in hours hours significant contribution, in hours------------------------------------------------------------------------ 475 75 550 450 100 550 425 225 650 400 250 650 375 375 750 350 400 750 325 425 750 300 550 850 275 575 850 250 600 850 225 625 850 200 650 850 175 675 850 150 800 950 125 825 950 100 850 950 75 875 950 50 900 950 25 925 950------------------------------------------------------------------------\* \* \* \* \*05. Amend Sec. 1400.5 as follows:0a. In paragraph (b) introductory text, ***remove*** the word ``Such'' and add the words ``Examples of'' in its place;0b. In paragraph (b)(3) introductory text, ***remove*** the words ``Indicators of such business arrangement'' and add the words ``Examples of business arrangements or acts'' in their place;0c. In paragraph (c), ***remove*** the words ``such person'' and add ``the person'' in their place, ***remove*** the words ``for such'' and add the word ``the'' in their place, and add the words ``perpetrated or'' after the words ``device was''; and0d. Revise paragraph (d) introductory text. The revision reads as follows:Sec. 1400.5 Denial of program benefits.\* \* \* \* \* (d) A person or legal entity that lies or perpetuates fraud, commits fraud, or participates in equally serious actions for the benefit of the person or legal entity, or the benefit of any other person or legal entity, to exceed the applicable limit on payments or the requirements of this part will be subject to a 5-year denial of all program benefits. Examples of equally serious actions include, but are not limited to:\* \* \* \* \*05. Revise Sec. 1400.6(a) to read as follows:Sec. 1400.6 Joint and several liability. (a) Any legal entity, including joint operations, and any member of a legal entity determined to have knowingly participated in a scheme or device, or other equally serious actions to evade the payment limitation provisions in this part, or that has the purpose of evading the provisions of this part, will be jointly and severally liable for any amounts determined to be payable as the result of the scheme or device, or other examples of equally serious actions mentioned in this section or in Sec. 1400.5, including amounts necessary to recover the payments.\* \* \* \* \*06. Add Sec. 1400.7 to read as follows:Sec. 1400.7 Revocable trust. A revocable trust and the grantor will be considered to be the same person under this part.Sec. 1400.8 [Amended]07. In Sec. 1400.8, ***remove*** the word ``such'' both times it appears and add the word ``the'' in its place.Sec. 1400.9 [Amended]08. In Sec. 1400.9(a) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place.Subpart B--Payment LimitationSec. 1400.100 [Removed and Reserved]09. ***Remove*** and reserve Sec. 1400.100 Sec. 1400.101 [Amended]010. Amend Sec. 1400.101 as follows:0a. In paragraph (a), ***remove*** the words ``such a'' and add the words ``the'' in their place;0b. In paragraph (b)(2), ***remove*** the words ``such minor'' and add the words ``the minor'' in their place;0c. In paragraph (b)(3) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place; and0d. In paragraph (c), ***remove*** the word ``such'' and add the word ``the'' in its place.Sec. 1400.102 [Amended]011. Amend Sec. 1400.102 as follows:0a. In paragraph (a), ***remove*** the reference ``Sec. 1400.1(a)(1)'' and add ``Sec. 1400.1'' in its place;0b. In paragraph (b) introductory text, ***remove*** the reference ``Sec. 1400.1'' and add the reference ``Sec. 1400.1(a)(1)'' in its place; and0c. In paragraph (c), ***remove*** the word ``such'' and add the word ``the'' in its place.Sec. 1400.103 [Amended]012. In Sec. 1400.103(a), ***remove*** the words ``such an'' and add the word ``the'' in their place and ***remove*** the words ``such organization'' and add the words ``the organization'' in their place.Sec. 1400.104 [Amended]013. Amend Sec. 1400.104 as follows:0a. In paragraph (a) introductory text, ***remove*** the words ``or legal entities'';0b. In paragraph (a)(1), ***remove*** the words ``such an'' and add the word ``the'' in their place;[[Page 52039]]0c. In paragraph (a)(3) introductory text, ***remove*** the words ``base acres not'' and add the words ``***land*** used for ***agricultural*** production not'' in their place and ***remove*** the words ``total base acres'' and add the words ``total ***land***'' in their place;0d. In paragraph (a)(3)(i), ***remove*** the words ``such an increase in base acres'' and add ``the increase in ***agricultural*** ***land***'' in their place;0e. In paragraph (a)(3)(ii), ***remove*** the words ``base acres'' and add the words ``***agricultural*** ***land***'' in their place;0f. In paragraph (a)(4), ***remove*** ``such'' each time it appears and add the word ``the'' in its place;0g. In paragraphs (a)(4)(i) through (iv), ***remove*** the comma and add a semicolon in its place;0h. In paragraph (a)(5) introductory text, add the words ``or livestock'' after the words ``gift of ***land***'' both times they appear and ***remove*** the word ``such'' and add the word ``the'' in its place;0i. In paragraph (a)(5)(i), ***remove*** the words ``such ***land***'' and add the words ``the ***land*** or livestock'' in their place and ***remove*** the comma and add a semicolon in its place;0j. In paragraph (a)(5)(ii), add the words ``or livestock'' after the words ``of ***land***'', ***remove*** the words ``the ***land***'s fair'' and add the words ``***land***'s or livestock's fair'' in their place, and ***remove*** the comma and add a semicolon in its place;0k. In paragraph (a)(5)(iii), ***remove*** the words ``the ***land***'' and add the words ``the ***land*** or livestock'' in their place and ***remove*** ``such ***land***,'' and add ``the ***land*** or livestock;'' in its place;0l. In paragraph (a)(5)(iv), ***remove*** the comma and add a semicolon in its place;0m. In paragraph (a)(5)(v), ***remove*** the words ``the ***land***'' and add the words ``the ***land*** or livestock'' in their place; and0n. In paragraph (b), ***remove*** the words ``or legal entities''.Sec. 1400.105 [Amended]014. In Sec. 1400.105(d) introductory text, ***remove*** the words ``or legal entity's''.Sec. 1400.106 [Amended]015. In Sec. 1400.106(a), ***remove*** the words ``Payments'' and add the words ``Direct or indirect payments'' in its place and add the words ``and will be determined in accordance with Sec. 1400.105'' at the end of the paragraph.Subpart C--Payment EligibilitySec. 1400.201 [Amended]016. Amend Sec. 1400.201 as follows:0a. In paragraph (a), ***remove*** the word ``such'' and add the word ``the'' in its place; and0b. In paragraph (d)(3), ***remove*** the words ``such a'' and add the word ``the'' in their place.017. Amend Sec. 1400.202 as follows:0a. In paragraph (c) introductory text, ***remove*** the words ``such capital'' and add the words ``the capital'' in their place; and0b. Revise paragraph (c)(1). The revision reads as follows:Sec. 1400.202 Persons.\* \* \* \* \* (c) \* \* \* (1) To meet the requirements of paragraph (a)(1)(i) of this section, must be contributed directly by the person and must not be acquired as a result of a loan made to, guaranteed, co-signed, or secured by any other person, joint operation, or legal entity that has an interest in the farming operation; and\* \* \* \* \*018. Amend Sec. 1400.203 as follows:0a. In paragraph (a)(1)(ii)(C), ***remove*** the word ``such'' and add the word ``the'' in its place;0b. In paragraph (b) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place both time it appears;0c. Revise paragraph (b)(1);0d. In paragraph (b)(2) introductory text, ***remove*** ``(a)(3)'' and add ``(3)'' in its place and ***remove*** the words ``as defined''; and0e. In paragraph (c), ***remove*** ``(b)(3)'' and add ``(3)'' in its place and ***remove*** the word ``such'' to add the word ``the'' in its place. The revision reads as follows:Sec. 1400.203 Joint operations.\* \* \* \* \* (b) \* \* \* (1) To meet the requirements of paragraph (a)(1)(i) of this section, and if contributed directly by the joint operation, must not be acquired as a loan made to, guaranteed, co-signed, or secured by any person, legal entity, or other joint operation that has an interest in the farming operation; and\* \* \* \* \*019. Amend Sec. 1400.204 as follows:0a. In paragraph (a)(2)(iii), ***remove*** the word ``such'' and add the word ``the'' in its place;0b. In paragraph (d) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place; and0c. Revise paragraph (d)(1). The revision reads as follows:Sec. 1400.204 Limited partnerships, limited liability partnerships, limited liability companies, corporations, and other similar legal entities.\* \* \* \* \* (d) \* \* \* (1) To meet the requirements of paragraph (a)(1) of this section, must be contributed directly by the legal entity and must not be acquired as a loan made to, guaranteed, co-signed, or secured by any person, legal entity, or joint operation that has an interest in the farming operation, as defined in this part; and\* \* \* \* \*020. Amend Sec. 1400.205 as follows:0a. In paragraph (e) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place; and0b. Revise paragraph (e)(1). The revision reads as follows:Sec. 1400.205 Trusts.\* \* \* \* \* (e) \* \* \* (1) To meet the requirements of paragraph (a) of this section, must be contributed directly by the trust and must not be acquired as a loan made to, guaranteed, co-signed, or secured by any person, legal entity, or joint operation that has an interest in the farming operation, as defined in this part; and\* \* \* \* \*021. Amend Sec. 1400.206 as follows:0a. In paragraph (b) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place; and0b. Revise paragraph (b)(1). The revision reads as follows:Sec. 1400.206 Estates.\* \* \* \* \* (b) \* \* \* (1) To meet the requirements of paragraph (a) of this section, must be contributed directly by the estate and must not be acquired as a loan made to, guaranteed, co-signed, or secured by any person, legal entity, or joint operation that has an interest in the farming operation, as defined in this part; and\* \* \* \* \*Sec. Sec. 1400.207, 1400.208, 1400.209, 1400.210, 1400.212, and 1400.213 [Amended]022. In Sec. Sec. 1400.207 through 1400.213, ***remove*** the word ``such'' and add the word ``the'' in its place in the following places:0a. In Sec. 1400.207(a) introductory text, (a)(1), and (b);0b. In Sec. 1400.208(b)(1) and (2);0c. In Sec. 1400.209(a) and (b)(2) and (3);0d. In Sec. 1400.210;0e. In Sec. 1400.212; and0f. In Sec. 1400.213 [[Page 52040]]023. Add Sec. 1400.214 to read as follows:Sec. 1400.214 Cash rent tenants. (a) Any tenant that is actively engaged in farming in accordance with the provisions of this subpart and conducts a farming operation in which the tenant rents the ***land*** for cash, for a crop share guaranteed as to the amount of the commodity, or by any arrangement in which the tenant does not compensate the landlord by cash or a crop share, and receives benefits, with respect to the ***land*** under a program specified in Sec. 1400.1(a)(1) and (2) will not be eligible to receive any payment with respect to the cash-rented ***land*** unless the tenant independently makes a significant contribution to the farming operation of: (1) Active personal labor; or (2) Significant contributions of both active personal management and equipment. (b) If the equipment is leased by the tenant from: (1) The landlord, then the lease must reflect the fair market value of the equipment leased with a payment schedule considered reasonable and customary for the area; or (2) The same person or legal entity that is providing hired labor to the farming operation, then the contracts for the lease of the equipment and for the hired labor must be two separate contracts. (c) If the equipment is leased by the tenant from the landlord, or from the same person or legal entity that is providing hired labor to the farming operation, then the tenant must exercise complete control over the leased equipment during the entire current crop year. Complete control is defined as exclusive access and use by the tenant. (d) If the cash rent tenant is a joint operation, then each member or their spouse must make a significant contribution of active personal labor or active personal management as specified in Sec. 1400.203(a)(1)(ii) to be considered eligible for the member's share of the program payments received by the joint operation on the cash rented ***land***. (e) If the cash rent tenant is a legal entity, then a significant contribution of active personal labor or active personal management must be made to the legal entity as specified in Sec. 1400.204(a)(2) for the legal entity to be considered eligible for the program payments on the cash rented ***land***.Subpart D [Removed and Reserved]024. ***Remove*** and reserve subpart D, consisting of Sec. 1400.301 Subpart E--Foreign PersonsSec. 1400.401 [Amended]025. Amend Sec. 1400.401 as follows:0a. In paragraph (a), ***remove*** the words ``such person'' and add the words ``the person'' in their place both times they appear, ***remove*** the words ``such farm'' and add the words ``the farm'' in their place, ***remove*** the words ``such an'' and add the word ``that'' in their place, and ***remove*** ``these regulations'' and adds ``the regulations in this subpart'' in its place;0b. In paragraph (b)(1), ***remove*** the words ``such a legal'' and add the words ``the legal'' in their place and ***remove*** the words ``such legal'' and add the words ``the legal'' in their place;0c. In paragraph (b)(2) introductory text, ***remove*** the word ``such'' and add the word ``the'' in its place;0d. In paragraph (b)(3), ***remove*** the words ``in such'' and add ``in'' in their place;0e. In paragraph (b)(4), ***remove*** the words ``in such'' and add the word ``in'' in their place and ***remove*** the words ``such payment'' and add the words ``the payment'' in their place; and0f. In paragraph (b)(5), ***remove*** the words ``such percentage'' and add the words ``the percentage'' in their place, ***remove*** the words ``such stock'' and add the words ``the stock'' in their place, and ***remove*** the words ``such class'' and add the word ``class'' in their place.Sec. 1400.402 [Amended]026. Amend Sec. 1400.402 as follows:0a. In paragraph (a)(1), ***remove*** the word ``such'' and add the word ``the'' in its place;0b. In paragraph (a)(2), ***remove*** the word ``Such'' and add the word ``The'' in its place; and0c. In paragraph (b), ***remove*** the words ``Such written'' and add the word ``Written'' in their place and ***remove*** ``such'' and add ``the'' in its place.Subpart F--Average Adjusted Gross Income Limitation027. Amend Sec. 1400.500 as follows:0a. In paragraph (c), ***remove*** the word ``such'' and add the word ``the'' in its place; and0b. Add paragraph (f). The addition reads as follows:Sec. 1400.500 Applicability.\* \* \* \* \* (f) The Administrator or NRCS Chief may waive the limitation under this section on a case-by-case basis for the protection of environmentally sensitive ***land*** of special significance. A waiver request must be in writing and: (1) Show that use of conservation program funding on or adjacent to environmentally sensitive ***land*** of special significance is critical to the success of a project that provides conservation benefits to multiple producers or landowners in a community, watershed, or other geographic area; (2) Demonstrate that the proposed action achieves enduring protection of environmentally sensitive ***land*** of special significance through use of a long-term agreement that is greater than 15 years in duration or through use of a deed restriction on the ***land***; or (3) Present evidence that otherwise demonstrates, as determined by the Administrator or the NRCS Chief, that the waiver is necessary to address the critical natural resources referenced in the definition of environmentally sensitive ***land*** of special significance.Sec. 1400.501 [Amended]028. Amend Sec. 1400.501 as follows:0a. In paragraph (a)(2), ***remove*** the word ``such'' and add the word ``the'' in its place; and0b. In paragraph (b), ***remove*** the word ``such'' and add the word ``this'' in its place.Sec. 1400.503 [Amended]029. In Sec. 1400.503, ***remove*** the word ``such'' each time it appears and add the word ``the'' in its place.Subpart G--Additional Payment Eligibility Provisions for Joint Operations and Legal Entities Comprised of Non-Family Members or Partners, Stockholders, or Persons With an Ownership Interest in the Farming OperationSec. 1400.601 [Removed and Reserved]030. ***Remove*** and reserve Sec. 1400.601 Sec. 1400.602 [Amended]033. Amend Sec. 1400.602 as follows:0a. In paragraphs (a)(1) and (2) introductory text, ***remove*** the word ``such'' each time it appears;0b. In paragraph (a)(3) introductory text, ***remove*** the words ``one such'' and add the word ``one'' in their place and ***remove*** the words ``with such'' and add the words ``with that'' in their place; and[[Page 52041]]0c. In paragraphs (b) and (e), ***remove*** the word ``such'' each time it appears and add the word ``the'' in its place.Richard Fordyce,Administrator, Farm Service Agency.Robert Stephenson,Executive Vice President, Commodity Credit Corporation.[FR Doc. 2020-18148 Filed 8-19-20; 4:15 pm]BILLING CODE 3410-05-P

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Action

Final rule.Summary

This rule implements the mandatory changes required by the ***Agriculture*** Improvement Act of 2018 (2018 Farm Bill) and other changes made by the Farm Service Agency (FSA) on behalf of CCC. Specifically, the mandatory changes update program applicability and payment limitations; and specify that the Secretary may approve a waiver of the average adjusted gross income (AGI) limitation for participants of certain conservation contracts administered by FSA and the Natural Resources Conservation Service (NRCS) on environmentally sensitive ***land***. Also, the mandatory changes expand the definition of “family member” to include first cousins, nieces, and nephews. This rule also includes changes that make minor clarifications and updates throughout part 1400.Dates

Effective: August 20, 2020.For Further Information Contact

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This rule amends 7 CFR part 1400 to implement changes made by the 2018 Farm Bill; (Pub. L. 115-334) as well as makes certain changes, as explained below. This rule updates the applicable programs and payment limitations in 7 CFR 1400.1 to reflect current policy and changes made by the 2018 Farm Bill. FSA administers the regulations in 7 CFR part 1400 on behalf of CCC.Payment Limitations

The 2018 Farm Bill and this rule create two separate payment limitations for the Noninsured Crop Disaster Assistance Program (NAP). Previously, a person or legal entity was subject to a $125,000 payment limitation regardless of the level of NAP coverage obtained. For 2019 and subsequent years, the 2018 Farm Bill provides a separate per crop year maximum per person and legal entity limitation of either $125,000 for payments to those who purchased basic 50/55 NAP coverage or $300,000 for payments to those who purchased buy-up coverage. The 2018 Farm Bill increased the payment limitation for the Emergency Conservation Program (ECP) to $500,000 per program per disaster event.

The 2018 Farm Bill officially removed LDPs and MLGs from the combined payment limit. This rule ***removes*** the payment limits for Marketing Loan Gains (MLG), Loan Deficiency Payments (LDP), and the Emergency Assistance for Livestock, Honeybees and Farm Raised Fish Program (ELAP) as mandated by the 2018 Farm Bill (section 1703(a)(2) and section 1501(e) respectively).Waiver of AGI Limitation for Environmentally Sensitive ***Land*** of Special Significance

The 2018 Farm Bill does not change the AGI limitation of $900,000 for certain programs; however, it does authorize the Secretary to waive the AGI limitation for participants of certain conservation contracts administered by FSA or NRCS when the Secretary determines that environmentally sensitive ***land*** of special significance will be protected because of the waiver. The waiver authority allows FSA and NRCS the discretion, on a case-by-case basis, to provide benefits to producers who may not otherwise meet the AGI requirements on environmentally sensitive ***land*** of special significance. This rule defines “environmentally sensitive ***land*** of special significance” in § 1400.3 FSA and the NRCS identified specific critical resources warranting protection through enrollment in its definition. This rule also adds provisions in § 1400.500(f) to specify how a request for a waiver must be submitted and what it must include.Definition of Family Member

FSA is expanding the definition of “family member” as mandated by the 2018 Farm Bill to include first cousin, niece, and nephew. This change expands the definition to allow farming operations to qualify for additional payment limitations for an existing farming operation under the rules for a substantive change, which are specified in § 1400.104 Furthermore, joint operations that included a first cousin, niece, or nephew were previously determined to be farming operations comprised of non-family members. With this change, a joint operation comprised of the newly expanded definition of family members would no longer be subject to the limitation of members qualifying on a management contribution alone, which increases the number of additional individuals eligible for payment within joint operations comprised solely of family members.Other Changes

This rule makes several changes to the definitions in 7 CFR 1400.3 This rule amends the definitions of “active personal management,” and “significant contribution” as it relates to management in 7 CFR 1400.3 and ***removes*** the definitions of “active personal management,” “significant contribution of active personal management,” and “significant contribution of the combination of active personal labor and active personal management” previously in subpart G so that consistent definitions of the terms are used throughout part 1400. This rule also makes minor clarifications to the terms “interest in the farming operation” and “lawful alien.”

It adds a new definition of “livestock” for the purposes of part 1400, for which “livestock” includes animals that are considered eligible livestock under the Livestock Indemnity Program (LIP). This change is intended to clarify which species qualify as livestock and ensure that the animals considered to be “livestock” under part 1400 is consistent with the administration of other FSA programs.

This rule moves the provisions for revocable trusts from § 1400.100 (subpart B, Payment Limitation) to § 1400.7 (subpart A, General Provisions) because they are general provisions applicable to all of part 1400 and not just to the payment limitation provisions.

This rule amends the provisions in § 1400.102 to clarify that the policy that a state or political subdivision or one of its agencies is not eligible for payments or benefits under the programs in § 1400.1 This rule also clarifies that the exception in § 1400.102(b) applies only to payments or benefits under the ***Agriculture*** Risk Coverage (ARC) and Price Loss Coverage (PLC) programs.

This rule amends § 1400.104(a) to ***remove*** the reference to “legal entities.” This change aligns the regulation with current language in the 2018 Farm Bill.

This rule amends § 1400.104(a)(3) to ***remove*** “base acres” and add “***land*** used for ***agricultural*** production.” The addition of 20 percent or more ***land*** used for ***agricultural*** production will be recognized as a substantive change in the farming operation and will take into consideration ***land*** used for annual crop production as well as grazing ***lands***.

This rule is making a change in amending § 1400.104(a)(5) to specify that a change in ownership by sale or gift of livestock can be recognized as a substantive change in the farming operation, in addition to a sale or gift of ***land***, which already exists in the rule, such that the sale or gift of livestock can result in the application of additional payment limits under 7 CFR part 1400. The addition of livestock as an element for consideration used in determining whether a substantive change has occurred takes into consideration all of the aspects of a farming operation including but not limited to ***land*** but also livestock and the value of the ***land*** or livestock to a farming operation. Further, this change is appropriate as substantive change rules apply to all programs subject to payment limitation, including Livestock Forage Disaster Program (LFP).

This rule amends § 1400.106 to specify that payment limitations apply to both direct and indirect payments, subject to the attribution provisions in § 1400.105 This change is a clarification of and therefore codification of current policy and does not alter the way FSA applies payment limitations.

This rule moves the cash rent tenant provisions of subpart D to subpart C, in § 1400.214, which contains the payment eligibility requirements.

This rule makes a technical correction to the provision in the regulation that indicated a legal entity's or joint operation's eligible capital, ***land***, or equipment could not be acquired as a result of a loan made to, guaranteed by, cosigned by, or secured by any person, legal entity or joint operation that has an interest in the farming operation, including the legal entity's or joint operation's members. The technical correction ***removes*** the legal entity's or joint operation's members from the provision and relies on “interest in the farming operation” to define the qualifying contribution.

This rule makes minor changes to update the regulatory language throughout part 1400. These changes are intended to make the regulation easier to understand and do not affect program implementation.Effective Date, Notice and Comment, and Paperwork Reduction Act

As specified in 7 U.S.C 9091, the regulations to implement the provisions of Title I and the administration of Title I of the 2018 Farm Bill are exempt from the notice and comment provisions of the Administrative Procedure Act (5 U.S.C 553) and the Paperwork Reduction Act (in 44 U.S.C chapter 35). Section 9091 further directs the Secretary to use the authority in 5 U.S.C 808 related to congressional review and delay in the effective date.

The Administrative Procedure Act (5 U.S.C.553) provides that the 30-day delay in the effective date provision does not apply when the rule involves specified actions, including matters relating to benefits. This rule governs the eligibility provisions for programs providing benefits to farmers and ranchers and therefore that exemption applies to this rule.

Therefore, this rule is effective upon publication in the Federal Register.Executive Orders 12866, 13563, 13771 and 13777

Executive Order 12866, “Regulatory Planning and Review,” and Executive Order 13563, “Improving Regulation and Regulatory Review,” direct agencies to assess all costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). Executive Order 13563 emphasized the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. The requirements in Executive Orders 12866 and 13563 for the analysis of costs and benefits apply to rules that are determined to be significant. Executive Order 13777, “Enforcing the Regulatory Reform Agenda,” established a federal policy to alleviate unnecessary regulatory burdens on the American people.

The Office of Management and Budget (OMB) designated this rule as significant under Executive Order 12866 and therefore, OMB reviewed this rule. The costs and benefits of this rule are summarized below. The full cost benefit analysis is available on regulations.gov

Executive Order 13771, “Reducing Regulation and Controlling Regulatory Costs,” requires that, in order to manage the costs required to comply with Federal regulations, that for every new significant or economically significant regulation issued, the new costs must be offset by savings from deregulatory actions. OMB guidance in M-17-21, dated April 5, 2017, specifies that “transfers” are not covered by Executive Order 13771.Cost Benefit Analysis Summary

The cost benefit analysis evaluated changes to payment limits and payment eligibility mandated by the 2018 Farm Bill along with two other changes the rule is making in the regulation. This rule implements those changes by amending the regulations in 7 CFR part 1400. We estimate that the changes will increase Farm Program outlays by about $21.2 million per year. The largest increases are from elimination of the payment limit for ELAP and a new separate payment limit for those producers who choose buy-up coverage under NAP.Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C 601-612), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA, Pub. L. 104-121), generally requires an agency to prepare a regulatory flexibility analysis of any rule whenever an agency is required by the Administrative Procedure Act or any other law to publish a proposed rule, unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. This rule is not subject to the Regulatory Flexibility Act because USDA is not required by Administrative Procedure Act or any law to publish a proposed rule for this rulemaking.Environmental Review

The environmental impacts of this final rule have been considered in a manner consistent with the provisions of the National Environmental Policy Act (NEPA, 42 U.S.C 4321-4347), the regulations of the Council on Environmental Quality (40 CFR parts 1500-1508), and the FSA regulations for compliance with NEPA (7 CFR part 799). FSA has determined that the provisions identified in this final rule are administrative in nature, intended to clarify the mandatory requirements of the programs, as defined in the 2018 Farm Bill, and do not constitute a major Federal action that would significantly affect the quality of the human environment, individually or cumulatively. As this rule presents administrative clarifications only, it is categorically excluded under § 799.31(3)(i)) issuing minor technical corrections to regulations, handbooks, and internal guidance, as well as amendments to them; therefore, FSA will not prepare an environmental assessment or environmental impact statement for this regulatory action.Executive Order 12372

Executive Order 12372, “Intergovernmental Review of Federal Programs,” requires consultation with State and local officials that would be directly affected by proposed Federal financial assistance. The objectives of the Executive Order are to foster an intergovernmental partnership and a strengthened Federalism, by relying on State and local processes for State and local government coordination and review of proposed Federal financial assistance and direct Federal development. For reasons specified in the final rule related notice to 7 CFR part 3015, subpart V (48 FR 29115, June 24, 1983), the programs and activities within this rule are excluded from the scope of Executive Order 12372 which requires intergovernmental consultation with State and local officials.Executive Order 12988

This rule has been reviewed under Executive Order 12988, “Civil Justice Reform.” This rule will not preempt State or local laws, regulations, or policies unless they represent an irreconcilable conflict with this rule. The changes mandated by the 2018 Farm Bill were effective for the 2019 crop year. Other changes in this rule will not have retroactive effect. Before any judicial actions may be brought regarding the provisions of this rule, the administrative appeal provisions of 7 CFR parts 11 and 780 must be exhausted.Executive Order 13132

This rule has been reviewed under Executive Order 13132, “Federalism.” The policies contained in this rule do not have any substantial direct effect on States, on the relationship between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of government, except as required by law. Nor does this rule impose substantial direct compliance costs on State and local governments. Therefore, consultation with the States is not required.Executive Order 13175

This rule has been reviewed in accordance with the requirements of Executive Order 13175, “Consultation and Coordination with Indian Tribal Governments.” Executive Order 13175 requires Federal agencies to consult and coordinate with Tribes on a government-to-government basis on policies that have Tribal implications, including regulations, legislative comments or proposed legislation, and other policy statements or actions that have substantial direct effects on one or more Indian Tribes, on the relationship between the Federal Government and Indian Tribes or on the distribution of power and responsibilities between the Federal Government and Indian Tribes.

The USDA Office of Tribal Relations (OTR) has assessed the impact of this rule on Indian Tribes and determined that this rule does have significant Tribal implications. OTR has determined that further Tribal consultation under Executive Order 13175 is not required at this time.

Tribal consultation for this rule was included in the 2018 Farm Bill consultation held on May 1-2, 2019, at the National Museum of American Indian, in Washington, DC, and on June 26-27, 2019, in Sparks, NV. The portion of the Tribal consultation relative to this rule was conducted by Bill Northey, USDA Under Secretary for the Farm Production and Conservation mission area, as part of the Title I session. No comments regarding this rule were raised.

If a Tribe requests additional consultation, FSA and CCC will work with OTR to ensure meaningful consultation is provided where changes, additions, and modifications are not expressly mandated by law.The Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA, Pub. L. 104-4) requires Federal agencies to assess the effects of their regulatory actions of State, local, and Tribal governments or the private sector. Agencies generally must prepare a written statement, including cost benefits analysis, for proposed and final rules with Federal mandates that may result in expenditures of $100 million or more in any 1 year for State, local or Tribal governments, in the aggregate, or to the private sector. UMRA generally requires agencies to consider alternatives and adopt the more cost effective or least burdensome alternative that achieves the objectives of the rule. This rule contains no Federal mandates, as defined in Title II of UMRA, for State, local and Tribal governments or the private sector. Therefore, this rule is not subject to the requirements of sections 202 and 205 of UMRA.E-Government Act Compliance

FSA and CCC are committed to complying with the E-Government Act, to promote the use of the internet and other information technologies to provide increased opportunities for citizen access to Government information and services, and for other purposes.Federal Assistance Programs

The title and number of the Federal Domestic Assistance Programs found in the Catalog of Federal Domestic Assistance to which this rule applies are:

10.051—Commodity Loans and Loan Deficiency Payments

10.069—Conservation Reserve Program

10.088—Livestock Indemnity Program

10.089—Livestock Forage Disaster Program

10.091—Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish Program

10.092—Tree Assistance Program

10.113—***Agriculture*** Risk Coverage

10.112—Price Loss Coverage

10.451—Noninsured Assistance

10.912—Environmental Quality Incentives Program

10.917—***Agricultural*** Management AssistanceList of Subjects in 7 CFR Part 1400

***Agriculture***, Grant programs—***agriculture***, Loan programs—***agriculture***, Natural resources, Price support programs.

For the reasons discussed above, CCC amends 7 CFR part 1400 as follows:Part 1400 Payment Limitation and Payment EligibilityRegulatory Text

1. The authority citation continues to read as follows:Authority:

7 U.S.C 1308, 1308-1, 1308-2, 1308-3, 1308-3a, 1308-4, and 1308-5; and Title I, Pub. L. 115-123.Subpart a General ProvisionsRegulatory Text

2. Amend § 1400.1 as follows:

a. Revise paragraph (a)(1);

b. In paragraph (a)(6), ***remove*** the word “and”;

c. In paragraph (a)(7), ***remove*** the period and add “; and” in its place;

d. Redesignate paragraph (a)(8) as paragraph (a)(9);

e. Add new paragraph (a)(8);

f. In newly redesignated paragraph (a)(9), ***remove*** the reference “Subparts C, D, and G” and add “Subparts C and G” in its place and ***remove*** “through (7)” and add “through (8)” in its place;

g. In paragraph (b)(1), ***remove*** “(5),”;

h. In paragraph (b)(3), ***remove*** the reference “Paragraph (a)(6)” and add the references “Paragraphs (a)(5) and (6)” in its place and ***remove*** the word “and” at the end of the paragraph;

i. In paragraph (b)(4), ***remove*** the period and add “; and” in its place;

j. Add paragraph (b)(5); and

k. Revise paragraph (f).

The additions and revisions read as follows.§ 1400.1 Applicability.

(a) \* \* \*

(1) The ***Agriculture*** Risk Coverage (ARC) and Price Loss Coverage (PLC) Programs, part 1412 of this chapter;

\* \* \* \* \*

(8) The Emergency Conservation Program (ECP) and Emergency ***Forest*** Restoration Program (EFRP) in part 701 of this title.

\* \* \* \* \*

(b) \* \* \*

(5) Paragraph (a)(8) of this section on a per disaster event basis.

\* \* \* \* \*

(f) The following amounts are the limitations on payments per person or legal entity for the applicable period for each payment or benefit.Table 1 to Paragraph (f) Payment or benefit Limitation per person or legal entity($)(1) Price Loss Coverage, ***Agriculture*** Risk Coverage payments (other than Peanuts) 125,000 per program year.(2) Price Loss Coverage and ***Agriculture*** Risk Coverage payments for Peanuts 125,000 per program year.(3) CRP annual rental payments 50,000 per program year.(4) NAP payments (i) basic 50/55 NAP coverage 125,000 per crop year.(ii) Buy-up NAP coverage 300,000 per crop year.(5) LFP 125,000 per program year.(6) CSP 1 200,000.(7) EQIP 2 450,000.(8) AMA program 50,000 per fiscal year.(9) ECP 500,000 per disaster event.(10) EFRP 500,000 per disaster event.§ 1400.2[Amended]Regulatory Text

3. Amend § 1400.2 as follows:

a. In paragraph (c) introductory text, ***remove*** the word “such” and add the words “the county” in its place;

b. In paragraph (c)(1), ***remove*** the word “such” and add the word “the” in its place;

c. In paragraph (f), ***remove*** the words “such determinations” and add the words “the determinations” in their place and ***remove*** the words “such year” and add the words “the applicable year” in their place; and

d. In paragraph (h), ***remove*** the words “such reviews” and add “the reviews” in their place.

4. Amend § 1400.3(b) as follows:

a. Revise the definitions of “Active personal management” and “Capital”;

b. Add the definition of “Environmentally sensitive ***land*** of special significance” in alphabetical order;

c. In the definition of “Equipment”, ***remove*** the words “Such equipment” and add the words “The equipment” in their place and ***remove*** the words “such equipment” each time they appear and add the words “the equipment” in their place;

d. In the definition of “Family member”, ***remove*** the words “spouse, or” and add the words “first cousin, niece, nephew, spouse, or” in their place;

e. In the definition of “Farming operation”, ***remove*** the words “such person” and add the words “the person” in their place;

g. ***Remove*** the definition of “Interest in a farming operation”;

h. Add the definition of “Interest in the farming operation” in alphabetical order;

i. In the definition of “***Land***”, ***remove*** the word “Such” and add the word “The” in its place, ***remove*** the words “If such” and add the words “If the” in their place, and ***remove*** the words “crop or crop proceeds, such” and add “farming operation, the” in their place;

j. In the definition of “Lawful alien”, ***remove*** the words “a valid Alien Registration Receipt Card” and add the words “appropriate valid credentials” in their place;

k. Add the definition of “Livestock” in alphabetical order;

l. In the definition of “Sharecropper”, ***remove*** the words “such crop” and add the words “the crop” in their place and ***remove*** the words “the provision of such labor” and add the word “work” in their place; and

m. Revise the definition of “Significant contribution”.

The additions and revisions read as follows:§ 1400.3 Definitions.

\* \* \* \* \*

(b) \* \* \*

Active personal management means personally providing and participating in activities considered critical to the profitability of the farming operation and performed under one or more of the following categories:

(1) Capital, which includes:

(i) Arranging financing and managing capital;

(ii) Acquiring equipment;

(iii) Acquiring ***land*** or negotiating leases;

(iv) Managing insurance; and

(v) Managing participation in USDA programs;

(2) Labor, which includes hiring and managing of hired labor; and

(3) Agronomics and marketing, which includes:

(i) Selecting crops and making planting decisions;

(ii) Acquiring and purchasing crop inputs;

(iii) Managing crops (that is, whatever managerial decisions are needed with respect to keeping the growing crops living and healthy—soil fertility and fertilization, weed control, insect control, irrigation if applicable) and making harvest decisions; and

(iv) Pricing and marketing of crop production.

\* \* \* \* \*

Capital means the funding provided by a person or legal entity to the farming operation for the operation to conduct farming activities. In determining whether a person or legal entity has independently contributed capital, in the form of funding, to the farming operation, the capital must have been derived from a fund or account separate and distinct from that of any other person or legal entity with an interest in the farming operation. Capital does not include the value of any labor or management that is contributed to the farming operation or any outlays for ***land*** or equipment. A capital contribution must be a direct out-of-pocket input of a specified sum or an amount borrowed by the person or legal entity and does not include advance program payments.

\* \* \* \* \*

Environmentally sensitive ***land*** of special significance means ***land*** offered for enrollment or adjacent to the ***land*** offered for enrollment that contains, or through enrollment will address, critical resources including, but not limited to:

(1) Habitat for threatened, endangered, or at-risk species;

(2) Historical or cultural resources;

(3) Native grasslands;

(4) Unique wetlands;

(5) Rare, unique, or related soils; and

(6) Critical groundwater recharge areas.

\* \* \* \* \*

Interest in the farming operation means any of the following:

(1) Owner, lessor, or lessee of the ***land*** in the farming operation;

(2) An interest in the ***agricultural*** products, commodities, or livestock produced by the farming operation; or

(3) A member of a joint operation that is an owner, lessor, or lessee of the ***land*** in the farming operation or has an interest in the ***agricultural*** products, commodities, or livestock produced by the farming operation.

\* \* \* \* \*

Livestock means those animals included in § 1416.304(a) of this chapter.

\* \* \* \* \*

Significant contribution means the provision of the following to a farming operation:

(1) ***Land***, capital, or equipment:

(i) For ***land***, capital, or equipment contributed independently by a person or legal entity, a contribution that has a value at least equal to 50 percent of the person's or legal entity's commensurate share of the total:

(A) Value of the capital necessary to conduct the farming operation;

(B) Rental value of the ***land*** necessary to conduct the farming operation; or

(C) Rental value of the equipment necessary to conduct the farming operation; or

(ii) If the contribution by a person or legal entity consists of any combination of ***land***, capital, and equipment, the combined contribution must have a value at least equal to 30 percent of the person's or legal entity's commensurate share of the total value of the farming operation.

(2) For active personal labor, an amount contributed by a person or members, stockholders, or partners of a legal entity to the farming operation that is described by the smaller of the following:

(i) 1,000 hours per calendar year; or

(ii) 50 percent of the total hours that would be necessary to conduct a farming operation that is comparable in size to the person's or legal entity's commensurate share in the farming operation.

(3) For active personal management, includes activities performed by a person, with a direct or indirect ownership interest in the farming operation or a legal entity, on a regular, continuous, and substantial basis to the farming operation and meets at least one of the following to be considered significant:

(i) Performs at least 25 percent of the total management hours required for the farming operation on an annual basis; or

(ii) Performs at least 500 hours of management annually for the farming operation.

(4) With respect to a combination of active personal labor and active personal management, when neither contribution by itself meets the requirement of paragraphs (2) and (3) of this definition, a combination of active personal labor and active personal management that, when made together:

(i) Is critical to the profitability of the farming operation;

(ii) Is performed on a regular, continuous, and substantial basis; and

(iii) Meets the following required number of hours:Table 1 to Paragraph (4)(iii) of the Definition of Significant Contribution Combination of active personal labor and active personal management minimum requirement for a significant contribution Management contribution in hours Labor contribution in hours Meets the minimum threshold for significant contribution, in hours475 75 550450 100 550425 225 650400 250 650375 375 750350 400 750325 425 750300 550 850275 575 850250 600 850225 625 850200 650 850175 675 850150 800 950125 825 950100 850 95075 875 95050 900 95025 925 950

\* \* \* \* \*

5. Amend § 1400.5 as follows:

a. In paragraph (b) introductory text, ***remove*** the word “Such” and add the words “Examples of” in its place;

b. In paragraph (b)(3) introductory text, ***remove*** the words “Indicators of such business arrangement” and add the words “Examples of business arrangements or acts” in their place;

c. In paragraph (c), ***remove*** the words “such person” and add “the person” in their place, ***remove*** the words “for such” and add the word “the” in their place, and add the words “perpetrated or” after the words “device was”; and

d. Revise paragraph (d) introductory text.

The revision reads as follows:§ 1400.5 Denial of program benefits.

\* \* \* \* \*

(d) A person or legal entity that lies or perpetuates fraud, commits fraud, or participates in equally serious actions for the benefit of the person or legal entity, or the benefit of any other person or legal entity, to exceed the applicable limit on payments or the requirements of this part will be subject to a 5-year denial of all program benefits. Examples of equally serious actions include, but are not limited to:

\* \* \* \* \*

5. Revise § 1400.6(a) to read as follows:§ 1400.6 Joint and several liability.

(a) Any legal entity, including joint operations, and any member of a legal entity determined to have knowingly participated in a scheme or device, or other equally serious actions to evade the payment limitation provisions in this part, or that has the purpose of evading the provisions of this part, will be jointly and severally liable for any amounts determined to be payable as the result of the scheme or device, or other examples of equally serious actions mentioned in this section or in § 1400.5, including amounts necessary to recover the payments.

\* \* \* \* \*

6. Add § 1400.7 to read as follows:§ 1400.7 Revocable trust.

A revocable trust and the grantor will be considered to be the same person under this part.§ 1400.8[Amended]Regulatory Text

7. In § 1400.8, ***remove*** the word “such” both times it appears and add the word “the” in its place.§ 1400.9[Amended]Regulatory Text

8. In § 1400.9(a) introductory text, ***remove*** the word “such” and add the word “the” in its place.Subpart B Payment Limitation§ 1400.100[Removed and Reserved]Regulatory Text

9. ***Remove*** and reserve § 1400.100 § 1400.101[Amended]Regulatory Text

10. Amend § 1400.101 as follows:

a. In paragraph (a), ***remove*** the words “such a” and add the words “the” in their place;

b. In paragraph (b)(2), ***remove*** the words “such minor” and add the words “the minor” in their place;

c. In paragraph (b)(3) introductory text, ***remove*** the word “such” and add the word “the” in its place; and

d. In paragraph (c), ***remove*** the word “such” and add the word “the” in its place.§ 1400.102[Amended]Regulatory Text

11. Amend § 1400.102 as follows:

a. In paragraph (a), ***remove*** the reference “§ 1400.1(a)(1)” and add “§ 1400.1” in its place;

b. In paragraph (b) introductory text, ***remove*** the reference “§ 1400.1” and add the reference “§ 1400.1(a)(1)” in its place; and

c. In paragraph (c), ***remove*** the word “such” and add the word “the” in its place.§ 1400.103[Amended]Regulatory Text

12. In § 1400.103(a), ***remove*** the words “such an” and add the word “the” in their place and ***remove*** the words “such organization” and add the words “the organization” in their place.§ 1400.104[Amended]Regulatory Text

13. Amend § 1400.104 as follows:

a. In paragraph (a) introductory text, ***remove*** the words “or legal entities”;

b. In paragraph (a)(1), ***remove*** the words “such an” and add the word “the” in their place;

c. In paragraph (a)(3) introductory text, ***remove*** the words “base acres not” and add the words “***land*** used for ***agricultural*** production not” in their place and ***remove*** the words “total base acres” and add the words “total ***land***” in their place;

d. In paragraph (a)(3)(i), ***remove*** the words “such an increase in base acres” and add “the increase in ***agricultural*** ***land***” in their place;

e. In paragraph (a)(3)(ii), ***remove*** the words “base acres” and add the words “***agricultural*** ***land***” in their place;

f. In paragraph (a)(4), ***remove*** “such” each time it appears and add the word “the” in its place;

g. In paragraphs (a)(4)(i) through (iv), ***remove*** the comma and add a semicolon in its place;

h. In paragraph (a)(5) introductory text, add the words “or livestock” after the words “gift of ***land***” both times they appear and ***remove*** the word “such” and add the word “the” in its place;

i. In paragraph (a)(5)(i), ***remove*** the words “such ***land***” and add the words “the ***land*** or livestock” in their place and ***remove*** the comma and add a semicolon in its place;

j. In paragraph (a)(5)(ii), add the words “or livestock” after the words “of ***land***”, ***remove*** the words “the ***land***'s fair” and add the words “***land***'s or livestock's fair” in their place, and ***remove*** the comma and add a semicolon in its place;

k. In paragraph (a)(5)(iii), ***remove*** the words “the ***land***” and add the words “the ***land*** or livestock” in their place and ***remove*** “such ***land***,” and add “the ***land*** or livestock;” in its place;

l. In paragraph (a)(5)(iv), ***remove*** the comma and add a semicolon in its place;

m. In paragraph (a)(5)(v), ***remove*** the words “the ***land***” and add the words “the ***land*** or livestock” in their place; and

n. In paragraph (b), ***remove*** the words “or legal entities”.§ 1400.105[Amended]Regulatory Text

14. In § 1400.105(d) introductory text, ***remove*** the words “or legal entity's”.§ 1400.106[Amended]Regulatory Text

15. In § 1400.106(a), ***remove*** the words “Payments” and add the words “Direct or indirect payments” in its place and add the words “and will be determined in accordance with § 1400.105” at the end of the paragraph.Subpart C Payment Eligibility§ 1400.201[Amended]Regulatory Text

16. Amend § 1400.201 as follows:

a. In paragraph (a), ***remove*** the word “such” and add the word “the” in its place; and

b. In paragraph (d)(3), ***remove*** the words “such a” and add the word “the” in their place.

17. Amend § 1400.202 as follows:

a. In paragraph (c) introductory text, ***remove*** the words “such capital” and add the words “the capital” in their place; and

b. Revise paragraph (c)(1).

The revision reads as follows:§ 1400.202 Persons.

\* \* \* \* \*

(c) \* \* \*

(1) To meet the requirements of paragraph (a)(1)(i) of this section, must be contributed directly by the person and must not be acquired as a result of a loan made to, guaranteed, co-signed, or secured by any other person, joint operation, or legal entity that has an interest in the farming operation; and

\* \* \* \* \*

18. Amend § 1400.203 as follows:

a. In paragraph (a)(1)(ii)(C), ***remove*** the word “such” and add the word “the” in its place;

b. In paragraph (b) introductory text, ***remove*** the word “such” and add the word “the” in its place both time it appears;

c. Revise paragraph (b)(1);

d. In paragraph (b)(2) introductory text, ***remove*** “(a)(3)” and add “(3)” in its place and ***remove*** the words “as defined”; and

e. In paragraph (c), ***remove*** “(b)(3)” and add “(3)” in its place and ***remove*** the word “such” to add the word “the” in its place.

The revision reads as follows:§ 1400.203 Joint operations.

\* \* \* \* \*

(b) \* \* \*

(1) To meet the requirements of paragraph (a)(1)(i) of this section, and if contributed directly by the joint operation, must not be acquired as a loan made to, guaranteed, co-signed, or secured by any person, legal entity, or other joint operation that has an interest in the farming operation; and

\* \* \* \* \*

19. Amend § 1400.204 as follows:

a. In paragraph (a)(2)(iii), ***remove*** the word “such” and add the word “the” in its place;

b. In paragraph (d) introductory text, ***remove*** the word “such” and add the word “the” in its place; and

c. Revise paragraph (d)(1).

The revision reads as follows:§ 1400.204 Limited partnerships, limited liability partnerships, limited liability companies, corporations, and other similar legal entities.

\* \* \* \* \*

(d) \* \* \*

(1) To meet the requirements of paragraph (a)(1) of this section, must be contributed directly by the legal entity and must not be acquired as a loan made to, guaranteed, co-signed, or secured by any person, legal entity, or joint operation that has an interest in the farming operation, as defined in this part; and

\* \* \* \* \*

20. Amend § 1400.205 as follows:

a. In paragraph (e) introductory text, ***remove*** the word “such” and add the word “the” in its place; and

b. Revise paragraph (e)(1).

The revision reads as follows:§ 1400.205 Trusts.

\* \* \* \* \*

(e) \* \* \*

(1) To meet the requirements of paragraph (a) of this section, must be contributed directly by the trust and must not be acquired as a loan made to, guaranteed, co-signed, or secured by any person, legal entity, or joint operation that has an interest in the farming operation, as defined in this part; and

\* \* \* \* \*

21. Amend § 1400.206 as follows:

a. In paragraph (b) introductory text, ***remove*** the word “such” and add the word “the” in its place; and

b. Revise paragraph (b)(1).

The revision reads as follows:§ 1400.206 Estates.

\* \* \* \* \*

(b) \* \* \*

(1) To meet the requirements of paragraph (a) of this section, must be contributed directly by the estate and must not be acquired as a loan made to, guaranteed, co-signed, or secured by any person, legal entity, or joint operation that has an interest in the farming operation, as defined in this part; and

\* \* \* \* \*§ § 1400.207, 1400.208, 1400.209, 1400.210, 1400.212, and 1400.213[Amended]Regulatory Text

22. In §§ 1400.207 through 1400.213, ***remove*** the word “such” and add the word “the” in its place in the following places:

a. In § 1400.207(a) introductory text, (a)(1), and (b);

b. In § 1400.208(b)(1) and (2);

c. In § 1400.209(a) and (b)(2) and (3);

d. In § 1400.210;

e. In § 1400.212; and

f. In § 1400.213

23. Add § 1400.214 to read as follows:§ 1400.214 Cash rent tenants.

(a) Any tenant that is actively engaged in farming in accordance with the provisions of this subpart and conducts a farming operation in which the tenant rents the ***land*** for cash, for a crop share guaranteed as to the amount of the commodity, or by any arrangement in which the tenant does not compensate the landlord by cash or a crop share, and receives benefits, with respect to the ***land*** under a program specified in § 1400.1(a)(1) and (2) will not be eligible to receive any payment with respect to the cash-rented ***land*** unless the tenant independently makes a significant contribution to the farming operation of:

(1) Active personal labor; or

(2) Significant contributions of both active personal management and equipment.

(b) If the equipment is leased by the tenant from:

(1) The landlord, then the lease must reflect the fair market value of the equipment leased with a payment schedule considered reasonable and customary for the area; or

(2) The same person or legal entity that is providing hired labor to the farming operation, then the contracts for the lease of the equipment and for the hired labor must be two separate contracts.

(c) If the equipment is leased by the tenant from the landlord, or from the same person or legal entity that is providing hired labor to the farming operation, then the tenant must exercise complete control over the leased equipment during the entire current crop year. Complete control is defined as exclusive access and use by the tenant.

(d) If the cash rent tenant is a joint operation, then each member or their spouse must make a significant contribution of active personal labor or active personal management as specified in § 1400.203(a)(1)(ii) to be considered eligible for the member's share of the program payments received by the joint operation on the cash rented ***land***.

(e) If the cash rent tenant is a legal entity, then a significant contribution of active personal labor or active personal management must be made to the legal entity as specified in § 1400.204(a)(2) for the legal entity to be considered eligible for the program payments on the cash rented ***land***.Subpart D Removed and ReservedRegulatory Text

24. ***Remove*** and reserve subpart D, consisting of § 1400.301 Subpart E Foreign Persons§ 1400.401[Amended]Regulatory Text

25. Amend § 1400.401 as follows:

a. In paragraph (a), ***remove*** the words “such person” and add the words “the person” in their place both times they appear, ***remove*** the words “such farm” and add the words “the farm” in their place, ***remove*** the words “such an” and add the word “that” in their place, and ***remove*** “these regulations” and adds “the regulations in this subpart” in its place;

b. In paragraph (b)(1), ***remove*** the words “such a legal” and add the words “the legal” in their place and ***remove*** the words “such legal” and add the words “the legal” in their place;

c. In paragraph (b)(2) introductory text, ***remove*** the word “such” and add the word “the” in its place;

d. In paragraph (b)(3), ***remove*** the words “in such” and add “in” in their place;

e. In paragraph (b)(4), ***remove*** the words “in such” and add the word “in” in their place and ***remove*** the words “such payment” and add the words “the payment” in their place; and

f. In paragraph (b)(5), ***remove*** the words “such percentage” and add the words “the percentage” in their place, ***remove*** the words “such stock” and add the words “the stock” in their place, and ***remove*** the words “such class” and add the word “class” in their place.§ 1400.402[Amended]Regulatory Text

26. Amend § 1400.402 as follows:

a. In paragraph (a)(1), ***remove*** the word “such” and add the word “the” in its place;

b. In paragraph (a)(2), ***remove*** the word “Such” and add the word “The” in its place; and

c. In paragraph (b), ***remove*** the words “Such written” and add the word “Written” in their place and ***remove*** “such” and add “the” in its place.Subpart F Average Adjusted Gross Income LimitationRegulatory Text

27. Amend § 1400.500 as follows:

a. In paragraph (c), ***remove*** the word “such” and add the word “the” in its place; and

b. Add paragraph (f).

The addition reads as follows:§ 1400.500 Applicability.

\* \* \* \* \*

(f) The Administrator or NRCS Chief may waive the limitation under this section on a case-by-case basis for the protection of environmentally sensitive ***land*** of special significance. A waiver request must be in writing and:

(1) Show that use of conservation program funding on or adjacent to environmentally sensitive ***land*** of special significance is critical to the success of a project that provides conservation benefits to multiple producers or landowners in a community, watershed, or other geographic area;

(2) Demonstrate that the proposed action achieves enduring protection of environmentally sensitive ***land*** of special significance through use of a long-term agreement that is greater than 15 years in duration or through use of a deed restriction on the ***land***; or

(3) Present evidence that otherwise demonstrates, as determined by the Administrator or the NRCS Chief, that the waiver is necessary to address the critical natural resources referenced in the definition of environmentally sensitive ***land*** of special significance.§ 1400.501[Amended]Regulatory Text

28. Amend § 1400.501 as follows:

a. In paragraph (a)(2), ***remove*** the word “such” and add the word “the” in its place; and

b. In paragraph (b), ***remove*** the word “such” and add the word “this” in its place.§ 1400.503[Amended]Regulatory Text

29. In § 1400.503, ***remove*** the word “such” each time it appears and add the word “the” in its place.Subpart G Additional Payment Eligibility Provisions for Joint Operations and Legal Entities Comprised of Non Family Members or Partners Stockholders or Persons with an Ownership Interest in the Farming Operation§ 1400.601[Removed and Reserved]Regulatory Text

30. ***Remove*** and reserve § 1400.601 § 1400.602[Amended]Regulatory Text

33. Amend § 1400.602 as follows:

a. In paragraphs (a)(1) and (2) introductory text, ***remove*** the word “such” each time it appears;

b. In paragraph (a)(3) introductory text, ***remove*** the words “one such” and add the word “one” in their place and ***remove*** the words “with such” and add the words “with that” in their place; and

c. In paragraphs (b) and (e), ***remove*** the word “such” each time it appears and add the word “the” in its place.Richard Fordyce,Administrator, Farm Service Agency.Robert Stephenson,Executive Vice President, Commodity Credit Corporation.[FR Doc. 2020-18148 Filed 8-19-20; 4:15 pm]BILLING CODE 3410-05-P

**Load-Date:** August 26, 2020

**End of Document**



[***Managing peatlands to cut greenhouse gas emissions***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62H2-9KX1-F0YC-N211-00000-00&context=1516831)

Impact News Service

April 21, 2021 Wednesday

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**Length:** 1009 words

**Body**

London: University of Leeds has issued the following news release:

Substantial cuts in global greenhouse gas ***emissions*** could be achieved by raising water levels in ***agricultural*** peatlands, according to a new study.

Peatlands occupy just three per cent of the world’s ***land*** surface area but store a similar amount of carbon to all terrestrial vegetation, as well as supporting unique biodiversity.

In their natural state, they can mitigate climate change by continuously ***removing*** carbon dioxide (CO2) from the atmosphere and storing it securely under waterlogged conditions for thousands of years. But many peatland areas have been substantially modified by human activity, including drainage for ***agriculture*** and ***forest*** plantations

This results in the release of the equivalent of around 1.5 billion tonnes of CO2 into the atmosphere each year – which equates to three per cent of all global greenhouse gas (GHG) ***emissions*** caused by human activities.

“This study emphasises the importance of peatlands as a global carbon store and the need to raise water tables in damaged peatlands.”ANDY BAIRD, PROFESSOR OF WETLAND SCIENCE

A research team, including scientists from the University of Leeds, studied CO2 ***emissions*** in 16 peatland areas and methane ***emissions*** in 41 peatland areas across the British Isles, along with data from other countries and estimated the potential reduction in ***emissions*** by restoring all global ***agricultural*** peatlands.

However, because large populations rely on these areas for their livelihoods, it may not be realistic to expect all ***agricultural*** peatlands to be fully rewetted and returned to their natural condition in the near future.

The team therefore also analysed the impact of halving current drainage depths in croplands and grasslands on peat – which cover over 250,000 km2 globally – and showed that this could still bring significant benefits for climate change mitigation. The study estimates this could cut ***emissions*** by around 500 million tonnes of CO2 a year, which equates to one per cent of all global GHG ***emissions*** caused by human activities.

Published today in Nature, the study included methane data collected by the University of Leeds from two sites on Thorne Moors, which forms part of Yorkshire’s Humberhead Peatlands. Together with Goole, Crowle and Hatfield Moors, these areas represent the largest area (2887 ha) of raised bog in lowland Britain.

The research paper’s co-authors include Professor Andy Baird, Professor Pippa Chapman, Dr Richard Grayson and Professor Joseph Holden, from Leeds’ School of Geography.

Professor Chapman said: “The Humberhead Peatlands are a remnant of a large wetland that used to occupy the landscape.

“Peat has been drained, cut and extracted from the site throughout recorded history for fuel, animal bedding and more recently horticultural use.

“This has left the area with too varied a water table to allow peat formation. Work is ongoing to restore these peatlands and return them to a favourable condition and our latest research shows that this regional effort will be of great benefit from a carbon ***emissions*** perspective. ”

Professor Baird added: 'This study emphasises the importance of peatlands as a global carbon store and the need to raise water tables in damaged peatlands.

“Researchers at Leeds are using newly-developed computer models across several projects to help improve peatland management and simulate the fate of damaged and restored peatlands into the future under a warming climate.'

A large proportion of the global greenhouse gases from peatlands are produced in Europe and Southeast Asia, with the total ***land*** area of many countries including the UK now a net source, not a sink, of GHGs due to ***emissions*** from degraded peat. The study’s authors say there is a growing recognition of the significance of peatlands for the global climate system, with efforts to curb ***emissions*** by conservation of undrained peatlands and rewetting of drained sites intensifying.

Lead author Professor Chris Evans, of the UK Centre for Ecology and Hydrology, said: “Widespread peatland degradation will need to be addressed if the UK and other countries are to achieve their goal of net zero greenhouse gas ***emissions*** by 2050, as part of their contribution to the Paris climate agreement ***targets***.

“Concerns over the economic and social consequences of rewetting ***agricultural*** peatlands have prevented large-scale restoration, but our study shows the development of locally appropriate mitigation measures could still deliver substantial reductions in ***emissions***. ”

Professor Evans and his fellow authors recognise the practical challenges, for example controlling water levels and storage, as well as cultivating crops suited to the waterlogged conditions of peatlands, known as ‘paludiculture’.

Research into wetland-adapted crops is underway but does not yet provide commercially viable large-scale alternatives to conventional farming.

However, the scientists point out there is plenty of scope to partially rewet ***agricultural*** peatlands without severely affecting production because many sites are over-drained – sometimes to over two metres – and often when no crop is present.

Professor Holden said: 'The Yorkshire and Humber region is host to a huge amount of peatland both in the uplands and lowlands.

“This new research shows that investment in much more peatland restoration in the region, that raises water tables in degraded areas, would really make a big difference to the UK in meeting its net zero carbon ***emissions*** ***targets***.'

In addition to increased ***emissions***, drainage of peatlands causes ***land*** subsidence and soil compaction, which affects soil health and exposes low-lying areas to increasing flood risk. It also deprives rare wetland-adapted plants, insects and mammals of important habitats.

The study in Nature also involved authors from the Swedish University of ***Agricultural*** Sciences, the James Hutton Institute, Bangor University, Durham University, Queen Mary University of London, University of Birmingham, University of Leicester, Rothamsted Research and Frankfurt University.

**Load-Date:** April 22, 2021

**End of Document**



[***SENATE COMMITTEE MEETINGS; Congressional Record Vol. 167, No. 100 (Extensions of Remarks - June 09, 2021)***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62WN-CVX1-JDG9-Y48K-00000-00&context=1516831)

Impact News Service

June 10, 2021 Thursday

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**Length:** 1917 words

**Body**

Washington: The Library of Congress, The Government of USA has issued the following Speech:

Title IV of Senate Resolution 4, agreed to by the Senate of February 4, 1977, calls for establishment of a system for a computerized schedule of all meetings and hearings of Senate committees, subcommittees, joint committees, and committees of conference. This title requires all such committees to notify the Office of the Senate Daily Digest--designated by the Rules Committee--of the time, place and purpose of the meetings, when scheduled and any cancellations or changes in the meetings as they occur. As an additional procedure along with the computerization of this information, the Office of the Senate Daily Digest will prepare this information for printing in the Extensions of Remarks section of the Congressional Record on Monday and Wednesday of each week. Meetings scheduled for Thursday, June 10, 2021 may be found in the Daily Digest of today's Record. MEETINGS SCHEDULED JUNE 15 9:30 a.m Committee on Armed Services To hold hearings to examine the posture of the Department of the Army in review of the Defense Authorization Request for fiscal year 2022 and the Future Years Defense Program; with the possibility of a closed session in SVC-217 immediately following the open session. SD-G50 10 a.m Committee on Appropriations Subcommittee on ***Agriculture***, Rural Development, Food and Drug Administration, and Related Agencies To hold hearings to examine proposed budget estimates and justification for fiscal year 2022 for the Department of ***Agriculture***. SD-124 Committee on Banking, Housing, and Urban Affairs To hold hearings to examine 21st century communities, focusing on local leaders on the infrastructure needs facing America's states, cities, and towns. WEBEX Committee on Energy and Natural Resources To hold hearings to examine the President's proposed budget request for fiscal year 2022 for the Department of Energy. SD-366 Committee on Finance To hold hearings to examine mental health care in America, focusing on addressing root causes and identifying policy solutions. SD-215 Committee on Foreign Relations To hold hearings to examine the nominations of Todd D. Robinson, of New Jersey, to be an Assistant Secretary (International Narcotics and Law Enforcement Affairs), Brett M. Holmgren, of Minnesota, to be an Assistant Secretary (Intelligence and Research), and Daniel J. Kritenbrink, of Virginia, to be an Assistant Secretary (East Asian and Pacific Affairs), all of the Department of State. SH-216/VTC Committee on the Judiciary To hold hearings to examine H.R 6, to authorize the cancellation of ***removal*** and adjustment of status of certain aliens. SD-106 2 p.m Committee on Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies To hold hearings to examine proposed budget estimates and justification for fiscal year 2022 for the National Aeronautics and Space Administration. SD-192 2:30 p.m Committee on Armed Services Subcommittee on Airland To hold hearings to examine Army modernization in review of the Defense Authorization Request for Fiscal Year 2022. SR-232A Committee on the Judiciary Subcommittee on Competition Policy, Antitrust, and Consumer Rights To hold hearings to examine protecting competition and innovation in home technologies. SD-226 Select Committee on Intelligence To hold closed hearings to examine certain intelligence matters. SH-219 3 p.m Committee on Commerce, Science, and Transportation Subcommittee on Tourism, Trade, and Export Promotion To hold hearings to examine the state of outdoor tourism, recreation, and ecotourism. SR-253 JUNE 16 Time to be announced Committee on Health, Education, Labor, and Pensions Business meeting to consider the nominations of Gwen Graham, of Florida, to be Assistant Secretary for Legislation and Congressional Affairs, Department of Education, Rajesh D. Nayak, of Maryland, Taryn Mackenzie Williams, of the District of Columbia, and Douglas L. Parker, of West Virginia, each to be an Assistant Secretary of Labor, and Dawn Myers O'Connell, of the District of Columbia, to be Assistant Secretary for Preparedness and Response, and Miriam E. Delphin- Rittmon, of Connecticut, to be Assistant Secretary for Mental Health and Substance Use, both of the Department of Health and Human Services. TBA 9:30 a.m Committee on Homeland Security and Governmental Affairs Business meeting to consider the nominations of Robin Carnahan, of Missouri, to be Administrator of General Services, Jen Easterly, of New York, to be Director of the Cybersecurity and Infrastructure Security Agency, Department of Homeland Security, and Chris Inglis, of Maryland, to be National Cyber Director. SD-342 10 a.m Committee on Appropriations Subcommittee on Interior, Environment, and Related Agencies To hold hearings to examine proposed budget estimates and justification for fiscal year 2022 for the Department of the Interior. SD-124 Committee on Appropriations Subcommittee on Labor, Health and Human Services, and Education, and Related Agencies To hold hearings to examine proposed budget estimates and justification for fiscal year 2022 for the Department of Education. SD-138 Committee on Appropriations Subcommittee on Military Construction and Veterans Affairs, and Related Agencies To hold hearings to examine proposed budget estimates and justification for fiscal year 2022 for military construction and family housing. SD-192 Committee on Commerce, Science, and Transportation Business meeting to consider S. 66, to require the Inter- Agency Task Force on Harmful Algal Blooms and Hypoxia to develop a plan for reducing, mitigating, and controlling harmful algal blooms and hypoxia in South Florida, S. 1747, to provide for an equitable management of summer flounder based on geographic, scientific, and economic data, S. 1890, to require the Federal Trade Commission to conduct a study on scams that ***target*** travelers during the COVID-19 pandemic, S. 1995, to amend the Dingell-Johnson Sport Fish Restoration Act with respect to sport fish restoration and recreational boating safety, an original bill entitled, ``Regional Ocean Partnership Act'', an original bill entitled, ``Surface Transportation'', the nominations of Pamela A. Melroy, of New York, to be Deputy Administrator of the National Aeronautics and Space Administration, Carlos Alberto Monje, Jr., of Louisiana, to be Under Secretary of Transportation for Policy, and Richard W. Spinrad, of Oregon, to be Under Secretary of Commerce for Oceans and Atmosphere, and routine lists in the Coast Guard. SR-253 Committee on Environment and Public Works To hold hearings to examine the nominations of Jeffrey M. Prieto, of California, and Jane Toshiko Nishida, of [[Page E622]] Maryland, both to be an Assistant Administrator of the Environmental Protection Agency, and Alejandra Y. Castillo, of New York, to be Assistant Secretary of Commerce for Economic Development. SD-406 Committee on Finance To hold hearings to examine the President's fiscal year 2022 budget. SD-215 2 p.m Committee on Small Business and Entrepreneurship Business meeting to consider the nomination of Dilawar Syed, of California, to be Deputy Administrator of the Small Business Administration. SD-430 Select Committee on Intelligence To receive a closed briefing on certain intelligence matters. SH-219 2:15 p.m Committee on Rules and Administration To hold an oversight hearing to examine the U.S Capitol Police following the January 6th attack on the Capitol. SR-301 2:30 p.m Committee on Appropriations Subcommittee on Transportation, Housing and Urban Development, and Related Agencies To hold hearings to examine proposed budget estimates and justification for fiscal year 2022 for the Department of Transportation. SD-192 Committee on Homeland Security and Governmental Affairs Government Operations and Border Management To hold hearings to examine improving security, trade, and travel at ***land*** ports of entry at the southwest border. VTC Committee on the Judiciary Subcommittee on the Constitution To hold hearings to examine the Women's Health Protection Act. SD-226 3 p.m Committee on Energy and Natural Resources Subcommittee on Public ***Lands***, ***Forests***, and Mining To hold hearings to examine S. 173, to provide for the designation of certain wilderness areas, recreation management areas, and conservation areas in the State of Colorado, S. 177, to amend the John D. Dingell, Jr. Conservation, Management, and Recreation Act to establish the Cerro de la Olla Wilderness in the Rio Grande del Norte National Monument and to modify the boundary of the Rio Grande del Norte National Monument, S. 182, to withdraw certain Federal ***land*** in the Pecos Watershed area of the State of New Mexico from mineral entry, S. 455, to designate and expand wilderness areas in Olympic National ***Forest*** in the State of Washington, and to designate certain rivers in Olympic National ***Forest*** and Olympic National Park as wild and scenic rivers, S. 554, to require the Secretary of ***Agriculture*** to conduct a study on the establishment of, and the potential ***land*** that could be included in, a unit of the National ***Forest*** System in the State of Hawaii, S. 567, to provide for conservation and economic development in the State of Nevada, S. 569, to direct the Secretary of ***Agriculture*** to transfer certain National ***Forest*** System ***land*** to the State of South Dakota, S. 609, to withdraw the National ***Forest*** System ***land*** in the Ruby Mountains subdistrict of the Humboldt-Toiyabe National ***Forest*** and the National Wildlife Refuge System ***land*** in Ruby Lake National Wildlife Refuge, Elko and White Pine Counties, Nevada, from operation under the mineral leasing laws, S. 904, to require the Secretary of the Interior, the Secretary of ***Agriculture***, and the Assistant Secretary of the Army for Civil Works to digitize and make publicly available geographic information system mapping data relating to public access to Federal ***land*** and waters for outdoor recreation, S. 1008, to require the Secretary of the Interior to develop a modeling tool, conduct a study, and issue reports relating to the tax equivalent amount of payments under the payment in lieu of taxes program, S. 1076, to amend the Energy Policy Act of 2005 to require the Secretary of the Interior to establish a program to plug, remediate, and reclaim orphaned oil and gas wells and surrounding ***land***, to provide funds to State and Tribal government to plug, remediate, and reclaim orphaned oil and gas wells and surrounding ***land***, S. 1128, to provide for the continuation of higher education through the conveyance to the University of Alaska of certain public ***land*** in the State of Alaska, S. 1222, to designate and adjust certain ***lands*** in the State of Utah as components of the National Wilderness Preservation System, and S. 1686, to amend the Wilderness Act to allow local Federal officials to determine the manner in which nonmotorized uses may be permitted in wilderness areas. SD-366 Committee on Veterans' Affairs To hold hearings to examine the President's proposed budget request for fiscal year 2022 and 2023 advance appropriations requests for the Department of Veterans Affairs. SR-418 4:30 p.m Committee on Armed Services Subcommittee on Strategic Forces To hold hearings to examine United States nuclear deterrence policy and strategy. SR-222 JUNE 17 10 a.m Committee on Appropriations To hold hearings to examine proposed budget estimates and justification for fiscal year 2022 for the Department of Defense. SD-106

**Load-Date:** June 11, 2021

**End of Document**



[***The race to zero emissions, and why the world depends on it***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61DX-WBB1-JDG9-Y452-00000-00&context=1516831)

Impact News Service

December 1, 2020 Tuesday

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**Length:** 975 words

**Body**

New York: The United Nation has issued the following press release:

What is net zero and why is it important?

Put simply, net zero means we are not adding new ***emissions*** to the atmosphere. ***Emissions*** will continue, but will be balanced by absorbing an equivalent amount from the atmosphere.

Practically every country has joined the Paris Agreement on climate change, which calls for keeping the global temperature to 1.5°C above pre-industrial era levels. If we continue to pump out the ***emissions*** that cause climate change, however, temperatures will continue to rise well beyond 1.5, to levels that threaten the lives and livelihoods of people everywhere.

This is why a growing number of countries are making commitments to achieve carbon neutrality, or 'net zero' ***emissions*** within the next few decades. It’s a big task, requiring ambitious actions starting right now.

Net zero by 2050 is the goal. But countries also need to demonstrate how they will get there. Efforts to reach net-zero must be complemented with adaptation and resilience measures, and the mobilization of climate financing for developing countries.

So how can the world move toward net zero?

The good news is that the technology exists to reach net zero – and it is affordable.

A key element is powering economies with clean energy, replacing polluting coal - and gas and oil-fired power stations - with renewable energy sources, such as wind or solar farms. This would dramatically reduce carbon ***emissions***. Plus, renewable energy is now not only cleaner, but often cheaper than fossil fuels.

A wholesale switch to electric transport, powered by renewable energy, would also play a huge role in lowering ***emissions***, with the added bonus of slashing air pollution in the world’s major cities. Electric vehicles are rapidly becoming cheaper and more efficient, and many countries, including those committed to net zero, have proposed plans to phase out the sale of fossil-fuel powered cars.

Other harmful ***emissions*** come from ***agriculture*** (livestock produce significant levels of methane, a greenhouse gas). These could be reduced drastically if we eat less meat and more plant-based foods. Here again, the signs are promising, such as the rising popularity of 'plant-based meats' now being sold in major international fast-food chains.

What will happen to remaining ***emissions***?

Reducing ***emissions*** is extremely important. To get to net zero, we also need to find ways to ***remove*** carbon from the atmosphere. Here again, solutions are at hand. The most important have existed in nature for thousands of years.

These 'nature-based solutions' include ***forests***, peatbogs, mangroves, soil and even underground seaweed ***forests***, which are all highly efficient at absorbing carbon. This is why huge efforts are being made around the world to save ***forests***, plant trees, and rehabilitate peat and mangrove areas, as well as to improve farming techniques.Who is responsible for getting to net zero?

We are all responsible as individuals, in terms of changing our habits and living in a way which is more sustainable, and which does less harm to the planet, making the kind of lifestyle changes which are highlighted in the UN’s Act Now campaign.

The private sector also needs to get in on the act and it is doing so through the UN Global Compact, which helps businesses to align with the UN’s environmental and societal goals.

It’s clear, however, that the main driving force for change will be made at a national government level, such as through legislation and regulations to reduce ***emissions***.

Many governments are now moving in the right direction. By early 2021, countries representing more than 65 per cent of global carbon dioxide ***emissions*** and more than 70 per cent of the world economy, will have made ambitious commitments to carbon neutrality.

The European Union, Japan and the Republic of Korea, together with more than 110 other countries, have pledged carbon neutrality by 2050; China says it will do so before 2060.

Are these commitments any more than just political statements?

These commitments are important signals of good intentions to reach the goal, but must be backed by rapid and ambitious action. One important step is to provide detailed plans for action in nationally determined contributions or NDCs. These define ***targets*** and actions to reduce ***emissions*** within the next 5 to 10 years. They are critical to guide the right investments and attract enough finance.

So far, 186 parties to the Paris Agreement have developed NDCs. This year, they are expected to submit new or updated plans demonstrating higher ambition and action. Click here to see the NDC registry.Is net zero realistic?

Yes! Especially if every country, city, financial institution and company adopts realistic plans for transitioning to net zero ***emissions*** by 2050.

The COVID-19 pandemic recovery could be an important and positive turning point. When economic stimulus packages kick in, there will be a genuine opportunity to promote renewable energy investments, smart buildings, green and public transport, and a whole range of other interventions that will help to slow climate change.But not all countries are in the same position to affect change, are they?

That’s absolutely true. Major emitters, such as the G20 countries, which generate 80 per cent of carbon ***emissions***, in particular, need to significantly increase their present levels of ambition and action.

Also, keep in mind that far greater efforts are needed to build resilience in vulnerable countries and for the most vulnerable people; they do the least to cause

climate change but bear the worst impacts. Resilience and adaptation action do not get the funding they need, however.

Even as they pursue net zero, developed countries must deliver on their commitment to provide $100 billion dollars a year for mitigation, adaptation and resilience in developing countries.

**Load-Date:** December 2, 2020

**End of Document**



[***SNP fails to hit carbon targets again as land use and forestry now 'net source'***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62XJ-HFX1-F0JC-M3VN-00000-00&context=1516831)

Herald Scotland

June 15, 2021 Tuesday

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**Length:** 1357 words

**Byline:** [*David Bol*](http://David Bol)

**Body**

SNP ministers have been warned that "Scotland needs to do more on climate change" after official statistics showed the Government has failed to meet legally-set greenhouse gas reduction ***targets*** for the third straight year.

The data shows that Scotland has now lost benefit from its 'carbon sink' where trees and grassland sequester harmful carbon with ***land*** use and forestry now shown to be a "net source" of Scotland's ***emissions*** for the first time, rather than help mitigate ***emissions*** in other areas.

Source ***emissions*** have been cut in Scotland by 43.8% from 1990 to 2019 but have only dropped by 2.3% between 2018 and 2019 - mainly from business, energy supply and domestic transport sectors.

Last year, it was announced that Scotland had failed to hit ***emissions*** reduction ***targets*** from 2017 to 2018 - blamed on the bad weather by then environment secretary Roseanna Cunningham.

The Scottish Government has been accused of having "scored a hattrick of own goals" with a failure to meet ***targets*** three years in a row ahead of the COP26 global climate conference to be held in Glasgow later this year.

READ MORE: Scottish Government's failure to meet carbon ***emission*** ***target*** blamed on cold weather

The official data to judge ***targets***, the Greenhouse Gas Account, has been adjusted to ***remove*** the effect of successive revisions to the data over time. Of a 55% ***target*** to reduce ***emissions*** by 2019, Scotland has only cut harmful ***emissions*** by 51.5%.

Scotland has pledged to become a net zero country by 2045 and to cut 1990 levels of ***emissions*** by 75% in just nine years' time.

But failures to reduce ***emissions*** sharply enough in domestic transport and ***agriculture*** have slowed progress.

Campaigners have warned that "transformative action" is needed to get Scotland's progress back on track.

Fabrice Leveque, head of policy at WWF Scotland, said: "Today's climate ***target*** result makes clear that Scotland needs to do more on climate change.

"Despite some positive progress in key sectors including transport and heat, the pace continues to fall short of where we need to be if we're to meet our net zero ambitions.

"Scientists have told us that we need to move faster, and with world leaders heading to Glasgow in November for the COP26 climate talks, it's more crucial than ever that Scotland leads by example to keep global warming below 1.5 degrees.

"It's critical that transformative action is taken, especially in ***agriculture***, where ***emissions*** are flatlining. Peatlands have the potential to lock away huge amounts of carbon but due to their degraded state, they're releasing this back to the atmosphere.

"Increased effort in these areas could revitalise rural economies and restore our precious nature, helping to ensure a fair and green recovery from the Covid pandemic."

Jamie Livingstone, head of Oxfam Scotland, aded: "On the eve of the most significant global climate talks for years being hosted in Glasgow, the Scottish Government has scored a hattrick of own goals by missing its annual ***emissions*** ***targets*** three years in a row.

"Climate change is wrecking lives, homes and communities, and pushing people deeper into poverty. While ***emissions*** fell year on year, we can afford no more excuses, no more empty promises and no more missed ***targets***.

"Countries around the world, including Scotland, must deliver on their pledges to slash their own ***emissions*** while putting their hands in their pockets to help those least able to cope with the unfolding climate devastation which Scotland helped cause and continues to make worse."

Between 2018 and 2019, business, energy supply and domestic transport ***emissions*** all experienced small decreases - while the ***agriculture***, aviation and shipping sectors "showed essentially no change", according to the statistics.

In 2019, domestic transport was the largest source of net ***emissions*** in Scotland with 12MtCO2e, followed by businesses on 7.9MtCO2e, ***agriculture*** on 7.5MtCo2 and energy supply on 6.4MtCO2e.

An official report accompanying the statistics warns that "domestic transport has consistently been a large part of Scotland's ***emissions***" adding there has been a "relatively small decrease" of 11.3% between 1990 and 2019.

Domestic transport has been Scotland's leading emitter since 2016 after the electricity grid was largely decarbonised and transport ***emissions*** only decreased by 0.3MtCO2e between 2018 and 2019.

Scotland's ***agriculture*** sector, which has been previously criticised by campaigners for a lack of a contribution to climate ***targets*** under former rural affairs secretary Fergus Ewing, saw "essentially no change in net ***emissions*** of overall greenhouse gases" between 2018 and 2019.

READ MORE: SNP 'cannot afford to start war with farmers' over carbon ***targets***

Following revised data, ***land*** use, ***land*** use change and forestry (LULUCF) ***emissions*** "are now shown to be a net-source of greenhouse gas ***emissions***". The report adds that "previously this category has been show to be a net-sink of greenhouse gas ***emissions***".

It states: "The reason for this revision is the inclusion of the effect of historical drainage and rewetting of peatlands that previously were not included in the data.

"LULUCF is now a net source of greenhouse gas ***emissions*** in Scotland, emitting 2.7MtCo2e of ***emissions*** in 2019. In 1990, ***emissions*** were 9.1MtCO2e."

Scottish Labour spokesperson for net zero, energy and transport, Monica Lennon, said: "Scotland's climate ***targets*** were hailed as world-leading when they were introduced, however, the SNP has again missed its ***targets*** for reducing greenhouse gases.

"The Scottish Government's rhetoric on climate emergency is not being matched by action, and time is running out to protect people and planet."

She added: "It's hugely worrying that Scotland's carbon sink is shrinking, with the level of greenhouse gases soaked up by forestry and ***land*** use falling sharply since 2011.

"Empty promises and missed ***targets*** are not good enough in a climate emergency. In the year of COP26 when Scotland should be leading the world we are instead failing on the basics.

"We need bold action now to get us back on track to meet these crucial ***targets***."

The Scottish Greens have called for a "step change" in approach to reverse consistent failures to meet ***targets***.

The party's environment spokesperson, Mark Ruskell, said: "These latest stats show that Scotland is not cutting ***emissions*** fast enough to meet our international obligations.

"While we have seen some progress in renewable energy, ***emissions*** from transport have seen no reduction at all, while ***emissions*** from ***land*** use has actually gone up.

"This is the third year in a row where Scotland has missed our ***emissions*** ***targets***, and the Scottish Government need to wake up to the urgency required.

"***Forests*** and peatlands are natural carbon sinks, and we are not protecting our wild places enough or supporting farmers to lower ***emissions***."

He added: "If governments are serious about traffic reduction then there must be a safe return to public transport in the months ahead with longer term investment to switch from roadbuilding to public transport and safer streets for walking and cycling.

"There must be a step change in Scotland's policies to cut ***emissions***, before it becomes irreversible."

Scottish Liberal Democrat energy spokesperson, Liam McArthur, added: "Once again, we're nowhere near where we need to be in terms of reducing Scotland's ***emissions***. The Scottish Government's warm words will make for an even warmer planet.

"It's troubling to see ***emissions*** from domestic transport so stubbornly high. Progress has been made in other sectors, but transport hasn't budged. If that doesn't change soon, we're in trouble. And with commitments to a third runway at Heathrow still on the table, we run the risk of making things even worse.

"At the moment, people just don't have the confidence to make the switch to environmentally friendly options. Whether it's an electric car or a bike, the infrastructure to support the switch just isn't there.

"Parties across parliament came together to agree ambitious ***targets***. At the moment, the SNP simply aren't stepping up to that challenge."

The Scottish Government will make a statement to Holyrood on the statistics this afternoon.

**Load-Date:** June 15, 2021

**End of Document**



[***Advanced biofuels feedstock list should be enlarged to meet EU target: industry***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:633D-DRK1-DYXB-V2JH-00000-00&context=1516831)

EurActiv.com

July 8, 2021 Thursday

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**Length:** 934 words

**Byline:** Sean Goulding Carroll

**Highlight:** The list of EU-approved sustainable fuel sources should be expanded to meet the higher ***targets*** for second-generation biofuels under the updated renewable energy directive, according to the advanced biofuels industry.

**Body**

An early draft of the EU's upcoming renewable energy directive, seen by EURACTIV, confirms the bloc's objective of roughly doubling the share of solar, wind and other renewables by the end of the decade, to reach 38-40% of Europe's total energy mix.

The leaked draft also includes an increase in the renewables ***target*** for transport, from 14% to 26%, and an increase in the sub-***target*** for advanced biofuels, from 3.5% to 5.5%.

Environmental groups have expressed doubts that the ***target*** can be met, because advanced biofuels are made from ***agricultural*** waste or residues from the ***forest*** industry, which are limited in supply.

But the industry dismisses those doubts, saying an enlarged list of approved feedstocks will enable producers to meet the EU's higher goals using a wider range of renewable energy sources.

"We are confident the higher [advanced biofuels] ***targets*** will be met but it is also critically important to see how the Commission enlarges the feedstock list for advanced biofuels which is done separately through a delegated act," said Marko Janhunen of UPM Biofuels, a Finnish company which produces wood-based alternatives to fossil-based transport fuels.

"With increased focus on both rapid decrease of transport ***emissions*** and sustainability at the same time, the increase of the advanced biofuels mandate is a welcome and a logical measure," Janhunen told EURACTIV.

UPM Biofuels is part of the Advanced Biofuels Coalition LSB, an industry body that comprises 11 companies, which are set to benefit from the reform.

The group says advanced cellulosic ethanol produced from grasses, wood, or algae, are a climate-neutral solution readily available to decarbonise cars or trucks that are currently running on internal combustion engines.

"By the end of this year, Europe's first commercial-scale cellulosic ethanol production plant will be completed by the Swiss company Clariant in Southwest Romania," the group said in a [*statement*](https://www.euractiv.com/section/alternative-renewable-fuels/opinion/making-european-sustainable-mobility-a-reality-with-cellulosic-ethanol/). The plant will produce advanced biofuels made form ***agricultural*** residues, such as cereal straw, corn stover, rice straw, or sugarcane bagasse. And other cellulosic ethanol projects are also underway in Slovakia, Poland, and Bulgaria using Clariant's technology.

Authorised feedstocks for biofuels are set out in Annex IX of the renewable energy directive, which is coming under revision next week as part of a broader package of EU climate laws. The package aims to cut the EU's CO2 ***emissions*** by 55% by 2030 compared to 1990 levels as an interim step towards carbon neutrality by 2050.

As a delegated act, the European Commission may add to the list of approved feedstocks in Annex IX based on scientific advice. However, it may not ***remove*** items. Currently recognised feedstocks include waste items such as animal manure, sewage sludge, and straw.

Biofuel producers are anxiously awaiting the final version of Annex IX, which will be unveiled on 14 July along with other climate proposals.

The higher ***targets*** have raised questions as to whether there will be sufficient availability of sustainable advanced fuels to meet the EU's goals, as second-generation biofuels are reliant on sources such as ***forest*** residue and ***agricultural*** waste, which are limited in supply.

In a March 2021 report, the clean mobility NGO Transport & Environment highlighted the difficulty of scaling up advanced biofuels. "The availability of sustainable advanced biofuels will always remain limited, due to the limited amount of sustainable feedstocks available and the competing uses for these," states the report.

However, the Advanced Biofuels Coalition says they are "certain that there will be no lack of supply" when it comes to meeting the revised ***targets***.

It cited a [*2014 study by the International Council on Clean Transportation*](https://theicct.org/publications/wasted-europes-untapped-resource), which said around 225 million tons of residues could be available in the EU to produce advanced biofuel, with the potential to supply 16% of road transport fuel in 2030.

Draft versions of the renewable energy directive update show that the advanced biofuel ***targets*** for 2022 and 2025 will remain as is, with the increase required by 2030. The longer timeframe coupled with greater regulatory certainty will allow the industry to invest in production capacity, according to Robert Vierhout of Enerkem, an advanced biofuels company.

"The [advanced biofuels] sub-***target*** increases gradually and thus will give certain time for further investments," said Vierhout via email.

Vierhout also called for the EU to maintain the use of advanced biofuels in road transport, arguing that doing so is necessary for the industry to produce at scale.

"The road transport sector is, considering its size, an important biofuel market that must be maintained in order to make the necessary investments in production capacity and to further slide down the cost curve," he said.

The aviation sector has called for scarce waste feedstocks to be used solely to produce green jet fuel, arguing that, unlike aircraft, road vehicles have efficient decarbonisation alternatives such as electrification.

However, Vierhout rejects the argument that advanced biofuels should be ringfenced for selected transport sectors.

"Aviation and maritime sectors are future markets: Advanced biofuels provide a huge potential for de-fossilising the aviation and maritime sectors for decades to come. Still, advanced biofuels should not be exclusively reserved for aviation and maritime transport," he said.

"To set the right path, these sectors should be mandated in addition to the current advanced biofuels mandate in RED II," he added, referencing the renewable energy directive.

*[Edited by Frédéric Simon]*

**Load-Date:** July 8, 2021

**End of Document**



[***Endangered and Threatened Species: Coastal Distinct Population Segment of the Pacific Marten***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:611M-K9S1-F0YC-N12H-00000-00&context=1516831)

Impact News Service

October 9, 2020 Friday

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**Length:** 30994 words

**Body**

Washington, DC: This Rule document was issued by the Fish and Wildlife Service (FWS)

Action

Final rule.Summary

We, the U.S Fish and Wildlife Service (Service), determine threatened species status under the Endangered Species Act of 1973 (Act), as amended, for the coastal distinct population segment (DPS) of Pacific marten (Martes caurina), a small mammal from coastal California and Oregon. We also issue final regulations that are necessary and advisable to provide for the conservation of this DPS under section 4(d) of the Act (a “4(d) rule”). This final rule extends the Act's protections to the coastal DPS of Pacific marten, subject to the 4(d) rule's exceptions.Dates

This rule is effective November 9, 2020.Addresses

This final rule is available on the internet at [*http://www.regulations.gov*](http://www.regulations.gov) under Docket No. FWS-R8-ES-2018-0076. Comments and materials we received, as well as supporting documentation we used in preparing this rule, are available for public inspection at [*http://www.regulations.gov*](http://www.regulations.gov) under Docket No. FWS-R8-ES-2018-0076.For Further Information Contact

Dan Everson, Field Supervisor, U.S Fish and Wildlife Service, Arcata Fish and Wildlife Office (see ADDRESSES). Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service at 800-877-8339.Supplementary InformationExecutive Summary

Why we need to publish a rule. Under the Endangered Species Act, a species may warrant protection through listing if it is endangered or threatened throughout all or a significant portion of its range. Listing a species as an endangered or threatened species can only be completed by issuing a rule. Further, under the Endangered Species Act, any species that is determined to be an endangered or threatened species requires critical habitat to be designated, to the maximum extent prudent and determinable.

What this document does. This rule lists the coastal distinct population segment (DPS) of Pacific marten (Martes caurina) as a threatened species under the Endangered Species Act. This document also finalizes a rule under the authority of section 4(d) of the Act that provides measures that are necessary and advisable to provide for the conservation of the coastal DPS of Pacific marten.

The basis for our action. Under the Act, we may determine that a species is an endangered or threatened species because of any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We have determined that the coastal DPS of the Pacific marten is likely to become in danger of extinction within the foreseeable future primarily due to habitat loss (including fragmentation) and associated changes in habitat quality and distribution.

Section 4(a)(3) of the Act requires the Secretary of the Interior (Secretary) to designate critical habitat concurrent with listing to the maximum extent prudent and determinable. In this case, we have found that the designation of critical habitat for the coastal DPS of Pacific marten is not determinable at this time.

Peer review and public comment. During the proposed rule stage, we sought the expert opinions of 8 peer reviewers and 3 technical experts regarding the species status assessment report. We received responses from 4 specialists, which informed our determination. We also considered all comments and information received from the public during the comment period.Previous Federal Actions

On October 9, 2018, we published a proposed rule in the Federal Register (83 FR 50574) to list the coastal DPS of Pacific marten (coastal marten) as a threatened species under the Act (16 U.S.C 1531 et seq.). Our proposed rule included a proposed 4(d) rule for the coastal marten. Please refer to that proposed rule for a detailed description of previous Federal actions concerning this DPS, which we refer to as a “species” in this rule, in accordance with the Act's definition of “species” at 16 U.S.C 1532(16).Summary of Changes From the Proposed Rule

In preparing this final rule, we reviewed and fully considered comments from the public on the proposed rule. We did not make any substantive changes to this final rule after consideration of the comments we received. We did update the Species Status Assessment (SSA) report (to version 2.1) based on comments and some additional information provided, as follows: (1) We made many small, nonsubstantive clarifications and corrections throughout the SSA report, including ensuring consistency, providing details about data sources used, and updating references; and (2) we included additional information we received regarding observations of the coastal marten, hypothesized historical range of the coastal marten, and more detailed life-history data for the species. We also updated our discussion of predators and the influence of vegetation management on their use of areas occupied by the coastal marten. However, the information we received during the comment period for the proposed rule did not change our previous analysis of the magnitude or severity of threats facing the species.

In addition, as a result of Federal, State, and public comment, we have added clarifying language, improved our rationale, revised our preamble discussion of the 4(d) rule, incorporated more specifics into the 4(d) rule itself, and added information on management or cleanup activities in response to public comments (see Final Rule Issued Under Section 4(d) of the Act). The commenters stated that additional detail or examples would help them better understand the ***forest*** management activities excepted by the 4(d) rule. Other comments requested that we add additional 4(d) exceptions regarding State employees or agents and activities for cleanup of disturbed habitat. In response, we added clarifying language as follows: (1) Added an exception for activities conducted in accordance with a permit issued under 50 CFR 17.32; (2) revised the exception and gave examples of forestry management activities to potentially reduce the risk or severity of wildfire (see § 17.40(s)(2)(ii) below); (3) clarified the use of State Natural Communities Conservation Plan or State Safe Harbor Agreements ((see § 17.40(s)(2)(iii) below); (4) added examples of forestry management activities which promote the conservation needs of the coastal marten (see § 17.40(s)(2)(iv) below); (5) added an exception for ***removal*** of toxicants and cleanup of coastal marten habitat (see § 17.40(s)(2)(v) below); and (6) added an exception for activities conducted by State conservation agency employees or agents that conserve coastal marten (see § 17.40(s)(2)(vi) below).

We also considered the recent Oregon Fish and Wildlife Commission decision and associated rule by the Oregon Department of Fish and Wildlife (ODFW) banning trapping of marten west of I-5 in Oregon, which includes the coastal DPS. Although this new ODFW regulation is expected to reduce marten mortality in the Oregon portion of the DPS, trapping was considered as one of several threats coastal marten faced, and it occurred at a low level (on average, less than 1 marten harvested per year over the past 28 years). We considered banning of trapping in one of our future scenarios (scenario 2) generated in the coastal marten SSA, and it did not result in any projected improvement in population resiliency for any of the Oregon populations (Service 2019, pp. 104-105). Hence, while banning trapping of martens in the coastal DPS will reduce marten mortality, there are still substantial threats to the DPS. We do not expect this change in management to improve the status of the coastal marten to the point that it does not meet the definition of a threatened species under the Act.Supporting Documents

A species status assessment (SSA) team prepared an SSA report for the species. The SSA team was composed of Service biologists, in consultation with other species experts. The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the species. The SSA report underwent independent peer review by scientists with expertise in carnivore biology, habitat management, and stressors (factors negatively affecting the species) to the species.

In accordance with our joint policy on peer review published in the Federal Register on July 1, 1994 (59 FR 34270), and our August 22, 2016, memorandum updating and clarifying the role of peer review of listing actions under the Act, we sought peer review of the SSA report. The Service sent the SSA report to eight independent peer reviewers and received two responses. The purpose of peer review is to ensure that our listing determinations and 4(d) rules are based on scientifically sound data, assumptions, and analyses. The peer reviewers have expertise that includes familiarity with the coastal marten and its habitat, biological needs, and threats. In addition, we sent the SSA report to three technical experts to review specific aspects and use of scientific information therein. We received responses from two of the technical experts.I. Final Listing DeterminationBackground

On June 23, 2014, we published a notice in the Federal Register (79 FR 35509) that summarized the taxonomic classification of the subspecies (based on current genetic information) and indicated our intent to conduct an evaluation of a potential DPS of martens in coastal Oregon and coastal northern California relative to the full species classification level. On April 7, 2015, we published a DPS analysis (80 FR 18742) concluding that Pacific martens in coastal Oregon and northern coastal California were both discrete and significant to the taxon to which it belongs, and constituted a listable entity referred to collectively as the “coastal DPS of the Pacific marten.” This document and the associated SSA reflect our analysis of that DPS. A recent publication evaluating Pacific marten genetics indicates that coastal Oregon and northern coastal California marten populations likely represent a single subspecies, the Humboldt marten (M. c. humboldtensis) (Schwartz et al. 2020, p. 11). Although our listable entity may be a subspecies based on this evaluation, the DPS analysis for coastal marten as described above remains valid for the purposes of this rule.

The coastal marten is a medium-sized carnivore that historically occurred throughout the coastal ***forests*** of northwestern California and Oregon. The coastal marten has a long and narrow body type typical of the mustelid family (e.g , weasels, minks, otters, and fishers), generally with brown fur overall, but with distinctive coloration on the throat and upper chest that varies from orange to yellow to cream. The coastal marten has large and distinctly triangular ears and a bushy tail. Its lifespan is usually less than 5 years. The coastal marten feeds mainly on small mammals, but also consumes birds, insects, and fruits. Coastal martens tend to select older ***forest*** stands (e.g , late-successional, old-growth, large-conifer, mature, late-seral, structurally complex ***forests***), or ***forests*** that have old-***forest*** characteristics such as old and large trees, multiple canopy layers, snags, downed logs and other decay elements, dense understory development, and biologically complex structure and composition.

Please refer to the October 9, 2018, proposed rule (83 FR 50574) and the species status assessment (SSA) report (Service 2019, entire) for a full summary of species information. Both documents are available at [*http://www.regulations.gov*](http://www.regulations.gov) under Docket No. FWS-R8-ES-2018-0076, and on the Arcata Fish and Wildlife Office's website at [*https://www.fws.gov/arcata/.Regulatory*](https://www.fws.gov/arcata/.Regulatory) and Analytical FrameworkRegulatory Framework

Section 4 of the Act (16 U.S.C 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an “endangered species” or a “threatened species.” The Act defines an endangered species as a species that is “in danger of extinction throughout all or a significant portion of its range,” and a threatened species as a species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act requires that we determine whether any species is an “endangered species” or a “threatened species” because of any of the following factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term “threat” to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term “threat” includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term “threat” may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an “endangered species” or a “threatened species.” In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species, such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an “endangered species” or a “threatened species” only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

The Act does not define the term “foreseeable future,” which appears in the statutory definition of “threatened species.” Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term “foreseeable future” extends only so far into the future as the Services can reasonably determine that both the future threats and the species' responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. “Reliable” does not mean “certain”; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

It is not always possible or necessary to define foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and commercial data available and should consider the timeframes applicable to the relevant threats and to the species' likely responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species' biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors.

Our proposed rule described “foreseeable future” as the extent to which we can reasonably rely on predictions about the future in making determinations about the future conservation status of the species. The Service since codified its understanding of foreseeable future in 50 CFR 424.11(d) (84 FR 45020). In those regulations, we explain the term “foreseeable future” extends only so far into the future as the Service can reasonably determine that both the future threats and the species' responses to those threats are likely. The Service will describe the foreseeable future on a case-by-case basis, using the best available data and taking into account considerations such as the species' life-history characteristics, threat-projection timeframes, and environmental variability. The Service need not identify the foreseeable future in terms of a specific period of time. These regulations did not significantly modify the Service's interpretation; rather they codified a framework that sets forth how the Service will determine what constitutes the foreseeable future based on our long-standing practice. Accordingly, though the regulations do not apply to the final rule for the coastal DPS of the Pacific marten because it was proposed prior to their effective date, they do not change the Service's assessment of foreseeable future for the coastal DPS of the Pacific marten as contained in our proposed rule and in this final rule.Analytical Framework

The SSA report documents the results of our comprehensive biological status review for the species, including an assessment of the potential threats to the species. The SSA report does not represent a decision by the Service on whether the species should be listed as an endangered or threatened species under the Act. It does, however, provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies. The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found at Docket No. FWS-R8-ES-2018-0076, and on the Arcata Fish and Wildlife Office's website at [*https://www.fws.gov/arcata/*](https://www.fws.gov/arcata/).

To assess the species' viability, we used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306-310). Briefly, resiliency supports the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years), redundancy supports the ability of the species to withstand catastrophic events (for example, droughts, large pollution events), and representation supports the ability of the species to adapt over time to long-term changes in the environment (for example, climate changes). In general, the more resilient and redundant a species is and the more representation it has, the more likely it is to sustain populations over time, even under changing environmental conditions. Using these principles, we identified the species' ecological requirements for survival and reproduction at the individual, population, and species levels, and described the beneficial and risk factors influencing the species' viability.

The SSA process can be categorized into three sequential stages. During the first stage, we evaluated the individual species' life-history needs. The next stage involved an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition. The final stage of the SSA involved making predictions about the species' responses to positive and negative environmental and anthropogenic influences. This process used the best available information to characterize viability as the ability of a species to sustain populations in the wild over time. We use this information to inform our regulatory decision.Summary of Biological Status and Threats

Our assessment evaluated the biological condition of the species and its resources, and the threats that influence the species' current and future condition, in order to assess the species' overall viability and the risks to that viability. It was based upon the best available scientific and commercial data, including the SSA report (Service 2019, entire), and the expert opinion of the SSA team members. Please refer to chapter 3 of the SSA report (Service 2019, pp. 36-71) for a more detailed discussion of the factors affecting the coastal marten. The following is a summary of the key results and conclusions from the SSA report.

The coastal marten historically ranged throughout coastal Oregon and coastal northern California, but the species has not recently been detected throughout much of the historical range, despite extensive surveys. The coastal marten currently exists in four small populations (fewer than 100 individuals each) in Oregon and California, and is absent from the northern and southern ends of its historical range. The current range is approximately 7 percent of its known historical range. The coastal marten has been extirpated from Sonoma and Mendocino Counties, California, and occupies small portions of Humboldt, Del Norte, and Siskiyou Counties. In Oregon, coastal martens have been largely extirpated from much of the inland counties within the historical range and are known to currently occur in portions of Coos, Curry, Josephine, Douglas, Lane, and Lincoln Counties, Oregon.

We have assessed the coastal marten's levels of resiliency, redundancy, and representation currently and into the future by first ranking the condition of each population. We ranked the four populations into three categories (high, moderate, and low) based on key population factors and habitat elements. We used three between-population factors (least-cost path distance, filters, and number of populations in proximity) and four within-population factors (population size, available male home ranges, available female home ranges, and proportion of habitat subject to high predation risk). Least-cost path distance describes the distance a coastal marten must travel for dispersal needs in order to reach the next closest population. Filters are barriers to this movement and can be either natural or manmade, such as large rivers or highways. This analysis provided condition categories to describe the resiliency of each population. A summary of this analysis is provided in table 4.3 of the SSA report (Service 2019, p. 96).

Maintaining representation in the form of genetic or ecological diversity is important to maintain the coastal marten's capacity to adapt to future environmental changes. We consider the coastal marten to have representation in the form of two different ecological settings. Some animals are adapted to the shore pine (Pinus contorta) ***forests*** found in coastal margins and dune ecosystems, and others are adapted to late-seral ***forest*** and serpentine ridges. One population represents the shore pine ecological setting, and three represent the ***forest*** and serpentine ecological settings. Genetic variation between populations is unknown at this time, as no studies have been conducted to determine the degree of genetic variation between the four populations.

The coastal marten needs to have multiple resilient populations distributed throughout its range to provide for redundancy. The more populations, and the wider the distribution of those populations, the more redundancy the species exhibits. Based on the distributions of current verifiable coastal marten detections and adjacent suitable habitat, we identified four extant population areas (EPAs) within coastal Oregon and northern coastal California:

(1) Central Coastal Oregon EPA;

(2) Southern Coastal Oregon EPA;

(3) Oregon-California Border EPA; and

(4) Northern Coastal California EPA.

Additional detections of coastal martens have occurred outside of the current EPAs, but they did not meet the criteria of a population (most likely, they represent transient individuals in search of new territories) according to methods used in the Humboldt Marten Conservation Strategy and Assessment (Slauson et al. 2019, pp. 72-73), a synthesis of literature on marten ecology developed by the Humboldt Marten Conservation Group. This group is made up of State, Federal, Tribal, private, and nongovernmental organizations in coastal Oregon and northwestern California to conserve and manage coastal martens.

Our analysis of the past, current, and future influences on what the coastal marten needs for long-term viability revealed that two factors pose the largest risk to future viability of the species. These risks are primarily related to habitat loss and associated changes in habitat quality and distribution (including habitat fragmentation) (Factor A) and include: (1) A decrease in connectivity between populations; and (2) habitat conversion from that suitable for coastal martens to that suitable for generalist predators and competitors, thereby potentially increasing interactions and subsequent coastal marten injury, mortality, or predation. These factors are all influenced by vegetation management, wildfire, and changing climate.

Predation of coastal martens (Factor B) may be affected by changes in ***forest*** composition, potentially increasing predator habitat and increasing coastal marten vulnerability to predation. Bobcats are the coastal marten's predominant predator, with predation accounting for 41 percent of mortalities documented in one study. Bobcats prefer regenerating harvested stands less than 30 years old, and are nearly absent from older ***forests***, the preferred habitat used by coastal marten. Coastal martens are vulnerable to predation and increased competition in habitats that have been subject to either high- or moderate-severity fires or intensive logging in the last 40 years where these events ***remove*** the structural characteristics of the landscape that provide escape cover and are important to coastal marten viability (canopy cover, shrub cover, etc.). These older ***forests*** have declined substantially from historical amounts: Older ***forests*** historically encompassed greater than 75 percent of the coastal California area, 50 percent of the Klamath and Siskiyou region in northern California and southwest Oregon, and 25 to 85 percent of the Oregon Coast Range. Estimates of the remaining older ***forests*** in the redwood region, Oregon Coast Range, and Klamath-Siskiyou region are around 5, 20, and 38 percent, respectively, of what occurred historically.

In addition to timber harvest activities, wildfires also destroy or ***remove*** ***forested*** habitat and occur regularly throughout the range of the coastal marten outside the coastal dunes population. Between 2000 and 2014, approximately 17 percent of the suitable coastal marten habitat in the north coastal California population burned. In 1987, in the California-Oregon border population area, roughly 12 percent of suitable habitat burned in the Longwood Fire. Substantial amounts of habitat occupied by the coastal marten have the potential to burn at varying severities in single wildfire events or over a few years. The effects from climate change are projected to result in longer wildfire seasons, producing more frequent and larger wildfires. Wildfires large enough to totally encompass all or most of all four individual population areas are already occurring throughout the range of the coastal marten and are expected to increase in frequency, raising concern over the resiliency of at least the three southern coastal marten population areas, which have been most affected by recent fires and are in a fire regime particularly vulnerable to future fires.

Dispersal is the means by which coastal marten populations maintain and expand their distribution. Successful dispersal is assisted by having suitable habitat between patches occupied by the species. Connectivity of habitat between populations allows for the coastal marten to maintain or expand population size and distribution. A resilient coastal marten population would have suitable habitat maintained between populations that provides important habitat for key prey, abundant daily resting sites, and a distance between populations that is within the range of an average coastal marten dispersal distance. Neither of the Oregon populations has functional connectivity to any other population and if a stochastic or catastrophic event eliminated either of these two populations, natural recolonization from the California populations would not be feasible. The two California populations have connectivity to one another, but not to the Oregon populations.

In addition to being mostly isolated, all four populations are relatively small and face other threats in addition to habitat loss. Since 1980, 19 mortalities of coastal martens caused by vehicles (Factor E) have been documented, all in Oregon and mostly along U.S Highway 101. We expect that some unknown amount of coastal marten roadkill goes undetected, so this is likely an underestimate of the number of coastal martens killed by cars. Exposure to rodenticides (Factor E), through direct ingestion or the consumption of exposed prey, has been documented in coastal martens. This exposure has lethal and sub-lethal effects on other mammal species, and similar effects are expected for coastal martens. Illegal cannabis cultivation sites on public, tribal, and private ***forest*** ***lands*** are implicated as the likely source of these rodenticides in the California and Southern Oregon populations. In a similar carnivore species (fisher (Pekania pennanti)), 85 percent of carcasses tested were exposed to rodenticides, with the exposure in 13 percent being the direct cause of death.

Certain diseases (Factor C) are also a concern to coastal martens including canine distemper viruses (CDV), rabies viruses, parvoviruses, and the protozoan (single-celled organism) Toxoplasma gondii. We acknowledge that there has been limited testing of coastal martens for the presence of pathogens or exposure to pathogens, but exposure levels and ultimate effect on populations are difficult to document until an outbreak is actually observed. While larger populations might display a mass mortality as a result of disease infections, extinction or extirpation is rare. With population sizes estimated at fewer than 100 each for all four coastal marten populations, an outbreak in an individual population puts it at a higher risk for extirpation.

The coastal marten faces a variety of threats including loss of habitat, threats from wildfire, and increased predation risk. These risks play a large role in the resiliency and future viability of the coastal marten. Given the lack of connectivity between populations, availability of suitable habitat, and increases in predation within the populations, we forecasted in the SSA report what the coastal marten may have in terms of resiliency, redundancy, and representation under three plausible future scenarios. All three scenarios were forecast out over the next 15, 30, and 60 years. A range of timeframes with a multitude of possible scenarios allows us to create a “risk profile” for the coastal marten and its viability into the future. Scenario 1 evaluates the future condition of the coastal marten if there is no change in trends in threats to the populations from what exists today, while the other two scenarios evaluate the response of the species to increases or decreases in the major factors that are influencing coastal marten viability. While we do not expect every condition for each scenario to be realized, we are using these scenarios to bound the range of possibilities. Scenarios 2 and 3 are considered the “outside bounds” for the range of potential plausible future conditions. For each scenario, we describe the stressors that would occur in each population. We use the best available science to predict trends in future stressors (timber harvest, wildfire, effects of climate change, etc.). Data availability varies across States and populations. Where data on future trends are not available, we look to past trends and evaluate if it is reasonable to assume these trends will continue. The results of the analysis of resiliency in our plausible future scenarios are described in further detail in the SSA report and summarized in table 5.1 of the SSA report (Service 2019, p. 104).

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have not only analyzed individual effects on the species, but we have also analyzed their potential cumulative effects. We incorporate the cumulative effects into our SSA analysis when we characterize the current and future condition of the species. Our assessment of the current and future conditions encompasses and incorporates the threats individually and cumulatively. Our current and future condition assessment is iterative because it accumulates and evaluates the effects of all the factors that may be influencing the species, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire species, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative effects analysis.Summary of Comments and Recommendations

On October 9, 2018, we published in the Federal Register a proposed rule (83 FR 50574) to list the coastal marten as a threatened species and adopt a 4(d) rule for the coastal marten, which applies the prohibitions and provisions of section 9(a)(1) of the Act to the species with certain, specific exceptions. We requested that all interested parties submit written comments on the proposed rule by December 10, 2018. We also contacted appropriate Federal and State agencies, scientific experts and organizations, tribal entities, and other interested parties, and invited them to comment on the proposed rule. Notices inviting the public to comment were published in newspapers across the areas where the species is believed to occur. We did not receive any requests for a public hearing. All substantive information provided to us during the comment period is incorporated directly into this final rule, has been used to clarify the information in our SSA report, or is addressed (by topic) below.

We reviewed all the comments we received from the peer and technical reviewers for substantive issues and new information regarding the coastal marten and its habitat contained in the SSA report. We addressed peer reviewer comments in the final SSA and this rule as appropriate. We include a summary of the peer review comments below.Peer Review Comments

As discussed in Supporting Documents above, we received comments from two peer reviewers and two technical experts. We reviewed all comments we received from the reviewers for substantive issues and new information regarding the information contained in the SSA report. The peer and technical reviewers generally concurred with our methods used to determine, and conclusions drawn from the available information regarding, the status of coastal marten populations and their biology in California and Oregon. In some cases, they provided additional information, clarifications, and suggestions to improve the final SSA report. The reviewers also provided or corrected references we cited in our SSA report. The additional details and information provided, which have been incorporated into the current SSA report and this final listing rule, did not substantially alter any of our conclusions, including those concerning population resiliency, and current and future conditions.

In addition, we also received comments on the proposed listing and 4(d) rule during the open comment period. Below, we categorize the comments and our responses by Federal, State, Tribal, and public comments.Federal Agency Comments

Comment 1: The U.S ***Forest*** Service (USFS) encouraged the Service to develop additional 4(d) exceptions to include a more diverse set of management activities that are more consistent with coastal marten conservation (e.g , road closures and ***removal*** to increase habitat security, restoration to increase habitat connectivity).

Our Response: We have added clarifying language, improved our rationale, and incorporated more specific information into the 4(d) rule, as well as added an additional exception related to clean up of toxicants and other chemicals from ***forested*** areas. The 4(d) rule exceptions may include potential road closures and restoration efforts if they are consistent with conservation of the coastal marten and included in a finalized Service approved conservation plan or strategy. Please see our discussions under Summary of Changes From the Proposed Rule, above, and Final Rule Issued Under Section 4(d) of the Act, below.

Comment 2: The USFS highlighted work in the Oregon Dunes National Recreation Area (Oregon Dunes NRA) to increase understanding of the central coastal Oregon coastal marten population that occupies the shore pine ecosystem in the recreation area. They also noted a collaborative of local landowners, small businesses, the environmental community, and off-highway vehicle users that formed several years back to restore the dunes ecosystem and maintain the area for recreational use. The USFS suggests that working with this group may be a key component for successful recovery of the coastal marten, and that support for recovery of the species is more likely when communities choose to support the efforts rather than being limited by regulations.

Our Response: We agree that working with local stakeholders to develop support and ownership for species recovery is key for successful implementation of the Act, and, as is our practice for listed species, we have and will continue to work with government and nongovernmental entities to recover the coastal marten.State Comments

Comment 3: The California Department of Fish and Wildlife (CDFW) suggested that the Service identify, either within the 4(d) rule or within a supplemental habitat management guide, the key structural features important to marten and their prey for planning and risk analysis prior to finalizing the listing rule. CDFW states that such clarification or guide would inform ***land*** managers and the Service of the suite of essential and preferred elements to analyze and conserve in a wildfire reduction program, while maintaining marten resiliency of large populations capable of withstanding stochastic events.

Our Response: We have added clarifying language, improved our rationale, and incorporated more specific information into the 4(d) rule. Please see our discussions under Summary of Changes From the Proposed Rule, above, and Final Rule Issued Under Section 4(d) of the Act, below. In addition, the SSA report for the coastal marten identifies those key structural features important to the species. We are also working with our Federal and State wildlife agency partners in California and Oregon, as well as other ***land*** management entities, to develop various mechanisms (including those identified by the CDFW) to assist in conservation of the coastal marten and its habitat.

Comment 4: CDFW raised a concern that a wide range of ***forest*** management activities could be interpreted to fall under the proposed 4(d) rule because these activities typically include the reduction of fire risk as a goal even when reductions are incidental to the production of timber for economic reasons. CDFW recommends aligning the rule with existing laws governing the approval and exception of certain activities designed to reduce wildfire fuels. Specifically, CDFW recommends limiting the application of the 4(d) rule in California to projects consistent with large-scale strategic fuel reduction projects carried out or overseen by ***land*** management agencies (Cal Fire, USFS, State and Federal Parks, etc.) and Fire Safe Councils, and only to those activities that fall within the following exceptions, prescriptions, and limitations described in the California ***Forest*** Practice Rules (CA FPR): ***Forest*** fire prevention exceptions that allow for: (1) Elimination of vertical and horizontal fuel continuity provided certain conditions are met; (2) ***removal*** of dead and dying trees provided certain conditions are met; (3) ***removal*** of fuels within 150 feet of legally permitted structures and within 300 feet of habitable structures provided certain conditions are met; and (4) fuelbreak/defensible space prescription that allows for ***removal*** of trees or other vegetation to create a shaded fuelbreak or defensible space.

Our Response: We have revised the exceptions listed in the 4(d) rule, and added explanatory language to clarify our intent and to more explicitly describe specific actions subject to this rule. Please see our discussions under Summary of Changes From the Proposed Rule, above, and Final Rule Issued Under Section 4(d) of the Act, below.

Comment 5: For the portion of the 4(d) rule that excepts take prohibitions for ***forest*** management activities in State-approved plans or agreements, CDFW pointed out that if the Service uses this rule to rely on the State safe harbor agreement (State SHA) to avoid “take” of a federally listed species, the distinction between State and Federal definitions may be important in considering how the State SHA meets the intended purpose of Federal protection under the Act. CDFW stated that the definition of “take” under California Code (section 86) is narrower in scope than is “take” under the Federal Endangered Species Act. While both Federal and State SHAs allow for incidental take of a species, it is unclear whether a State SHA is consistent with Federal SHA definitions.

Our Response: We are not relying on existing State SHAs, or other State-approved plans or agreements addressed in the 4(d) rule, to avoid take of a federally listed species, nor for such plans to meet the intended purpose of Federal protection under the Act. Rather, we are relying on these types of plans to serve their intended purpose of improving overall habitat conditions, which will result in a conservation benefit to the coastal marten. We recognize that implementation of such State-approved plans may result in some short-term or small level of localized negative effects to coastal martens or their habitat, but also that the success of these plans in improving habitat conditions may subsequently contribute to the long-term viability of the species. As such, we are identifying that take that occurs as a result of these plans would be an exception to those actions prohibited under section 9 of the Act.

Comment 6: CDFW recommends defining “conservation needs of the coastal marten,” as phrased in the 4(d) rule, to ensure that excepted activities will contribute to the recruitment or conservation of high-quality coastal marten habitat. CDFW stated that one option is to establish, within this rule, large tree structure density ***targets***, shrub layer species composition and coverage ***targets***, and landscape-scale habitat composition ***targets*** to be used by ***land*** managers and Service biologists when developing and evaluating management activities that may be covered by the 4(d) rule.

Our Response: We have revised the exceptions listed in the 4(d) rule; added explanatory language, including specific examples of activities designed to promote, retain, or restore suitable coastal marten habitat; and more explicitly described, to clarify intent, specific actions subject to the 4(d) rule. Coastal martens use a variety of habitats, and it would be inappropriate to establish, in the 4(d) rule, habitat composition ***targets*** for the variety of habitats they occupy. We encourage ***land*** managers to work cooperatively with the Service to develop conservation plans or strategies that are consistent with the needs of the coastal marten.

Comment 7: CDFW recommends defining “Federal or State plans,” as phrased in the 4(d) rule, and clarifying the process for determining consistency of such plans. As an example, CDFW stated it is not clear if this provision would apply to California timber harvest plans (THP), non-industrial timber management plans (NTMP), program timber harvest plans (PTHP), and exceptions reviewed and approved by CalFire. Ensuring that these plans rise to the level of “consistent with the conservation needs of coastal marten” would require a case-by-case review. CDFW stated that if this was the Service's intent, an outline in the rule would be helpful to address whether a consultation with the Service is required to determine whether proposed activities will conserve suitable habitat. CDFW stated that without consultation, additive effects could result, which may lead to significant impacts not intended by the rule. Alternatively, the rule could state that THPs, NTMPs, and PTHPs are not included unless they are part of a larger plan to improve habitat for coastal martens.

Our Response: We have revised the exceptions listed in the 4(d) rule, and added explanatory language, to clarify our intent and to more explicitly describe specific actions subject to this rule. The revised language identifies only State approved NCCPs and State SHAs that address and authorize State take under CESA and does not discuss or include Federal plans. However, activities that may be conducted by Federal entities if found to be beneficial to the conservation of the coastal marten and is included as part of a Service approved conservation strategy or plan would fall under an exception in the 4(d) rule. In development of the 4(d) rule, we identified those prohibitions and exceptions which would focus on conservation of the coastal marten and its habitat. We purposefully did not include exceptions for THPs, NTHPs, and PTHPs per se due to their general broad nature and their focus on timber harvest rather than habitat management and conservation which would benefit the coastal marten. As a result, the mere submittal, or State approval, of a timber harvest plan will not meet any of the section 9(a)(1) prohibition exceptions listed in the 4(d) rule (see Regulation Promulgation, below). However, some measures in timber harvest plans may qualify for exception under the 4(d) rule if those activities are designed for reducing the risk or severity of wildfire or are consistent with finalized coastal marten conservation plans or strategies for which the Service has determined that such plans or strategies would be consistent with conservation strategies for the coastal marten. Please see our discussions under Summary of Changes From the Proposed Rule, above, and Final Rule Issued Under Section 4(d) of the Act, below.

Comment 8: With respect to our description of the conservation benefit of the proposed 4(d) rule, CDFW generally agreed that a tradeoff between short-term impacts and long-term habitat improvement may be necessary for the conservation and recovery of the coastal marten. However, they believe that each proposed project should be weighed carefully to ensure that short-term impacts do not accumulate to levels that would further threaten the persistence of the species. CDFW recommends establishing a system with identified minimum habitat distribution and population size thresholds to track the cumulative effect of excepted management activities and to verify suitable habitat and population thresholds are not exceeded in the pursuit of long-term benefits. CDFW stated that special emphasis should be given to Conservation Emphasis Areas, as identified in the Humboldt marten conservation assessment and strategy (Slauson et al. 2019, entire), because they have the greatest potential to meet overall conservation goals, and are also the areas where short-term impacts have the greatest potential to preclude long-term recovery. CDFW recommended that projects in these areas should receive specific review to ensure management actions resulting in “minimal and temporary harm,” as stated in the proposed 4(d) rule, are beneficial and consistent with the Conservation Emphasis Area goals.

Our Response: We appreciate the CDFW comments on tracking and focusing conservation efforts for the coastal marten through the implementation of the 4(d) rule and agree that there is a tradeoff between short-term impacts and long-term benefits to habitat depending on the type of activity. We are in the process of developing such or similar tracking methods suggested by the commenter through our section 7 consultation process. Activities on Federal ***lands*** or requiring Federal permitting or authorization will be subject to section 7 consultation requirements under the Act for federally listed species. In addition, once critical habitat is established, we would evaluate potential effects of Federal project activities on areas designated as critical habitat. With respect to guidance, the SSA report for the coastal marten and the proposed and final critical habitat rules once developed will describe the physical or biological features for the coastal marten, as well as any special management that should occur in critical habitat units. If landowners have questions or need further assistance, we strongly encourage them to contact their local U.S Fish and Wildlife Service office; contact information is available from the person listed under FOR FURTHER INFORMATION CONTACT, above.

Comment 9: CDFW noted that the proposed 4(d) rule objective of maintaining “complex tree and shrub conditions needed to support persistence” is a broad condition not defined in the rule and could be interpreted as contradictory. As an example, CDFW stated that a project may focus on a single component (increasing shrub complexity) by, or in concert with, ***removing*** the other entity (large, overstory trees or retention trees from past harvest). CDFW stated that this could be counterproductive to maintaining or promoting coastal marten habitat. CDFW recommended that it would be helpful to provide guidance on the range of desirable coastal marten habitat conditions on managed landscapes.

Our Response: We have revised the exceptions listed in the 4(d) rule, and added explanatory language, to clarify our intent and to more explicitly describe specific actions subject to this rule. Specifically, we added the following examples: Forestry management activities that promote, retain, or restore suitable coastal marten habitat that increase percent canopy cover, percent ericaceous shrub cover, and denning and resting structures. See also response to Comment 7. Please see our discussions under Summary of Changes From the Proposed Rule, above, and Final Rule Issued Under Section 4(d) of the Act, below.

Comment 10: The Oregon Department of Fish and Wildlife (ODFW) listed several conservation measures underway that should be considered in our determination. These include: (1) ODFW, through the Oregon Fish and Wildlife Commission, is in a rulemaking process to restrict trapping of coastal marten west of Interstate 5 (note: This action was a possible occurrence in Scenario 2 of the SSA report that suggested a population improvement through threat reduction); (2) ODFW is working on a connectivity analysis for multiple species, including the coastal marten, to help identify areas for habitat restoration or protection; (3) Federal agencies are currently implementing fuels-reduction efforts on Federal ***forests*** across the coastal marten's range to decrease wildfire impact, frequency, and intensity; and (4) ODFW has capitalized on renewed interest in the coastal marten by acquiring funds and establishing partnerships to expand monitoring efforts, with the intent of gaining information that will guide the management and restoration of coastal marten.

Our Response: With respect to conservation measure (1), we acknowledge the recent decision (September 2019) by the Oregon Fish and Wildlife Commission (OFWC) to ban marten trapping in the DPS (OFWC 2019, entire) (also see Comment 43). Regarding conservation measure (2), we commend the ODFW for their proactive work on martens in the coastal DPS; while their connectivity analysis, when completed, will help inform recovery actions for martens, it is not sufficient to reduce the threats to a level where we can determine that listing the coastal marten DPS is no longer warranted. With respect to conservation measure (3), we evaluated the impact of wildfire and fuels reduction efforts currently in place in our threats analysis, and have included such measures to reduce the impact of wildfire in our 4(d) rule's exceptions. Finally, as to conservation measure (4), we appreciate our partnership with ODFW and look forward to continuing our joint efforts in working towards coastal marten conservation.Tribal Comments

We solicited information from and met with members of the Yurok Tribe regarding the proposed listing of the coastal marten. We also sent the draft SSA report to the Yurok Tribe; the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians; the Coquille Indian Tribe; the Cow Creek Band of Umpqua Tribe of Indians; the Confederated Tribes of Grand Ronde; and the Confederated Tribes of Siletz Indians for comment. We did not receive comments on the proposed rule from any tribal entities.Public Comments4(d) Rule

Comment 11: Two commenters requested that ***forest*** practices conducted under the Oregon ***Forest*** Practices Act and its implementing regulations be included under the 4(d) rule. One of these commenters also requested that activities certified by third-party ***forest*** sustainability systems (e.g , Sustainable Forestry Initiative) be excepted from take prohibitions under the 4(d) rule.

Our Response: We did not specifically identify the Oregon ***Forest*** Practices Act (OFPA) as a mechanism for excepting activities from section 9(a)(1) prohibitions as actions undertaken through the OFPA may include additional activities outside our intended scope of the 4(d) rule. The commenters did not provide specific forestry practices that should be considered for exception under the 4(d) rule; however, our 4(d) rule does provide that certain forestry management activities that are for the purpose of reducing the risk or severity of wildfire may be excepted from the section 9(a)(1) prohibitions, as described in 50 CFR 17.40(s)(2)(ii), and this may include actions conducted under the Oregon ***Forest*** Practice Act if those activities meet the descriptions in our 4(d) rule.

Regarding third-party ***forest*** sustainability certifications, the commenter did not provide specific application and subsequent conservation benefits these certifications would provide to coastal martens. As a result, we could not evaluate the commenter's request. However, the exception under 50 CFR 17.40(s)(2)(iv) (see Regulation Promulgation, below) allows for ***forest*** management activities consistent with the conservation needs of the coastal marten developed in finalized conservation plans and strategies that are determined by the Service to be consistent with conservation strategies for the coastal marten.

Comment 12: One commenter suggested that the willingness of private landowners to implement a full suite of additional conservation measures, such as environmental research and site-specific conservation plans, should also be recognized by the Service as “activities consistent with formal approved conservation plans or strategies,” as described in our proposed 4(d) rule.

Our Response: We concur with the commenter and recognize private landowner activities furthering conservation of the coastal marten as important. Such activities would be reviewed under the applicable exceptions of the 4(d) rule, and the Service will determine if the activity is consistent with conservation strategies for the coastal marten, and thus qualifies as an exception under the 4(d) rule.

Comment 13: One commenter stated that the 4(d) rule is vague and will be difficult to apply because it is based on language subject to interpretation. Another commenter believed more clarity was needed on specific activities not covered by the 4(d) rule and raised several questions about how it should be interpreted.

Our Response: We have revised the exceptions listed in the 4(d) rule, and added explanatory language, to clarify our intent and to more explicitly describe specific actions subject to the 4(d) rule.

Comment 14: One commenter stated that rather than using vague and confusing language in a 4(d) rule to except landowners from take, we should have landowners use the Act's existing regulatory framework and develop habitat conservation plans (HCPs) or other mechanisms under section 10 of the Act. The commenter stated that an HCP would provide a more tailored and particularized look at the individual circumstances of the landowner and of the species' use of their ***land***.

Our Response: To improve clarity and avoid confusion, we have revised the exceptions listed in the 4(d) rule, and added explanatory language to clarify our intent and to more explicitly describe specific actions subject to the 4(d) rule. In our 4(d) rule, we provide specific exceptions from take for those forestry management activities such as fuels reduction and other vegetation management to assist in preventing catastrophic wildfire or are consistent with conservation strategies for the coastal marten through State or Service approved plans. Landscape planning efforts such as HCPs are large scale conservation efforts developed to conserve sensitive species and their habitats while providing long term planning assurances and consistency. Although we agree with the commenter that HCPs are a valuable conservation tool, they are not the only tool available for conservation and recovery of a threatened species. We determined that by specifically providing exceptions from take for a few specific activities which overall provide benefits for the coastal marten and its habitat, we can further conservation of the coastal marten.

Applicants conducting activities that may cause incidental take of coastal martens as a result of any activity not described in our 4(d) rule may seek an HCP and a permit under section 10(a) of the Act, or consultation under section 7 of the Act if there is a Federal nexus.

Comment 15: One commenter stated that a broader 4(d) rule may provide landowners incentive to retain ***forests*** (as opposed to converting ***forest*** ***land*** to other ***land*** uses) and to participate in cooperative conservation measures.

Our Response: One of the reasons we issue 4(d) rules is to incentivize positive conservation actions and streamline the regulatory process for ***land*** managers. Our 4(d) rule for the coastal marten is just one of many tools we use to accomplish conservation. Although a broader 4(d) rule may allow for additional actions to take place without significant regulatory oversight, we have determined that such a strategy would not be necessary or advisable for conservation of the coastal marten. We conclude that broadening the 4(d) rule will not result in a benefit to the species, and may increase its likelihood of becoming an endangered species.

We strongly encourage landowners working with the Service to cooperatively develop conservation measures for the coastal marten. In both Oregon and California, the Service has already begun working with Federal, State, and nongovernmental ***forest*** managers to develop a conservation strategy that would meet the requirements of the final 4(d) rule (50 CFR 17.40(s)(2)(iii and iv)) (see Regulation Promulgation, below).

Comment 16: One commenter stated that the Service's authority to issue 4(d) rules is narrowly confined by the definition of “conservation,” which the Act defines as the use of all [emphasis added by the commenter] methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided are no longer necessary. The commenter points to the Service's policy of extending all the section 9 prohibitions of endangered species to threatened species (50 CFR 17.31(a)), which, according to the commenter, means the Service found that the best way to “conserve” threatened species is to apply all prohibitions afforded to endangered species. The commenter concluded that, if the Service decides to depart from this practice, then the Service must otherwise “provide for the conservation of the species.”

Our Response: We have determined to extend all the section 9 prohibitions of an endangered species to the coastal marten, with certain specific exceptions, in order specifically to provide for the conservation of the species. The exceptions in the 4(d) rule were identified as actions that will assist in potentially reducing the risk of largescale wildfire, as well as other State or Service approved measures that are consistent with conservation strategies for the coastal marten. We have determined that such exceptions will benefit the overall conservation of the species.

Comment 17: One commenter stated that the portion of the 4(d) rule referring to State-approved plans or agreements that cover the coastal marten and are approved by CDFW is a special exception for Green Diamond Resource Company because they are the only large industrial timberland owner in the range that has obtained such an approved agreement with CDFW. The commenter believes the agreement fails to provide meaningful benefits to coastal martens and is insufficient to conserve the coastal marten as required under the Act. The commenter raised several issues with the agreement, including the reliance on translocation when it is unknown if translocation is feasible, changes to the company's wildlife tree retention program that do not allow trees to become old and complex, designating a “marten habitat reserve” in an area that was already unavailable for harvesting, and espousing agreement benefits that are already in place.

Our Response: We are not intending that the conservation of the coastal marten be achieved solely through the implementation of the State issued Green Diamond SHA. Conservation of the species, as required under the Act, will depend on a variety of recovery actions over time. In addition, although the Green Diamond SHA currently is the only CDFW-approved plan in place for the coastal marten, we anticipate additional plans to be developed by other entities in the future. We have revised the 4(d) to specifically except only those forestry management activities included in a plan or agreement for ***lands*** covered by NCCPs or State SHAs that address and authorize take of coastal marten as a covered species and which have been approved by the CDFW under the California Endangered Species Act. The Green Diamond SHA allows for certain forestry management activities conducted on their ***lands*** that are reasonably expected to provide a net conservation benefit for the coastal marten. The Green Diamond SHA provides aspects of habitat retention and wildfire management which will benefit the coastal marten. However, we also understand that the Green Diamond SHA does not provide for all aspects of coastal marten conservation. Any activities outside those described in the plan would not be included within the 4(d) exceptions as they would not be part of a CDFW-approved plan or agreement as described in 50 CFR 17.40(s)(2)(iii)

The Act provides a broad and flexible framework to facilitate conservation with a variety of stakeholders through various means. Working with our State resource agency partners in implementing conservation is one of many ways we work with, leverage, and expand our existing network of conservation partnerships to produce effective conservation practices and conservation strategies on the ground for all endangered or threatened species and their habitats. Working and collaborating with our State wildlife agency partners, tribes, private landowners, non-governmental organizations, and Federal partners to achieve on-the-ground conservation for endangered or threatened species and habitats will lead to greater conservation than if done independently. It is only through our inclusive efforts with the conservation community that we can collectively protect our shared resources.

Comment 18: One commenter pointed out that the Service did not cover the coastal marten under the habitat conservation plan with Green Diamond Resource Company (Green Diamond), wherein the company attempted to cover the same prescriptions currently in place in the Green Diamond safe harbor agreement (SHA) (see Comment 17). The commenter stated that the Service rejected the inclusion of coastal martens because of insufficient information available to consider the range of effects. The commenter questioned how the Service could conclude that the SHA would promote the conservation of the species if the prescribed management in the HCP was too uncertain to meet HCP issuance criteria. The commenter stated that, although the legal standard for issuing an incidental take permit (the Service needs to find the HCP minimizes and mitigates take to the maximum extent practicable) differs from issuing a 4(d) rule (covered actions must provide for the conservation of the species), the practical result of the 4(d) rule will forgive all taking of coastal marten by Green Diamond.

Our Response: The commenter is correct that the coastal marten is not a covered species in the Green Diamond HCP. However, since the implementation of the Green Diamond HCP, a conservation strategy has been developed (Slauson et al. 2019, entire) that outlines a three-pronged conservation strategy for the coastal marten and its habitat. The first two prongs of this strategy seek to: (1) Protect existing populations and currently suitable habitat, and (2) reestablish coastal marten populations where currently suitable habitat is inaccessible owing to existing dispersal barriers. Green Diamond and CDFW have developed a State SHA that is reasonably expected to provide a net conservation benefit for the coastal marten on Green Diamond ***lands*** for certain activities. The Green Diamond SHA is authorized under the CESA, and addresses, in part, the first and second prongs of the strategy. The Green Diamond SHA accomplishes this by implementing certain coastal marten habitat management and assisted dispersal commitments including funding, monitoring, and adaptive management (see CDFW 2018, entire). Moreover, the State SHA includes measures that were not originally included in the HCP, including financial and technical assistance for assisted dispersal. Accordingly, the State SHA provides additional protections for the coastal marten beyond those contained in the Green Diamond HCP. The commenter's statement that the practical result of the 4(d) exception of the State SHA would allow Green Diamond any manner of take is not correct because the 4(d) rule sets out specific and limited exceptions to the section 9 prohibition on take; as applicable to this comment, forestry management activities may be exempted from the take prohibition if included in a plan or agreement for ***lands*** covered by a NCCP or State SHA that addresses and authorizes State take of coastal marten as a covered species and is approved by the CDFW under CESA.

Comment 19: One commenter stated the Service failed to provide an adequate rationale for the 4(d) rule. The commenter stated that the Service's rationale that the exception of forestry management activities will, “encourage active ***forest*** management that creates and maintains the complex tree and shrub conditions needed to support the persistence of marten populations” would not occur under the Green Diamond SHA (see Comments 17 and 18). The commenter stated that management under the Green Diamond SHA prevents the development of suitable complex tree conditions and shrub layer because it will lower the age class of ***forests*** outside of riparian reserves. The commenter also stated that those riparian reserves were already protected prior to the State SHA and therefore the State SHA does not provide additional conservation for the coastal marten. The commenter further stated that the Service also claims that by excepting some ***forest*** management activities from take prohibitions, “these provisions can encourage cooperation . . . in implementing conservation measures that will maintain or enhance habitat and expand the population,” yet provides no explanation of how excepting take would encourage better behavior.

Our Response: We have determined that the measures identified in the 4(d) rule are necessary and advisable for conservation of the coastal marten. The provisions of the 4(d) rule for coastal marten will promote conservation of the species and its habitat by encouraging management of the landscape in ways that allow ***land*** management considerations while meeting the conservation needs of the coastal marten. This is accomplished by applying all the prohibitions for an endangered species, except as otherwise authorized or permitted. The long-term viability of the coastal marten, as with many wildlife species, is directly tied to the condition of its habitat. As described in our analysis of the species' status, one of the primary driving threats to the coastal marten's continued viability is the destruction of its habitat from catastrophic wildfires. The potential for an increase in frequency and severity of these catastrophic wildfires from the effects of climate change subsequently increases the risk to the species posed by this threat. We have determined that actions taken by ***forest*** management entities in the range of the coastal marten for the purpose of reducing the risk or severity of catastrophic wildfires, or conducting forestry management activities covered by California-approved SHAs or NCCPs, even if these actions may result in some short-term or small level of localized negative effect to coastal martens, will further the goal of reducing the likelihood of the species from becoming an endangered species, and will also likely contribute to its conservation and long-term viability. We have added clarifying language, improved our rationale, and incorporated more specifics into the 4(d) rule. Additionally, we removed the language within the preamble of the 4(d) rule that states, “These provisions can encourage cooperation . . . in implementing conservation measures that will maintain or enhance habitat and expand the population.” Please see our discussions under Summary of Changes From the Proposed Rule, above.

Comment 20: One commenter stated that in order to issue a 4(d) rule the Service must adhere to the National Environmental Policy Act (NEPA; 42 U.S.C 4321 et seq.) and complete internal section 7 consultation under the Act, and that failure to conduct these activities is a violation of NEPA and the Act.

Our Response: The courts have ruled that NEPA does not apply to listing decisions under section 4(a) of the Act, nor to 4(d) rules issued concurrent with listing (see Pacific Legal Foundation v. Andrus, 657 F.2d 829 (6th Cir. 1981); and Center for Biological Diversity v. U.S Fish and Wildlife Service, No. 04-4324, 2005 WL 2000928, at \*12 (N.D Cal. Aug. 19, 2005). In addition, the Service has determined that section 7 does not apply to the promulgation of 4(d) rules. Under the Act, we are to base listing decisions on the best available scientific and commercial information. If a species warrants listing under the Act based on a review of the best available scientific and commercial information, the Service must list the species, if not precluded by other higher priority listing actions. In other words, the Service does not have discretion to not list a species in consideration of other information, including the results of a section 7 analysis. This 4(d) rule is being promulgated concurrent with the listing of the species, and by extension, is therefore also not subject to section 7 consultation requirements. Further, the Service's determination that a 4(d) rule is necessary and advisable to provide for conservation of the species necessarily subsumes a determination that the rule will not jeopardize the species or adversely modify its critical habitat.

Comment 21: One commenter supported the 4(d) rule but stated its benefits were primarily afforded to non-Federal activities because the consultation requirements of section 7 for Federal activities remain in place. The commenter requested that we except Federal activities from section 7 consultation if they are consistent with the 4(d) rule, as it is well within the Service's general rulemaking authority under the Act.

Our Response: The overall intent of any 4(d) rule is to develop protective regulations necessary and advisable for the conservation of the species, not necessarily to provide regulatory “benefits” to any Federal entity. The 4(d) rule for the coastal marten applies all the prohibitions and provisions for the protection of endangered wildlife under section 9(a)(1) of the Act, with the exception of certain activities that we have determined are not likely to be primary drivers of the species' status, and which are likely to provide an overall conservation benefit by reducing wildfire impact, providing for habitat management, and allowing clean-up of contaminated habitat. Under section 7(a)(2) of the Act, Federal agencies, in consultation with the Service, must insure that their action, viewed against the aggregate effects of everything that has led to the species' current status and the cumulative effects of non-federal activities that are likely to affect the species in the future, is not likely to jeopardize the continued existence of the species. However, section 7 consultations for actions that are not prohibited by a 4(d) rule should be streamlined, as any action that we determine is compatible with the conservation of the species in a 4(d) rule should not result in jeopardy to the species.

Comment 22: More than 2,500 commenters, submitting the same or similar comment letters, stated that the 4(d) rule is insufficient to ensure the coastal marten's survival and will condemn the coastal marten to extinction because it largely excepts “State logging plans” (timber harvest plans), even though logging has been the main driver of the marten's decline. Another 190 comments by email, submitting the same or similar text, stated that the proposed 4(d) rule excepts from section 9 prohibitions the very things that have brought coastal martens to the point where they should be listed as endangered under the Act.

Our Response: The 4(d) rule does not specifically identify or except timber harvest plans (including THPs, NTHPs, and PTHPs) per se due to their general broad nature and their focus on timber harvest rather than habitat management and conservation that would benefit the coastal marten. As a result, the mere submittal, or State approval, of a timber harvest plan will not meet any of the section 9(a)(1) prohibition exceptions listed in the 4(d) rule (see Regulation Promulgation, below). However, some measures in timber harvest plans may qualify for exception under the 4(d) rule if those activities are designed for reducing the risk or severity of wildfire or are consistent with finalized coastal marten conservation plans or strategies for which the Service has determined that such plans or strategies would be consistent with conservation strategies for the coastal marten.

As for the remaining comments on the proposed 4(d) rule, we have excepted certain activities from take that would reduce habitat loss through fire, or that would occur subject to a plan or agreement covered by a NCCP or State Safe Harbor Agreement approved by CDFW under the authority of CESA, or forestry management activities consistent with marten conservation that are also consistent with finalized conservation plans or strategies for which the Service has determined that meeting such plans or strategies would be consistent with marten conservation strategies. We conclude that these activities meet the standards set out in the 4(d) rule and in addressing the stressors of fire and timber harvest that could could result in habitat loss for the coastal marten.

Comment 23: One commenter stated that the 4(d) rule is overly broad and lacks conservation measures to protect the marten from jeopardy. The commenter stated that the protections afforded to endangered species by the Act are necessary to protect the coastal marten because State regulations are not protective of the species, and are pushing the species towards extinction. The commenter raised concerns that the State of Oregon's authorizations of forestry practices, which allow the use of strychnine and other poisons, are not compatible with marten conservation. The commenter concludes that a 4(d) rule that would except State-approved logging plans is not adequately protective and will not provide for the survival and recovery of the coastal marten.

Our Response: Under the 4(d) rule, State-approved logging plans are not excepted from section 9(a)(1) prohibitions (see our responses to Comments 11 and 22). The exception under 50 CFR 17.40(s)(2)(iii) (see Regulation Promulgation, below) is specific to agreements approved by the CDFW under the authority of the CESA. Oregon does not have analogous agreement instruments under its Endangered Species Act; hence, there is not a similar exception in Oregon. The exception at 50 CFR 17.40(s)(2)(iv) (see Regulation Promulgation, below) applies to ***forest*** management activities consistent with marten conservation needs, and any ***forest*** management activity must be consistent with finalized conservation plans or strategies which the Service has determined is consistent with the conservation strategies of the coastal marten.

Comment 24: One commenter stated that a 4(d) rule for the marten is not needed, but should the Service proceed with one, it must include enforceable protective conservation measures to ensure the marten is not lost in the few areas where it persists. The commenter stated that conservation measures should prohibit logging within extant coastal marten population areas and curtail clear-cut logging and similar logging activities in mature ***forests*** between existing coastal marten population areas to facilitate habitat development. The commenter stated that projects that leave shelter trees or resting structures in an otherwise inhospitable landscape would not meet the definition of conservation measures. The commenter stated that Federal ***lands*** alone cannot provide enough habitat to ensure marten viability without connectivity on private and State ***lands***.

Our Response: Without a 4(d) rule for the coastal marten, the species would have no protective regulations in effect. By applying all the prohibitions and provisions of section 9(a)(1) of the Act, which are the same for endangered species, to the coastal marten, except for certain ***forest*** management activities associated with: (1) Wildfire management activities intended to reduce the risk or severity of wildfire; (2) State NCCPs or SHAs approved by CDFW under CESA; (3) finalized plans or strategies consistent with conservation needs of the coastal marten and which are Service approved for coastal marten; and (4) ***removal*** of toxicants consistent with conservation of the coastal marten, the 4(d) rule includes protective measures to ensure the coastal marten and its habitat is conserved. The 9(a)(1) prohibitions mean that any activity apart from those excepted in this 4(d) rule that would result in take of the marten, such as those examples described by the commenter, would be unlawful. The exceptions outlined in the 4(d) rule are not ownership specific and are not intended to rely on just Federal ***lands*** or on Federal agency conservation actions; the exceptions would apply to those entities that have appropriate plans in place across the landscape that provide for management and are designed to reduce the risk of coastal marten habitat loss. We conclude that allowing these specific activities under the conditions described in the 4(d) rule would promote conservation of the species and its habitat.

Comment 25: One commenter urged the Service to condition any listing of the marten with measures such as a 4(d) rule that would allow and promote continued and expanded vegetation management in the Oregon Dunes National Recreation Area (NRA) that is necessary to control invasion by both native and nonnative plants that are rapidly colonizing and eliminating unique elements of this ecosystem. The commenter believes the Service must consider the long-term risk to the broader dunes ecosystem, including marten and other at-risk organisms residing there, and allow invasive plant control intended to protect and/or restore sites. The commenter believes slowing or stopping these efforts at this time risks irreversible loss of the dunes and the diverse habitats associated with them.

Our Response: Portions of the Oregon Dunes NRA provide nearly all of the coastal shore pine habitat known to be used by coastal martens in the central coastal Oregon population. Activities associated with ***removal*** of shore pine habitat that is used by coastal marten in restoration of dune habitat are not part of the 4(d) exceptions. Conservation of the shore pine ecosystem is important for the conservation of the coastal marten. We are in conference, under section 7 of the Act, with the Oregon Dunes NRA on the impacts of implementing the Oregon Dunes Restoration Project on the coastal marten population. We will continue with section 7 consultation after listing becomes final, working with the agencies managing the Oregon Dunes NRA to help meet the project objectives while also meeting the conservation needs of the marten and ensuring the project does not jeopardize the species. As a result of the section 7 consultation efforts, any restoration efforts associated with the Oregon Dunes NRA will also take into consideration conservation of the coastal marten and its shore pine habitat within the area.Existing Regulatory and Conservation Actions

Comment 26: One commenter encouraged the Service to consider not only the threats, but also the existing conservation measures in place to conserve coastal martens, including the Northwest ***Forest*** Plan, Redwood National Park management, listing status in California and associated CESA regulations, and the Green Diamond Resource Company SHA for coastal martens in California.

Our Response: In the SSA report, we describe the current resiliency of the coastal marten. Our conclusions on current resiliency for the coastal marten took into consideration the existing conservation actions as well as any regulatory mechanisms being implemented to conserve habitat used by the species.

Comment 27: One Board of County Commissioners and two nongovernmental organizations pointed out that we did not address existing State and Federal regulatory mechanisms that provide substantial conservation benefits to coastal martens. Coastal martens are listed under the CESA, and take of coastal martens is negligible in Oregon. The commenters stated that other regulatory mechanisms are in place, such as the Northwest ***Forest*** Plan (NWFP), Oregon Dunes management plans, and Oregon ***land*** use laws that provide protection for coastal martens and need to be considered in a listing determination. One commenter pointed out specific aspects of the NWFP that we noted in the SSA report as providing benefits to coastal martens, including habitat recruitment that would contribute to coastal marten population connectivity, as well as reduced levels of timber harvest compared to non-Federal ***forests***. The commenter stated that the prohibition of take of coastal martens as a listed species under the CESA is not addressed in terms of its reduction of threat levels to coastal martens, at least in California. The commenters believe that these mechanisms, as well as ODFW management programs, research efforts, and initiation of rulemaking to ban coastal marten trapping, are either adequate to the degree that listing the coastal DPS is not warranted, or need to be fully and robustly considered before a listing decision is made.

Our Response: We agree with the comments regarding the benefits of State and Federal regulatory mechanisms for the conservation of listed species. For the coastal marten, we took into account Federal, State, and Tribal regulatory mechanisms and conservation measures when determining the Federal listing status of the DPS and have concluded that even with the existing regulatory mechanisms in place, the coastal marten still needs protections under the Act. See Determination of Coastal Marten Status, below, for our review of existing regulatory mechanisms.

Comment 28: Three commenters stated that the Service did not fully consider existing regulatory mechanisms because we inadequately addressed the potential ban on coastal marten trapping in Oregon.

Our Response: At the time of our proposed listing rule for the coastal marten (83 FR 50574; October 9, 2018), the State of Oregon had not yet proposed or finalized restrictions on trapping in the State. We have revised this final rule to incorporate the latest status of ODFW's rulemaking effort to ban harvest of coastal martens by trapping in western Oregon. However, although trapping is considered a threat to the coastal marten, trapping is not considered one of the main drivers leading toward our determination of threatened status for the species, but is considered along with all other threats cumulatively affecting the species.

Comment 29: Two commenters stated that the Service did not fully consider existing regulatory mechanisms because we inadequately addressed the effect of legalization of cannabis on coastal marten exposure to anticoagulant rodenticides. One of the commenters further stated that cannabis growers in California are required to apply pesticides in accordance with U.S Environmental Protection Agency (U.S EPA)-approved labeling, as well as State and local permitting requirements. The commenters stated that these requirements would result in a reduced incidence of unlawful cannabis growing and pesticide application, thereby reducing the threats from this activity on the species.

Our Response: We discuss legalization of cannabis and its effects on anticoagulant rodenticide exposure to coastal martens in our SSA report (Service 2018, pp. 48-49; Service 2019, pp. 39-42). However, it is unclear at this time as to how legalization will influence the use of anticoagulant rodenticides or other toxicants and subsequent coastal marten exposures, especially with respect to illegal cannabis grow sites. The commenter seems to assume that regulation of legalized cannabis cultivation has reduced the amount of unlawful cannabis cultivation and unlawful use of pesticides. However, the commenter provides no information to support that assumption.

We have no information to indicate that legalization of cannabis cultivation will reduce “black market” activities and associated grow sites, or how local regulations and zoning ordinances for cannabis cultivation on private ***lands*** will alter the number of illegal grows on public ***land*** (Owley 2018, pp. 1713-1714). There is no indication illegal growing has decreased with legalization of cannabis; continued lack of enforcement, as well as financial advantages over legally registered businesses, allow illegal underground operations to thrive (Bureau of Cannabis Control California 2018, pp. 28, 30). In fact, legalization may increase “black market” sales in other States, thereby increasing illegal grows to meet demand (Hughes 2017, entire).

Although cannabis growers are required to apply pesticides in accordance with U.S EPA-approved labeling requirements, no pesticides are currently registered by the U.S EPA for application on cannabis, because the U.S EPA cannot recognize cannabis as a legal crop due to its status as a federally controlled substance. Unless exempt from registration requirements, use of a pesticide on a crop for which it is not registered is illegal. Yet tests of cannabis products grown by the cannabis industry reveal the presence of pesticides applied contrary to their registered label, including 71 percent of cannabis flowers grown for medical marijuana in Oregon (Voelker and Holmes 2015, pp. 7-8; Sandler et al. 2019, pp. 41-42). None of the pesticides tested were rodenticides, but the assertion that cannabis legalization has reduced the unlawful use of pesticides appears to be unfounded.

Moreover, legalization of cannabis cultivation may have increased the number of grow sites in some areas. Within the DPS counties in Oregon, over 2,000 legal operations have been permitted (Oregon Liquor Control Commission (OLCC) 2019, unpaginated); this number is in addition to existing illegal grow sites, which may not diminish as a result of legalized cultivation. Associated rodenticide use on the permitted grow sites is difficult to determine, and, as far as we know, has not been assessed.

Hence, we stand by our conclusion that the threat of coastal marten exposure to rodenticides remains, and it is uncertain as to whether cannabis legalization will decrease the threat to coastal martens by toxicant exposure.Distinct Population Segment

Comment 30: The Douglas County Board of Commissioners stated that designation of the DPS is arbitrary and capricious, basing this conclusion on the premise that if there is no contemporary or historical biogeographic barrier to the interaction between coastal marten populations in Oregon and coastal marten populations in California (citing Slauson et al. 2009), then there similarly is no reason to conclude that the coastal population as a whole in California and Oregon cannot interact with the rest of the M. caurina taxon in Oregon or elsewhere in North America (see Comment 31).

Our Response: Contemporary or historical biogeographic barriers are only one of multiple factors we consider when determining whether a population meets the standards for designation as a DPS. Under our DPS Policy (Service 1996), a population segment of a vertebrate taxon must be both discrete and significant to the taxon to which it belongs. The commenter is referring to the discreteness portion of the policy, which we address here. A population segment may be considered discrete if it satisfies either of two conditions. The condition relevant to this comment states that the population segment is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation. We articulate our position in detail in our April 7, 2015, 12-month finding (80 FR 18742, pp. 18744-18746). In short, we found substantial genetic differences between the coastal marten population (combined coastal Oregon and California) and other populations of Pacific martens, indicating that they are markedly separated from each other and providing evidence of a long-standing geographic separation. Although some low degree of introgression indicates occasional past movement of individuals between coastal and inland marten populations, evidence suggests this was an infrequent occurrence. Further, recently published results of a genetic evaluation of the Pacific marten indicate that coastal Oregon and coastal California marten populations likely represent a single subspecies (Schwartz et al. 2020, p. 11). Consequently, the coastal marten may actually be a subspecies, which is also a listable entity under section 3(16) of the Act.

Comment 31: As a follow up to Comment 30, the same commenter stated that researchers (Dawson et al. 2017, entire) provided further evidence that our DPS determination was arbitrary and capricious. Specifically, the commenter believes this publication continues to reflect a wider range for Martes americana caurina, providing a context not only for characterizing the genetics of M. a. caurina and M. a. humboldtensis, but also providing a context for the Federal listing status of M. a. caurina relative to its wider range rather than just the Oregon and California coastal populations.

Our Response: It appears the commenter has misapplied the results of Dawson et al. (2017) for the coastal marten. First, the commenter incorrectly labels the two currently designated subspecies as belonging to the American marten species (Martes americana) when in fact they belong to the Pacific marten species (M. caurina), as supported by recent data (Dawson and Cook 2012, p. 35; Dawson et al. 2017, p. 716). Consequently, the correct nomenclature for these two subspecies is M. c. caurina and M. c. humboldtensis, not M. a. caurina and M. a. humboldtensis. In that light, Dawson et al. (2017, pp. 721, 724) further supports our DPS designation because they determined that American marten populations exhibit greater genetic variability among populations and greater geographic distribution of individual genetic haplotypes than do Pacific martens, indicating American marten populations are more similar to each other than are Pacific marten populations. Because Dawson et al. conclusions support a determination that the Pacific marten is a different entity than the American marten, the status of the American marten is not relevant to this determination.

Comment 32: The Douglas County Board of Commissioners stated that we assumed that the three coastal marten populations identified in the SSA report were in decline and that we based this assumption on a reduction in the number of coastal martens trapped and anecdotal observations of road-killed coastal martens. They believe these records may not provide scientific evidence to support a declining population. In addition, the commenters believe that a more robust survey effort in the Oregon Coast Range would likely result in finding additional populations of coastal martens. Finally, they conclude that in order for the Service to make a finding on the listing status of the coastal marten, we must first determine the size and extent of the current population(s).

Our Response: The best available scientific information for the coastal marten does not allow us to determine the exact number of individuals and population sizes. However, we did not intend our discussion of trapping and anecdotal records in our analysis to be used to demonstrate that coastal martens are declining in trend. The only available population estimates are a single recent estimate for the central coastal Oregon population published in 2018, and two estimates for the northern coastal California population, one from 2008 and a subsequent estimate in 2012 that estimated fewer coastal martens than in 2008. Without additional information, it is not clear whether the decreased population estimate for the northern coastal California population represents a true long-term population decline, a short-term decline in response to a stochastic event such as a weather event or disease outbreak, or natural variation. Our only conclusion specific to a coastal marten population trend was our finding that the distribution of the coastal marten and its habitat has substantially declined from its historical range.

We do not feel that a more robust survey effort in coastal Oregon would result in discovering additional populations of coastal martens. Central and southern coastal Oregon was surveyed systematically in 2014 and 2015 with 348 sample units (908 survey stations), which was the largest carnivore survey done in Oregon up to that time (Moriarty et al. 2016, pp. 72, 76-77). The authors surveyed 70 percent of the coastal marten's historical range in Oregon; they acknowledged that while their survey methodology may have missed individuals, they were unlikely to miss a thriving, sizeable population of coastal martens. Hence, published research indicates additional coastal marten populations do not currently occur in central and southern coastal Oregon. Apparently suitable marten habitat occurs in northern coastal Oregon, some of which has since been surveyed with no detections. Further surveys in this area would be desirable to settle questions about coastal marten distribution along the north coast. However, even if a coastal marten population were found in northern coastal Oregon, it would still be an isolated population removed from the remainder of the taxon, with low likelihood of genetic intermixing with populations to the south.

The commenter believes that the Service must determine the current population (we assume they mean population size) and quantify what represents a population that needs protection under the Act. To determine population size requires a census, which is rarely done for wild animal populations, and then usually only when the population is extremely small and survey methodology can reliably detect all individuals. Instead, we rely on population estimates, which have inherent variability. As noted above, we have three empirical estimates for coastal martens, and alone they tell us little about current population trends of coastal martens. The commenter seems to believe that without quantitative data, we must refrain from making a decision on the listing status of a species. However, upon receiving a petition to list a species, the Act and our regulations require us to make our determination solely on the basis of the best scientific and commercial data available. Hence, we have used the population estimate and distribution data combined with other available data on coastal martens to inform our analysis in the SSA report to assess the viability of the coastal marten. This assessment of the biological information, along with the threats facing the species or its habitat, was used to inform the Service in making a listing determination for the coastal marten.

Comment 33: One commenter questioned the accuracy of the historical range and its use in deriving the DPS boundary, stating that the historic range is a coarse boundary and that no genetic data have been used to confirm its validity southeast of the Klamath River. In addition, the commenter states that the occurrence of the Humboldt (Martes caurina humboldtensis) and Sierran (M. c. sierra) subspecies in the same wilderness area with no discernable barriers creates confusion and raises questions about the discreteness of the DPS.

Our Response: Additional genetic information would be useful in further defining the boundary of the DPS. We used the best available information to determine where to most accurately capture the DPS boundary (Grinnell and Dixon 1926, p, 415; Bailey 1936, p. 296; Grinnell et al. 1937, pp. 190, 207, 209; Zielinski and Golightly 1996, p. 115; Zielinski et al. 2001, p. 480; Slauson et al. 2019, entire) (see section 4.1, Historical Range and Distribution, of the SSA report; Service 2019, pp. 73-75). In addition, a DPS may be considered discrete if it is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation. Complete separation is not necessary under our DPS policy. Given this definition of discreteness and the most recently available genetic analysis, we continue to assert that the coastal marten meets the definition of, and qualifies as a valid, DPS under our policy. This conclusion is further supported by recent information that the coastal marten may be a valid subspecies of the Pacific marten (Schwartz et al. 2020, p. 11).***Forest*** Management

Comment 34: Several commenters raised concerns regarding ***forest*** management. One commenter stated that we automatically correlated ***forest*** management with habitat loss (83 FR 50574, October 9, 2018, p. 50577). In addition, they believed that we need to acknowledge that coastal martens exist across a range of habitat and management conditions, including intensively managed ***forests***. They stated that we further need to acknowledge that coastal martens use a variety of habitat types (e.g , young ***forests*** with abundant shrub cover in the central Oregon coast population) and should not be singly focused on a specific habitat type, specifically old ***forest***, as preferential for coastal martens (83 FR 50574, October 9, 2018, pp. 50575-50576). As an example, one of the commenters referenced a comparison of coastal marten survival between unharvested reserves and a clear-cut landscape (Payer and Harrison 1999). The commenter states that the study found no differences in survival for coastal marten in the two landscapes.

Our Response: Coastal martens exist across a range of habitat and management conditions, and we acknowledge the coastal marten's use of serpentine and shore pine vegetation types, contrasting them with the older ***forest*** stands used elsewhere in the study area (Service 2018, pp. 34-35). We also acknowledge the coastal marten's use of intensively managed ***forests***, although research indicates that coastal martens still need a high proportion of older ***forest*** or serpentine habitat at the home range and landscape scale (Service 2018, pp. 36-40). Payer and Harrison (1999, pp. 43-44) also acknowledge this, noting that coastal marten densities were higher in reserve landscapes, and that in areas managed as industrial ***forest*** landscapes, coastal martens positioned their home ranges in areas with more mature ***forest*** habitat and less in recently clear-cut ***forests***.

We did not automatically correlate ***forest*** management with habitat loss. In the referenced page of the October 9, 2018, proposed rule (83 FR 50577), we note that habitat loss has and continues to be influenced by wildfire, vegetation management, and a changing climate, but we do not maintain that all ***forest*** management results in habitat loss, or similarly, that all wildfire or climate change effects will result in habitat loss.

Comment 35: One commenter states that the Service should recognize that managed ***forest*** landscapes are dynamic through space and time, with recent harvest units interspersed across landscapes with younger or mature ***forest*** stands and retention buffers. In addition, the commenter states that modern ***forest*** practice regulations, such as the Oregon ***Forest*** Practices Act (OFPA) provide, at the landscape level, ***forests*** that produce a mixture of old and large trees, multiple canopy layers, snags and other decay elements, understory development, and biologically complex structure and composition. The commenter believes these structural attributes complement late-successional conditions often associated with public ***forests***.

Our Response: Managed ***forest*** landscapes are dynamic with shifting mosaics of ***forest*** stand ages, and that ***forest*** practice regulations require retention of some ***forest*** structural components. However, the quantity and scale of these components, as required in the OFPA, does not necessarily result in suitable coastal marten habitat, and may have resulted in a landscape that has increased competition and predation pressures on coastal martens. While the OFPA requires retention of certain types of vegetation and structure at the landscape scale, coastal martens respond to threats at smaller scales including home-range and stand scales where this mixture of elements necessary for survival are not always present.

Comment 36: One commenter stated that vegetation management is not a threat, per se, because recent experience suggests that timber harvest and coastal marten occupancy are not mutually exclusive. The commenter believes there is no definitive research that shows coastal martens do not use younger ***forest*** stands on managed ***lands***, and in fact, coastal martens are found in managed ***forests***. The commenter states that the frequency, extent, and quality of timber harvesting varies greatly across the DPS with varying adverse and even beneficial effects, and some ***forest*** management provides coastal marten habitat and contradicts blanket assertions that younger ***forests*** are a threat to coastal martens. The commenter also asserts that the Service did not adequately address how managed ***forests*** provide suitable habitat for coastal martens and how these ***forests*** function to connect coastal marten populations.

Our Response: Definitive research is not available that shows coastal martens do not use younger ***forest*** stands on managed ***lands***. We have acknowledged the coastal marten's use of intensively managed ***forest*** landscapes (see our response to Comments 34), and find that the degree to which timber harvest will affect coastal marten habitat may vary greatly with the magnitude, intensity, frequency, and other site-specific and landscape conditions. We acknowledge some of these effects in the SSA report (Service 2019, pp. 61-62). However, multiple studies show the importance of mature and old ***forests*** to coastal martens. Coastal marten densities are higher in reserve landscapes, and in areas managed as industrial ***forest*** landscapes, coastal martens position their home ranges in areas with more mature ***forest*** habitat and less in recently clear-cut ***forests*** (Payer and Harrison 1999, pp. 43-44; Thompson et al. 2012, p. 228; Service 2018, p. 61).Habitat and Habitat Modeling

Comment 37: Two commenters stated that the habitat model used in the SSA report was insufficient, and raised multiple technical issues regarding its development and applicability. They believe that more effort is needed to assess potential predicted coastal marten habitat.

Our Response: The SSA report (Service 2019, pp. 84-86) acknowledges limitations with the coastal marten habitat model used, particularly its application in Oregon. However, while we agree that more improved habitat modeling for the species would be useful, we are required to make our listing determinations on the best scientific and commercial data available at the time of listing. While the commenters pointed out limitations with the model, they did not provide an alternative to the information resulting from the model. One of the commenters suggested we consider an independent analysis similar to what was done for northern spotted owls (Davis et al. 2016, entire). To account for the limitations of the model developed by researchers, we adjusted certain aspects of the model such as elevation and removed areas where the species is known not to occur. As a result, we consider the modeling as described in the SSA to be an appropriate tool for assisting to determine the distribution of habitat and conservation status of the coastal marten. Although we are pursuing additional modeling to better represent coastal marten habitat in Oregon, such a model is not yet available. Until it is, we are relying on the existing habitat modeling used in the SSA report as the best available data, while still acknowledging the limitations of its application in Oregon.

Comment 38: One commenter felt that the habitat model used in the proposed rule likely underestimates habitat suitability for the coastal marten and should be updated to include seral stages in addition to the Old Growth Structure Index (OGSI) to evaluate connectivity of habitats used in the Service's least cost path modeling analysis that was used to evaluate population resiliency in the SSA report. The commenter states that given that coastal martens clearly occupy and reproduce on managed ***lands***, these younger ***forests*** should be incorporated into a least cost path model, which may provide a much different assessment of connectivity.

Our Response: We acknowledge the limitations with the coastal marten habitat model used and took those limitations into consideration in determining the status of the coastal marten. While there is evidence that coastal martens use a variety of habitats, there is no evidence that younger seral stages would improve the model fit or provide the necessary elements required for dispersal. While we are aware that coastal martens occur on and reproduce in managed ***forests***, multiple studies of martens across North America show the importance of mature and old ***forests*** to martens in general (Thompson et al. 2012, p. 228), and the coastal marten model performed best when using OGSI. Further, the Service's least cost model did identify connectivity across managed ***lands*** and currently remains the best available data to use to evaluate connectivity.

Comment 39: One commenter stated that the SSA report and proposed rule regarding understory shrub associations with both managed and unmanaged ***forests*** do not reflect the uncertainty in the science. The commenter provides information indicating that vegetation associations, including understory shrub layers, can be highly variable within the coastal marten's range and it is not clear that past or present ***forest*** management activities have substantially altered, or will substantially alter, vegetation associations in a manner that will limit habitat suitability for the species.

Our Response: While we agree with the commenter that understory shrub layers can be highly variable within the range of the coastal marten, and that landscapes managed for timber harvest, depending on frequency, intensity, and extent of activities, may provide some level of understory shrub habitat for the coastal marten, the best available literature indicates that coastal martens select habitat that has a dense understory shrub layer (Andruskiw et al. 2008, pp. 2275-2277; Slauson and Zielinski 2009, pp. 39-42; Eriksson 2016, pp. 19-23). These areas provide food and prey resources for coastal martens and provide cover from predators. Dense understory shrub layers, used by coastal martens for breeding, are most often found outside of areas subject to timber harvest activities.Listing Status

Comment 40: Two commenters stated that we should list the coastal marten as endangered rather than threatened. One commenter based that opinion on researchers' estimates of the coastal marten total population of fewer than 500 animals. The other commenter based their opinion on a variety of factors, including a population of fewer than 400 animals; the coastal marten's extirpation from 93 percent of its range, with 72 percent of mature ***forest*** logged, leaving coastal martens in isolated, remnant populations; increased threats to isolated populations; human-caused mortalities in the central coastal Oregon population resulting in a 99 percent risk of population extirpation within 30 years (Linnell et al. 2018); suitable habitat conditions in central and northern coastal Oregon being so curtailed as to only be capable of supporting a single population (Slauson et al. 2018 [2019]); increased threats specifically to the California population; and California's listing of the coastal marten as endangered under the CESA.

Our Response: The Act defines an endangered species as any species which is in danger of extinction throughout all or a significant portion of its range (section 3(6)), and a threatened species as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (section 3(20)). Although smaller populations are often more at risk of extinction than larger populations, whether a population meets the definition of endangered or threatened under the Act is not solely limited to population size, and varies by species and circumstance. Vulnerability to extinction is a complex interplay between the species' existing condition, including population size, the types and timing of threats and their interactions and magnitude, and how populations respond or are expected to respond to those threats.

We took into consideration the factors identified by the commenter (i.e , small, isolated, populations; human-caused mortalities) in our determination of threatened status. We also reviewed the literature cited by the commenter, which references coastal marten population persistence and habitat conditions in Oregon (Linnell et al. 2018; Slauson et al. 2018 [2019]). We find that Linnell et al. (2018) gives a range of modeled outcomes regarding persistence of the single population analyzed by the researchers and that the modeled outcome depends on population size and number of human-caused mortalities (Linnell et al. 2018, pp. 14-15). The statement by the commenter points to the smallest potential population (20 individuals) having the highest human-caused mortalities (3 mortalities) per year. The commenter also points to trapping in Oregon as being part of the reason for increased human-caused mortalities. With trapping of the coastal marten now being banned by Oregon, the threat from trapping taking coastal martens has been greatly reduced, thereby making this “worst-case” scenario less likely.

Regarding the commenter's reference to Slauson et al. 2018 (published February 2019), we acknowledge that the existing populations of coastal marten are isolated and small, and that habitat conditions in some cases are limiting. However, the conclusion made by the researchers that habitat is limited in central and northern coastal Oregon is based on modeled habitat that in some cases does not reflect the areas actually being used by the coastal marten. For example, the model does not take into consideration lower elevation areas that are being used by the coastal marten.

The commenter stated that the CDFW's determination of endangered status under the CESA was reason to conclude federally endangered status under the Act. Comparing the analysis conducted by the CDFW determining that the coastal marten should be considered endangered under the CESA to that of the Service's threatened determination is not appropriate. The CDFW determination does not take into consideration Oregon populations. In our analysis of the best available commercial and scientific information, we determined that the coastal marten is not in danger of extinction (i.e , “endangered”), but is likely to become an endangered species within the foreseeable future (“threatened”) based on the timing of threats acting on the species and its habitat. See Determination of Coastal Marten Status, below.

Comment 41: One Board of County Commissioners stated that it is inappropriate for the Service to list the coastal marten as threatened because we know very little about the actual prevalence of the species due to limited and inadequate surveying effort and data.

Our Response: We are required to make listing determinations based on the best scientific and commercial information available. Since 2014, extensive coastal marten surveys have been conducted encompassing more than 70 percent of the coastal marten's predicted historical range in Oregon, including survey stations in Lincoln, Benton, Lane, Douglas, Coos, Curry, and Josephine Counties (Moriarty et al. 2016, pp 72-73). Extensive surveys for coastal marten have also been conducted in California (Service 2018, p. 82). Although the survey methodology may have resulted in some individuals being missed in some locations, the existing survey protocol was unlikely to miss a “thriving, sizable population” of coastal martens (Moriarty et al. 2016, p. 77).

Comment 42: One commenter encouraged the Service to consider the positive impacts that private timberlands have on coastal martens, including restricted public access that reduces the risk of illegal activities such as illegal cannabis cultivation sites and associated toxicants, reduced road traffic and associated road mortalities, and reduced trapping pressures. They concluded that managed timberlands contribute to a lessened risk of mortality from these factors.

Our Response: While some of the stressors may be reduced on managed timberlands, or other ownerships for that matter, we still look at the cumulative effect of all stressors and conservation actions addressing them collectively across the DPS to assess their effects on coastal martens and determine the DPS' listing status. Based on our consideration of the five listing factors, we find that the current condition of the coastal marten still provides for enough resiliency, redundancy, and representation within the four existing populations; however, the threats from wildfire and habitat loss, exacerbated by small population size, are expected to manifest in a decline of the species' status into the future. The association of specific threats to specific ownerships, geographic locations, or other conditions will be important in recovery planning and developing conservation strategies for the coastal marten.

Comment 43: One commenter requested that the Service “emergency list” the coastal marten because of the ongoing coastal marten trapping season on Federal ***lands***. The commenter stated that recent research on coastal martens in the central coastal Oregon population concluded that human-caused mortality of two to three coastal martens per year in this area could extirpate this population within 30 years. The commenter stated that continued trapping clearly meets the statutory definition of jeopardy and should be halted immediately. The commenter postulated that the Service has the authority to end trapping of coastal martens on Federal ***lands*** by enacting emergency protection for the coastal marten under the Act while the Federal listing is in process.

Our Response: Although trapping has been identified as a threat to coastal martens, we did not consider this threat to be a driver for determining if the coastal marten should be listed as an endangered or threatened species. We considered trapping to be part of the cumulative threats facing the species. Our analysis of the threat from trapping indicated that, on average, less than one animal has been lost annually over the last 28 years due to trapping. Additionally, there have been no legally trapped or harvested coastal martens in Oregon since 2014. Further, on September 13, 2019, the Oregon Fish and Wildlife Commission banned trapping coastal martens in areas where it is known to occur in Oregon, which includes Federal ***lands*** (OFWC 2019, entire). As a result, we do not consider trapping impacts to be as severe as characterized by the commenter, and with the new restrictions, we do not consider trapping a threat to the viability of the coastal marten and as a result not a condition for emergency listing under section 4(b)(7) of the Act.

Comment 44: One commenter, concerned with the central coastal Oregon population and its associated habitat located within the Oregon Dunes ecosystem, suggested that the coastal marten in this area should not be listed because coastal marten and habitat in this area are already adequately protected under existing Federal law and regulations, and because a listing will add a complex, time-consuming procedural consultation hurdle that will slow and/or limit critical and time-sensitive habitat protection and restoration work in the Oregon Dunes. The commenter stated that this would likely result in the following immediate and long-term detrimental effects to the broader dunes ecosystem, which supports other rare, at-risk, and listed species: (1) Risk to maintenance of high-quality coastal marten habitat conditions in this area; (2) threat to the long-term persistence of values for which the Oregon Dunes NRA was established; and (3) associated negative economic effects on surrounding communities. In addition, the commenter stated that other listed or rare species depend on the restoration of the Oregon dunes, including the threatened western snowy plover (Charadrius alexandrinus nivosus), and several rare plants and invertebrates.

The commenter went on to recognize the work of the Oregon Dunes Restoration Collaborative (ODRC), which was formed to increase engagement of local communities and coordinate efforts to significantly expand protection and restoration of the dunes. The commenter stated that there are limited resources for the ODRC to complete restoration work, and the commenter believes additional administrative procedures associated with listing the coastal marten, or slowing the process, will be burdensome and likely result in loss of public interest and support for restoration. In addition, the commenter stated that the coastal marten and its habitat are already adequately protected under the National ***Forest*** Management Act, and because it is a candidate species under the Act and is on the Regional ***Forester***'s (USFS) sensitive species list.

Our Response: Based on our assessment of the threats facing the coastal marten as well as conservation measures, management, and regulatory mechanisms in place, we have determined that the coastal marten meets the definition of a threatened species under the Act. We are working with the USFS and stakeholders such as ODRC on management of the Oregon Dunes NRA. We agree that working with ***land*** managers and local stakeholders to develop support and ownership for species recovery is key for successful implementation of the Act, and, as is our practice for listed species, we will work with government and nongovernmental entities as we work to recover the coastal marten.Off-Highway Vehicle Recreation

Comment 45: One commenter stated that coastal martens co-exist with off-highway vehicle (OHV) activities that occur in the Oregon Dunes NRA. They stated that if the coastal marten is listed, then listing should not limit the ability to recreate in the area in designated riding routes.

Our Response: Habitat use of the Oregon Dunes NRA by coastal marten is mostly within ***forested*** areas not used by recreational OHV enthusiasts, and we did not identify OHV activities as a threat to the coastal marten. Consequently, we find it unlikely that listing the coastal marten as threatened will significantly impact OHV use within the area. We will continue to work with our Federal and State partners regarding conservation of coastal marten and its habitat with the Oregon Dunes NRA.Population Status

Comment 46: Three commenters stated that additional coastal marten locations in southern Oregon, not considered in the SSA report or the proposed rule to list the coastal marten, suggest the possibility of increased redundancy and resiliency. One of these commenters stated that this suggests the coastal marten is not likely to become endangered in the foreseeable future. Specifically, two new locations were found in near-coastal ***forests***, suggesting redundancy with the central coastal Oregon population, although there is no information on the number of individuals in this area. The commenters stated that between the southern coastal Oregon population and the Oregon-California border population, two new coastal marten locations were found near detections from 1997 and 2001, suggesting increased connectivity between these two populations.

Our Response: We have reviewed the occurrence information the commenter provided and incorporated this information as appropriate into our analysis of the status of the coastal marten. Although the new detections are encouraging, they do not lead us to believe that redundancy or resiliency has increased to the level that listing is not warranted. None of the detections meet our ruleset for delineating additional coastal marten population areas, nor are the detections close enough to existing population areas to be subsumed by them, again according to our ruleset (Service 2019, pp. 75, 82). It is difficult to determine whether the two coastal marten detections located between the southern coastal Oregon population and the Oregon-California border population suggest increased connectivity. Again, there are not enough locations within proximity of each other to derive a separate population; if there were, such a population area would provide for additional connectivity between populations and improve the overall resiliency of the coastal marten (Service 2019, pp. 94-95). However, there is not sufficient evidence to conclude whether these two detections represent: (1) Coastal marten connectivity between the two extant populations (either as individuals or over multiple generations); (2) coastal marten reestablishment in their historical range; or (3) remnant individuals from a once existing population. The best available data suggest that these detections do not represent a separate population, because the survey methodology, while it may have missed individual coastal martens, was unlikely to miss a sizable population (Moriarty et al. 2016, p. 77).

Comment 47: Three commenters stated that their beliefs the number of individuals in the northern coastal California population is larger than estimated in the SSA report due to flawed survey methodology and analysis methods. The commenters believe the estimate does not reflect recent coastal marten captures of a third or more of the population size outside of the population area, which provide evidence that coastal martens occur outside of the area bounded in the SSA report and that there is a potential for a larger population size. The commenters also state that the population estimate does not reflect available coastal marten habitat and that coastal marten detections south of this population and within the DPS may also be Humboldt martens and that they should be included in the population estimate.

Our Response: We based our determination of population estimates on the best scientific and commercial information available and do not consider the survey methodology or analysis methods for population estimates to be flawed. The population estimates were not intended to reflect available marten habitat but instead to capture what we know about current population numbers and their distribution. Coastal marten suitable habitat was analyzed and is reflected in tables 4.2 and 4.3 of the SSA report under the number of available male and female home ranges. We are not aware of any verifiable marten detections south of the northern coastal California population and within the DPS other than a few detections in Prairie Creek Redwoods State Park (PCRSP). At the time of publication of the proposed rule (October 9, 2018), there were two detections in PCRSP, with three additional detections since that time. We decided to not include these detections within the northern coastal California population because they were separated from the extant populations by more than 5 kilometers and there were only two individuals at the time of publication of the proposed rule (October 9, 2018) (see section 4.2 of the SSA report for further explanation of extant population areas [EPAs]). We have determined that the increase in detections to five is still an insignificant number and thus we still do not include them in our analysis of the status of this population. The information in our SSA report was peer reviewed by knowledgeable species experts. These experts agreed with our characterizations of populations and distribution, and concurred with our determination of the species' DPS, which coincides with a subspecies determination for the taxon. The commenters did not provide any substantial information to support their comments regarding population size and distribution.Predation and Competition

Comment 48: Four commenters questioned our statement in the proposed rule (83 FR 50574, 50577, October 9, 2018) that predation of martens has increased due to changes in ***forest*** composition. In the absence of historical and empirical data indicating changes in predation rates, one commenter suggested this should be presented only as a potential hypothesis.

Our Response: Data are lacking to definitively conclude that predation of coastal martens in the DPS has increased. Our statement was based on our observation that areas subject to timber harvest are usually more open and provide less cover from predators than areas with higher shrub density, downed logs, and standing snags. We have modified the language in our SSA report and this rule to state that the increase in predation may be linked to changes in ***forest*** composition but that this increase may be hypothetical.

Comment 49: Three commenters questioned our conclusion in the proposed rule that viability risks to coastal martens, “are primarily related to habitat loss and associated changes in habitat quality and distribution and include: (1) A decrease in connectivity between populations; and (2) habitat conversion from that suitable for martens to that suitable for generalist predators and competitors, thereby increasing potential interactions and subsequent marten injury, mortality, or predation. The factors are all influenced by vegetation management, wildfire, and changing climate” (83 FR at 50577, October 9, 2018). The commenters believe that we phrased these conclusions as factual when there is uncertainty around a decrease in connectivity, an increase in bobcats associated with changes in ***forest*** composition, whether bobcats are the predominant coastal marten predators across the coastal marten's range, whether bobcats prefer stands less than 30 years old, and what constitutes coastal marten habitat. The commenters also stated that the Service should not rely on an inference drawn from mortality observations on a small coastal marten population without any control or historical point of reference to support a conclusion that vegetation management leads to predation that is a relatively worse threat to the coastal marten than would otherwise exist.

Our Response: Regarding population connectivity, the commenters did not provide any information to support their statements on population connectivity for coastal martens. However, based on Zielinski et al. 2001 (p. 486), we have concluded that the coastal martens' historical range has been reduced. This research indicates that the species has been extirpated from a significant part of its range and that coastal martens may be sensitive to ***forest*** fragmentation, given marten sensitivity elsewhere in North America. Based on this information, survey efforts, and habitat modeling, we conclude that connectivity between coastal marten populations has been reduced, especially between Oregon populations, limiting the species' overall resiliency.

Regarding statements relating to predators and increased predation, some of the commenters provided technical information regarding the other uncertainties around the influence of vegetation management on predators, and their subsequent effect on coastal martens. Although the commenters raised concerns with the local, unpublished works that indicated bobcats are the primary coastal marten predator and are associated with younger ***forests***, our suggestion that increased ***forest*** fragmentation or reduced canopy cover increases predation risk by coastal martens is consistent with marten research elsewhere in North America (as cited in Service 2019, pp. 43-44, or as provided by the commenter [e.g , Joyce 2018, p. 126]). Moreover, the commenters provided no information to the contrary. Regardless, we have revised our description regarding the certainty of predation and its potential increase within the SSA report and this final rule to clarify that it is difficult to determine at this time if the rate of predation on marten has increased compared to historical levels and that further information is needed to determine if predation is increasing and how predation rates correspond to habitat fragmentation.Significant Portion of the Range

Comment 50: One commenter stated the Service erred in failing to evaluate whether the coastal marten is endangered in a significant portion of its range. They postulated that by not doing this evaluation, the Service violated the Act and the decision to list as threatened is arbitrary and capricious. The commenter stated that the Service's position that a “significant portion of the range” analysis is not warranted because the coastal marten already qualified for listing contradicts the letter and intent of Congress and the Act. Hence, the commenter believes the Service must complete a significant portion of the range analysis.

Our Response: Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. The court in Center for Biological Diversity v. Everson, 2020 WL 437289 (D.D.C Jan. 28, 2020), vacated the aspect of the 2014 Significant Portion of its Range Policy that provided that the Services do not undertake an analysis of significant portions of a species' range if the species warrants listing as threatened throughout all of its range. Therefore, we evaluated whether the coastal marten is endangered in a significant portion of its range—that is, whether there is any portion of the species' range for which both (1) the portion is significant; and, (2) the species is in danger of extinction in that portion. See Status Throughout a Significant Portion of Its Range.

Comment 51: One commenter stated that Humboldt [coastal] martens are in danger of extinction in the central coastal Oregon population area, that this constitutes a significant portion of their range, and thus the species should be listed rangewide as endangered. They believe this population is significant, surviving in a unique ecological setting of shrubby shore pine habitat, and represents the northernmost extent of the species' range. They state that the species is at risk of extinction, threatened by trapping, vehicle mortality, small population size, population isolation, stochastic events, and impending habitat loss due to restoration activities in the Oregon Dunes NRA. The commenter states that researchers (Linnell et al. 2018) concluded that the population has as much as a 99 percent risk of extirpation within 30 years with two to three annual human-caused mortalities. In addition, the commenter stated that the SSA report demonstrates the population is not only significant, but also gravely endangered, given that all three future scenarios result in the population remaining in a low resiliency condition. Hence, the commenter believe the coastal marten should be listed as endangered rangewide because it is endangered in a significant portion of its range in central coastal Oregon. The commenter went on to apply much of the same rationale for listing as endangered in the rest of Oregon and California citing additional loss from logging, wildfire, and rodenticides. Further, the commenter stated that the CDFW concluded that some of these similar threats were the basis for their determination listing the species as endangered in the State under CESA. As a result, the commenter concluded that the coastal marten should be listed as endangered rangewide.

Our Response: The commenter does not present any new information regarding the timing or severity of threats facing the coastal marten which we have not already considered in our current threatened determination. We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the coastal marten. The Act defines an endangered species as any species that is “in danger of extinction throughout all or a significant portion of its range” and a threatened species as any species “which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” A thorough analysis and discussion of the threats that may impact the coastal marten are included in the final SSA report (Service 2019, entire) associated with this document, and we applied those threats to the statutory listing criteria to which they apply. We considered whether the coastal marten is presently in danger of extinction and determined that proposing endangered status is not appropriate. While threats are currently acting on the species and many of those threats are expected to continue into the future, we did not find that the species is currently in danger of extinction throughout all of its range. With four populations occurring across the range of the species, the current condition of the species still provides for enough resiliency, redundancy, and representation such that it is not currently in danger of extinction but may become so in the future. Furthermore, we considered whether the species was in danger of extinction throughout a significant portion of its range, and determined that it is not because the threats acting on the species were uniform and there were no concentration of threats leading us to believe that any one area may be endangered. See Comment 40, above, for additional response.Species Status Assessment

Comment 52: One Board of County Commissioner pointed out discrepancies between version 1.1 of the coastal marten SSA report and version 2.0 of the SSA report, stating that there was no reasoned explanation provided for the “rushed amendments” to the SSA report within the span of a month. They stated the SSA report process should be a much more open and public process. They considered the revisions and additions “hasty” and believed the changes were arbitrary and capricious.

Our Response: Our SSA report is the biological document upon which our listing determination is based. Species status assessments are peer-reviewed, as well as reviewed by technical experts and our State, Federal, and Tribal partners. Changes between version 1.1 and version 2.0 of the coastal marten SSA report were mainly reflective of substantive comments from our peer reviewers, technical experts, and government partner reviewers. We further solicited public comment on the SSA report when the proposed listing determination was published in the Federal Register (83 FR 50574; October 9, 2018), and we incorporated substantive comments in the 2019 version of the SSA report (Service 2019, entire).Determination of Coastal Marten Status

Section 4 of the Act (16 U.S.C 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of “endangered species” or “threatened species.” The Act defines an “endangered species” as a species that is “in danger of extinction throughout all or a significant portion of its range,” and a “threatened species” as a species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act requires that we determine whether a species meets the definition of “endangered species” or “threatened species” because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

In determining whether a species meets the definition of an endangered or threatened species, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species, such as any existing regulatory mechanisms or conservation efforts.

In conducting our status assessment of the coastal marten, we evaluated all identified threats under the section 4(a)(1) factors and assessed how the cumulative impact of all threats combined are acting on the viability of the coastal marten as a whole. We used the best available information as summarized in our Draft SSA and Final SSA reports, information received from peer review and comments on the 2018 proposed listing rule (83 FR 50574), as well as our most recent analysis summarized herein to gauge the magnitude of each individual threat on the coastal marten. We then assessed how those effects combined and may be ameliorated by any existing regulatory mechanisms or conservation efforts and how that will impact the coastal marten's future viability. This included effects from both habitat-based and direct mortality-based threats and what those combined effects will mean to the future condition of the DPS. Depending on the scope and degree of each of the threats and how they cumulatively combine, these threats can be of particular concern where populations are small and isolated, as is the case for the coastal marten.

The loss of habitat and habitat patch size in the future across the range of the coastal marten is exposing coastal martens to increased threats from direct mortality and decreased habitat availability and increased fragmentation, resulting in low resiliency and reduced viability for the coastal marten as a whole. Based on our analysis, we find the cumulative impact of all identified threats on the coastal marten, especially habitat loss and fragmentation due to high-severity wildfire (Factor A) and vegetation management (Factor A) (noting that the threats are exacerbated by changing climate conditions and thus also play a role under Factor E), will act upon the coastal marten to such a degree that the DPS is likely to become endangered in the foreseeable future. The existing regulatory mechanisms (Factor D) and current conservation efforts are not addressing these threats to the level that will likely preclude the coastal marten from becoming an endangered species in the foreseeable future.Status Evaluation

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the coastal marten. A thorough analysis and discussion of the threats that are affecting the coastal marten are included in the final SSA report (Service 2019, entire) associated with this document.

A large proportion of the area where coastal marten occurs is on Federal or State ***land*** that has various regulatory mechanisms in place to manage ***forested*** habitat (Factor D). However, coastal marten populations continue to be small and isolated, and habitat connecting populations is often degraded or fragmented despite regulatory mechanisms in place for forestry management practices in both California and Oregon. The current status of coastal marten habitat is, in part, an artifact of silvicultural practices and wildfires that reset the successional ***forest*** stage and structure favoring early successional habitat components which may lack the appropriate cover or structure preferred by the coastal marten for foraging, resting, or denning. The late-successional associated structures or habitat preferred by coastal martens will most likely require several decades of appropriate ***forest*** and species management to reduce habitat fragmentation, increase population numbers and distribution, and achieve the ***forest*** structure that will assist in restoring the natural ecology of this ecosystem for this species and connect the existing fragmented habitats. Although the coastal marten can use and cross areas of lesser habitat value (containing less cover and structure) within these fragmented habitats, the management prescriptions provided through the various regulatory mechanisms are, in some instances, not likely alleviating or addressing the future threat of continued habitat loss, habitat fragmentation, or disturbance from wildfire to coastal marten. Remedies to address such impacts are multi-decadal, are not logistically easy to implement, may be expensive to address, and may meet social resistance. Therefore, we have determined that, while existing regulatory mechanisms enable ***land*** managers within the DPS to ameliorate to some extent the identified threats to the coastal marten, the existing regulatory mechanisms, although being implemented as designed, do not completely address the identified threats to adversely impact habitat for the coastal marten. As a result, we do not consider that the regulatory mechanisms in place, in and of themselves, alleviate the need for listing the coastal marten as a threatened species.

During the public comment period for the proposed rule (83 FR 50574; October 9, 2018), we received comments from the public stating that the coastal marten should receive an endangered status determination, based on the timing and magnitude of threats facing the coastal marten. The DPS does not meet the Act's definition of an endangered species. The current conditions of the coastal marten, as assessed in the SSA report, show extant coastal marten populations in four areas (EPAs) across its range, including large areas of occupied habitat in Oregon and California. The best available data do not indicate a declining trend in abundance, and it is likely that the low abundance (and, therefore, low resiliency) indicated in our analysis is partly due to the species being difficult to detect. While threats are currently acting on the species and many of those threats are expected to continue into the future, with four populations occurring across the range of the species, the current condition of the coastal marten still provides for enough resiliency, redundancy, and representation such that it is not currently in danger of extinction. Therefore, we do not find that the species meets the definition of an endangered species under the Act. Our analysis and determination on whether the coastal marten meets the definition of a threatened species is outlined below. A threatened species is any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.Foreseeable Future

In order to determine if the coastal marten is a threatened species under the Act, we must first determine what the foreseeable future timeframe is for the species. The term foreseeable future extends only so far into the future as we can reasonably determine that both the future threats and the marten's responses to those threats are likely according to 50 CFR 424.11(d). As stated above, the coastal marten faces a variety of threats including loss of habitat, wildfire, and increased predation risk (see Summary of Biological Status and Threats). These threats play a large role in the coastal marten's resiliency and future viability. Future conditions and future threat analysis is particularly challenging for the coastal marten, because one of the major threats facing the species and its habitat (wildfire) is unpredictable as to exactly when it may occur and to what extent it may impact the species. In addition, the timeframe of regeneration of habitat of the appropriate age class and structure needed for the coastal marten after a wildfire or habitat ***removal*** can be decadal in nature. In our SSA, we identified several timeframes based on the information available on threats and future habitat and environmental conditions for the species. Our future scenario analysis forecast the likely coastal marten viability over the next 15, 30, and 60 years, depending on the threat and information available about its future condition and impacts (see Future Condition, Service 2019, pp. 97-109). In cases where future trends in threats were not available, we looked to past frequency and severity of the threat and projected that into the future. As a result, based on the information available on potential future conditions, we selected the extent of the foreseeable future for the coastal marten to be approximately 60 years. This timeframe allows for multiple generations of coastal marten to occur and accounts for some development and reestablishment of appropriate structural habitat conditions and takes into consideration wildfire return intervals. Looking out past this time period, the predictability of threats (especially wildfire) would lose their capacity to be meaningful.

Estimates of future resiliency, redundancy, and representation for the coastal marten are low. As discussed in detail in the SSA report, the species faces a variety of threats including loss and fragmentation of habitat (Factor A) due to wildfire, timber harvest, and vegetation management. In addition, collisions with vehicles (Factor E) and rodenticides (Factor E) are all impacting coastal marten individuals, and the threat of disease (Factor C) carries the risk of further reducing populations. Changes in vegetation composition and distribution from large-scale wildfire and timber harvest activities may also make coastal martens more susceptible to predation (Factor C) from larger carnivores. These threats, which are expected to be exacerbated by the species' small and isolated populations (Factor E) and the effects of climate change (Factor E), were central to our assessment of the future viability of the coastal marten. In our analysis of the factors affecting this species, we found no evidence that the existing regulatory mechanisms (Factor D) are contributing to declines in the species' status, nor do they alleviate the need for listing.

Given current and future decreases in resiliency, populations will become more vulnerable to extirpation from stochastic events, in turn, resulting in concurrent losses in representation and redundancy. All three scenarios presented in the SSA report as representative of plausible future scenarios create conditions where the coastal marten would not have enough resiliency, redundancy, or representation to sustain populations over time. While determining the probability of each scenario was not possible with the available data, the entire range of future risk revealed by the three plausible scenarios showed that the species would likely continue to lose resiliency, redundancy, and representation throughout its range in all scenarios.Status Throughout All of Its Range

After evaluating threats to the species and assessing the cumulative effect of the threats under the section 4(a)(1) factors, we have found that the loss of habitat, threats to individuals, and lack of connectivity between populations will continue to impact the coastal marten despite conservation efforts. Further, the population and habitat factors used to determine the resiliency, representation, and redundancy for coastal marten will continue to decline into the future. Thus, after assessing the best available information, we conclude that the coastal marten is not currently in danger of extinction, but is likely to become in danger of extinction within the foreseeable future throughout all of its range.Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. The court in Center for Biological Diversity v. Everson, 2020 WL 437289 (D.D.C Jan. 28, 2020) (Everson), vacated the aspect of the 2014 Significant Portion of its Range Policy that provided that the Services do not undertake an analysis of significant portions of a species' range if the species warrants listing as threatened throughout all of its range. Therefore, we proceed to evaluating whether the species is endangered in a significant portion of its range—that is, whether there is any portion of the species' range for which both (1) the portion is significant; and, (2) the species is in danger of extinction in that portion. Depending on the case, it might be more efficient for us to address the “significance” question or the “status” question first. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the species' range.

Following the court's holding in Everson, we now consider whether there are any significant portions of the species' range where the species is in danger of extinction now (i.e , endangered). In undertaking this analysis for the coastal marten, we choose to address the status question first—we consider information pertaining to the geographic distribution of both the species and the threats that the species faces to identify any portions of the range where the species is endangered.

For the coastal marten, we considered whether the threats are geographically concentrated in any portion of the species' range at a biologically meaningful scale. The threats, which are discussed further in the SSA report, include: Loss of habitat and modification due to wildfire, timber harvest, and vegetation management (Factor A); trapping (Factor B); disease and predation (Factor C); collisions with vehicles (Factor E); rodenticides (Factor E); and the effects of climate change (Factor E). These threats are expected to be exacerbated by the species' small and isolated populations (Factor E). These threats, including their cumulative effects, were central to our assessment of the future viability of the coastal marten. From the threats facing the coastal marten, we have determined that habitat loss and modification, predation, and the effects of climate change in the context of having small and isolated populations are the driving threats leading to the species' threatened status. These threats can have large impacts on habitat availability and condition and lead to direct or indirect impacts on the species. Distribution of these threats is, for the most part, uniform across the known populations. We found no concentration of threats in any portion of the coastal marten's range at a biologically meaningful scale. Thus, there are no portions of the species' range where the species has a different status from its rangewide status. Therefore, no portion of the species' range provides a basis for determining that the species is in danger of extinction in a significant portion of its range, and we determine that the species is likely to become in danger of extinction within the foreseeable future throughout all of its range. This is consistent with the courts' holdings in Desert Survivors v. Department of the Interior, No. 16-cv-01165-JCS, 2018 WL 4053447 (N.D Cal. Aug. 24, 2018), and Center for Biological Diversity v. Jewell, 248 F. Supp. 3d, 946, 959 (D. Ariz. 2017).Determination of Status

Our review of the best scientific and commercial information available indicates that the coastal DPS of the Pacific marten meets the Act's definition of a threatened species. Therefore, we are listing the coastal DPS of the Pacific marten as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness, and conservation by Federal, State, Tribal, and local agencies, private organizations, and individuals. The Act encourages cooperation with the States and other countries and calls for recovery actions to be carried out for listed species. The protection required by Federal agencies and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Subsection 4(f) of the Act calls for the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning consists of preparing draft and final recovery plans, beginning with the development of a recovery outline and making it available to the public within 30 days of a final listing determination. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery plan also identifies recovery criteria for review of when a species may be ready for reclassification from endangered to threatened (“downlisting”) or ***removal*** from protected status (“delisting”), and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available on our website ([*http://www.fws.gov/endangered*](http://www.fws.gov/endangered)).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (e.g , restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal ***lands*** because their range may occur primarily or solely on non-Federal ***lands***. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal ***lands***.

Following publication of this final rule, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the States of California and Oregon will be eligible for Federal funds to implement management actions that promote the protection or recovery of the coastal marten. Information on our grant programs that are available to aid species recovery can be found at: [*http://www.fws.gov/grants*](http://www.fws.gov/grants).

Please let us know if you are interested in participating in recovery efforts for this species. Additionally, we invite you to submit any new information on this species whenever it becomes available and any information you may have for recovery planning purposes (see FOR FURTHER INFORMATION CONTACT, above).

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is listed as an endangered or threatened species and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of any endangered or threatened species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service.

Several Federal agency actions that occur within the species' habitat may require consultation as described in the preceding paragraph. These actions include management and any other landscape-altering activities on ***lands*** administered by the Service and the Department of the Interior's Bureau of Indian Affairs, Bureau of ***Land*** Management, and National Park Service and the Department of ***Agriculture***'s U.S ***Forest*** Service; issuance of section 404 Clean Water Act (33 U.S.C 1251 et seq.) permits by the U.S Army Corps of Engineers; and construction and maintenance of roads or highways by the Department of Transportation's Federal Highway Administration or the California Department of Transportation or Oregon Department of Transportation.

It is our policy, as published in the Federal Register on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a final listing on proposed and ongoing activities within the range of a listed species. The discussion below regarding protective regulations under section 4(d) of the Act complies with our policy.II. Final Rule Issued Under Section 4(d) of the ActBackground

Section 4(d) of the Act contains two sentences. The first sentence states that the “Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation” of species listed as threatened. The U.S Supreme Court has noted that statutory language like “necessary and advisable” demonstrates a large degree of deference to the agency (see Webster v. Doe, 486 U.S 592 (1988)). Conservation is defined in the Act to mean “the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to [the Act] are no longer necessary.” Additionally, the second sentence of section 4(d) of the Act states that the Secretary “may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2), in the case of plants.” Thus, the combination of the two sentences of section 4(d) provides the Secretary with wide latitude of discretion to select and promulgate appropriate regulations tailored to the specific conservation needs of the threatened species. The second sentence grants particularly broad discretion to the Service when adopting the prohibitions under section 9.

The courts have recognized the extent of the Secretary's discretion under this standard to develop rules that are appropriate for the conservation of a species. For example, courts have upheld rules developed under section 4(d) as a valid exercise of agency authority where they prohibited take of threatened wildlife, or include a limited taking prohibition (see Alsea Valley Alliance v. Lautenbacher, 2007 U.S Dist. Lexis 60203 (D. Or. 2007); Washington Environmental Council v. National Marine Fisheries Service, 2002 U.S Dist. Lexis 5432 (W.D Wash. 2002)). Courts have also upheld 4(d) rules that do not address all of the threats a species faces (see State of Louisiana v. Verity, 853 F.2d 322 (5th Cir. 1988)). As noted in the legislative history when the Act was initially enacted, “once an animal is on the threatened list, the Secretary has an almost infinite number of options available to him with regard to the permitted activities for those species. He may, for example, permit taking, but not importation of such species, or he may choose to forbid both taking and importation but allow the transportation of such species” (H.R Rep. No. 412, 93rd Cong., 1st Sess. 1973).

Exercising its authority under section 4(d), the Service has developed a rule that is designed to address the coastal marten's specific threats and conservation needs. Although the statute does not require the Service to make a “necessary and advisable” finding with respect to the adoption of specific prohibitions under section 9, we find that this rule as a whole satisfies the requirement in section 4(d) of the Act to issue regulations deemed necessary and advisable to provide for the conservation of the coastal marten. As discussed above under Summary of Biological Status and Threats, the Service has concluded that the coastal marten is likely to become in danger of extinction within the foreseeable future primarily due to habitat loss (including fragmentation) and associated changes in habitat quality and distribution. Under this 4(d) rule for the coastal marten, except as described and explained below, all prohibitions and provisions that apply to endangered wildlife under section 9(a)(1) of the Act will apply to the coastal marten. Applying these section 9(a)(1) prohibitions will help minimize threats that could cause further declines in the status of the species. The provisions of this 4(d) rule will promote conservation of the coastal marten by encouraging management of the landscape in ways that meet both ***land*** management considerations and the conservation needs of the DPS. The provisions of this rule are one of many tools that the Service will use to promote the conservation of the coastal marten.Provisions of the 4(d) Rule

This 4(d) rule will provide for the conservation of the coastal marten by prohibiting the following activities, except as otherwise authorized or permitted: Import or export; take; possession and other acts with unlawfully taken specimens; delivery, receipt, transportation, or shipment in interstate or foreign commerce in the course of commercial activity; or sale or offer for sale in interstate or foreign commerce. These prohibitions mimic those prohibitions afforded to endangered species under section 9(a)(1) of the Act.

In addition to the prohibited activities identified above, we also provide for exceptions to those prohibitions for certain activities as described below.

We note that the long-term viability of the coastal marten, as with many wildlife species, is intimately tied to the condition of its habitat. As described in our analysis of the species' status, one of the primary driving threats to the coastal marten's continued viability is the destruction of its habitat from catastrophic wildfires. The potential for an increase in frequency and severity of these catastrophic wildfires from the effects of climate change subsequently increases the risk to the species posed by this threat. We have determined that actions taken by ***forest*** management entities in the range of the coastal marten for the purpose of reducing the risk or severity of catastrophic wildfires, even if these actions may result in some short-term or small level of localized negative effect to coastal martens, will further the goal of reducing the likelihood of the species from becoming an endangered species, and will also likely contribute to its conservation and long-term viability. Therefore, these actions are excepted from the section 9(a)(1) prohibitions.

We also recognize that there are other actions undertaken by ***forest*** management entities, such as the CDFW under the authority of the CESA, where the intended purpose of the action is not the reduction of catastrophic wildfire risk, but to improve overall habitat conditions for coastal marten. We realize that these actions may also result in some short-term or small level of localized negative effects to coastal martens or their habitat. However, we acknowledge that these types of actions are often undertaken through inclusion in NCCPs or State SHAs, which are approved by the CDFW under the authority of the CESA, and that these plans and agreements address identified effects to the coastal marten (a CESA-listed species). We have determined that actions under such State approved plans or agreements will adequately reduce or offset any negative effects to the coastal marten so that they will not result in a further decline of the species; therefore, we are excepting them from the section 9(a)(1) prohibitions in the 4(d) rule.

In addition, we note that there are activities undertaken by ***forest*** management entities that are consistent with the conservation needs of coastal marten and include activities consistent with finalized conservation plans, or strategies for the coastal marten and for which the Service has explicitly determined that meeting such plans or strategies, or portions thereof, would be consistent with the conservation needs of the coastal marten. While we recognize the potential that these types of actions may result in some small level of localized disturbance or temporary negative effects to coastal martens or their habitat, these conservation efforts will improve overall habitat conditions or contribute to the species' overall long-term viability and we have excepted them from section 9(a)(1) prohibitions in the 4(d) rule.

Toxicants, especially anticoagulant rodenticides, are recognized as a threat to the closely related fisher, and have been detected in coastal martens and other non-***target*** predators within the historical range of the coastal marten. Illegal cannabis cultivation sites are considered a likely source. When these sites are found, they often require reclamation (waste cleanup and ***removal*** of fertilizers, pesticides, and other chemicals that were left behind). Cleanup of these sites may involve activities that may cause localized, short-term disturbance to coastal martens (e.g , helicopters or off-road vehicles), as well as potential ***removal*** of some habitat structures valuable to coastal martens (e.g , ***removal*** of hazard trees that may be a suitable den site in order to allow helicopter access). However, the ***removal*** of known rodenticides and other chemicals that can have long-term effects on coastal martens, their prey, and the surrounding environment is encouraged and is considered to have a long-term beneficial contribution to coastal marten resiliency. Hence, short-term disturbances or small-scale habitat loss associated with rodenticide ***removal*** are excepted from the section 9(a)(1) prohibitions in the 4(d) rule.

We recognize the special and unique relationship with our State natural resource agency partners in contributing to conservation of listed species. State agencies often possess scientific data and valuable expertise on the status and distribution of endangered, threatened, and candidate species of wildlife and plants. State agencies, because of their authorities and their close working relationships with local governments and landowners, are in a unique position to assist the Services in implementing all aspects of the Act. In this regard, section 6 of the Act provides that the Services shall cooperate to the maximum extent practicable with the States in carrying out programs authorized by the Act. Therefore, any qualified employee or agent of a State conservation agency that is a party to a cooperative agreement with the Service in accordance with section 6(c) of the Act, who is designated by his or her agency for such purposes, will be able to conduct activities designed to conserve the coastal marten that may result in otherwise prohibited take without additional authorization.

Under the Act, “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Some of these provisions have been further defined in regulation at 50 CFR 17.3 Take can result knowingly or otherwise, by direct and indirect impacts, intentionally or incidentally.

We may issue permits to carry out otherwise prohibited activities, including those described above, involving threatened wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.32 With regard to threatened wildlife, a permit may be issued for the following purposes: For scientific purposes, to enhance propagation or survival, for economic hardship, for zoological exhibition, for educational purposes, for incidental taking, or for special purposes consistent with the purposes of the Act. There are also certain statutory exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

Therefore, as explained above, we are issuing protective regulations under section 4(d) of the Act, in which all the prohibitions and provisions that apply to endangered wildlife under section 9(a)(1) of the Act, with the exceptions outlined below, apply to the coastal marten:

(1) Activities which are conducted in accordance with a permit issued by the Service under 50 CFR 17.32 These include actions for one of the following purposes: Scientific purposes, or the enhancement of propagation or survival, or economic hardship, or zoological exhibition, or educational purposes, or incidental taking, or special purposes consistent with the purposes of the Act. Such permits may authorize a single transaction, a series of transactions, or a number of activities over a specific period of time.

(2) ***Forest*** management activities for the purposes of reducing the risk or severity of wildfire. These activities may include fuels reduction projects, firebreaks, and wildfire firefighting activities. Fuels reduction projects include ***forest*** management practices such as those that treat vertical and horizontal (ladder) fuels in an effort to reduce continuity between understory and the overstory vegetation and the potential for crown fires, ***removal*** of fuels within 150 feet of legally permitted structures and within 300 feet of habitable structures, or implementation of Fuelbreak/Defensible Space Prescriptions which allow for ***removal*** of trees or other vegetation to create a shaded fuelbreak along roads or other natural features, or create defensible space.

(3) Forestry management activities included in a plan or agreement for ***lands*** covered by a Natural Communities Conservation Plan or State Safe Harbor Agreement that addresses and authorizes State take of coastal marten as a covered species and is approved by the California Department of Fish and Wildlife under the authority of the California Endangered Species Act.

(4) Forestry management activities, approved by the Service, under finalized conservation plans or strategies, that are consistent with the conservation needs of the coastal marten (includes activities that promote, retain, or restore suitable coastal marten habitat, increase percent canopy cover, increase percent ericaceous shrub cover, and denning and resting structures). These activities must be consistent with conservation plans or strategies which identify coastal marten conservation prescriptions or compliance and for which the Service has determined that meeting such plans or strategies, or portions thereof, would be consistent with conservation of the coastal marten.

(5) Activities to ***remove*** toxicants and other chemicals consistent with conservation strategies for coastal marten. Such activities include management or cleanup activities that ***remove*** toxicants and other chemicals from ***forested*** areas, for which the Service has determined that such activities to ***remove*** toxicants and other chemicals would be consistent with conservation strategies for coastal marten. Cleanup of these sites may involve activities that may cause localized, short-term disturbance to coastal martens, as well as require limited ***removal*** of some habitat structures valuable to coastal martens (e.g , hazard trees that may be a suitable den site).

(6) Activities conducted by any qualified employee or agent of a State conservation agency which is a party to a cooperative agreement with the Service in accordance with section 6(c) of the Act, who is designated by his or her agency for such purposes, and who will be able to conduct activities designed to conserve the coastal marten that may result in otherwise prohibited take for wildlife without additional authorization.

While we are providing these exceptions to the prohibitions and provisions of section 9(a)(1), we clarify that all Federal agencies (including the Service) that fund, permit, or carry out the activities described above will still need to ensure, in consultation with the Service (including intra-Service consultation when appropriate), that the activities are not likely to jeopardize the continued existence of the species. Private entities who undertake any actions other than those described in the exceptions above that may result in adverse effects to the coastal marten, when there is no associated Federal nexus to the action, may wish to seek an incidental take permit from the Service before proceeding with the activity.

Nothing in this 4(d) rule will change in any way the recovery planning provisions of section 4(f) of the Act, the consultation requirements under section 7 of the Act, or the ability of the Service to enter into partnerships for the management and protection of the coastal marten. However, interagency cooperation may be further streamlined through planned programmatic consultations for the species between Federal agencies and the Service.III. Critical Habitat Prudency and Determinability

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12), require that, to the maximum extent prudent and determinable, the Secretary shall designate critical habitat at the time the species is determined to be an endangered or threatened species. In this final rule, we affirm the determinations we made in our October 9, 2018, proposed rule (83 FR 50574) concerning the prudency and determinability of critical habitat for the coastal marten. In our proposed rule, we found that designating critical habitat for the coastal marten may be prudent, but that a designation was not determinable at that time because information sufficient to perform a required analysis of the impacts of the designation was lacking. We continue to develop a careful assessment of the economic impacts that may occur due to a critical habitat designation and to work with the States and other partners in acquiring the complex information needed to perform that assessment. At this time, however, the information sufficient to perform a required analysis is incomplete, and, therefore, we find designation of critical habitat for the coastal marten to be not determinable at this time. When we have completed our assessment, we will publish in the Federal Register a proposed rule to designate critical habitat for the coastal marten and solicit public comments on that proposal.Required DeterminationsNational Environmental Policy Act (42 U.S.C 4321 et seq.)

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act (NEPA; 42 U.S.C 4321 et seq.), need not be prepared in connection with listing a species as an endangered or threatened species under the Endangered Species Act. We published a notice outlining our reasons for this determination in the Federal Register on October 25, 1983 (48 FR 49244).Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination With Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with tribes in developing programs for healthy ecosystems, to acknowledge that tribal ***lands*** are not subject to the same controls as Federal public ***lands***, to remain sensitive to Indian culture, and to make information available to tribes. In development of the SSA report, we sent letters noting our intent to conduct a status review and requested information from all tribal entities within the historical range of the coastal marten, as well as providing a draft SSA report to the tribes for review. The tribes within the range of the coastal marten include the Yurok Tribe; the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians; the Coquille Indian Tribe; the Cow Creek Band of Umpqua Tribe of Indians; the Confederated Tribes of Grand Ronde; and the Confederated Tribes of Siletz Indians. As discussed earlier in this rule, we did not receive comments on the October 9, 2018, proposed rule (83 FR 50574) from any tribal entities. As such, we believe we have fulfilled our relevant responsibilities.References Cited

A complete list of references cited in this rulemaking is available on the internet at [*http://www.regulations.gov*](http://www.regulations.gov) and upon request from the Arcata Fish and Wildlife Office (see FOR FURTHER INFORMATION CONTACT).Authors

The primary authors of this final rule are the staff members of the Fish and Wildlife Service's Species Assessment Team, the Arcata Fish and Wildlife Office, and the Oregon Fish and Wildlife Office.List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.Regulation Promulgation

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:Part 17 Endangered and Threatened Wildlife and PlantsRegulatory Text

1. The authority citation for part 17 continues to read as follows:Authority:

16 U.S.C 1361-1407; 1531-1544; 4201-4245, unless otherwise noted.

2. Amend § 17.11 in paragraph (h) by adding an entry for “Marten, Pacific [Coastal DPS]” to the List of Endangered and Threatened Wildlife in alphabetical order under MAMMALS to read as set forth below:§ 17.11 Endangered and threatened wildlife.

\* \* \* \* \*

(h) \* \* \*Common name Scientific name Where listed Status Listing citations and applicable rulesMammals \* \* \* \* \* \* \* Marten, Pacific [Coastal DPS] Martes caurina U.S.A (CA (northwestern), OR (southwestern)) T 85 FR [Insert Federal Register page where the document begins], 10/8/2020; 50 CFR 17.40(s). 4d \* \* \* \* \* \* \*

3. Amend § 17.40 by adding a paragraph (s) to read as follows:§ 17.40 Special rules—mammals.

\* \* \* \* \*

(s) Pacific marten (Martes caurina), Coastal DPS.

(1) Prohibitions. Except as provided in paragraph (s)(2) of this section, all prohibitions and provisions of section 9(a)(1) of the Act apply to the Coastal DPS of the Pacific marten.

(2) Exceptions from prohibitions. In regard to the Coastal DPS of the Pacific marten (“coastal marten”), you may:

(i) Conduct activities as authorized by a permit under § 17.32

(ii) Take as set forth at § 17.21(c)(2) through (c)(4) for endangered wildlife.

(iii) Take as set forth at § 17.31(b).

(iv) Conduct ***forest*** management activities for the purposes of reducing the risk or severity of wildfire, which include fuels reduction projects, firebreaks, and wildfire firefighting activities. More specifically, ***forest*** management practices such as those that treat vertical and horizontal (ladder) fuels in an effort to reduce continuity between understory and the overstory vegetation and the potential for crown fires, ***remove*** fuels within 150 feet of legally permitted structures and within 300 feet of habitable structures, or implement Fuelbreak/Defensible Space Prescriptions that allow for ***removal*** of trees or other vegetation to create a shaded fuelbreak along roads or other natural features, or create defensible space.

(v) Conduct forestry management activities included in a plan or agreement for ***lands*** covered by a Natural Communities Conservation Plan or State Safe Harbor Agreement that addresses and authorizes State take of coastal marten as a covered species and is approved by the California Department of Fish and Wildlife under the authority of the California Endangered Species Act.

(vi) Conduct forestry management activities consistent with the conservation needs of the coastal marten (e.g , activities that promote, retain, or restore suitable coastal marten habitat that increase percent canopy cover, percent ericaceous shrub cover, and denning and resting structures). These include activities consistent with finalized conservation plans or strategies, such as plans and documents that include coastal marten conservation prescriptions or compliance, and for which the Service has determined that meeting such plans or strategies, or portions thereof, would be consistent with conservation strategies for coastal marten.

(vii) Conduct activities to ***remove*** toxicants and other chemicals consistent with conservation strategies for coastal marten. Such activities include management or cleanup activities that ***remove*** toxicants and other chemicals from ***forested*** areas, for which the Service has determined that such activities to ***remove*** toxicants and other chemicals would be consistent with conservation strategies for coastal marten. Cleanup of these sites may involve activities that may cause localized, short-term disturbance to coastal martens, as well as require limited ***removal*** of some habitat structures valuable to coastal martens (e.g , hazard trees that may be a suitable den site).Aurelia Skipwith,Director, U.S Fish and Wildlife Service.[FR Doc. 2020-19136 Filed 10-7-20; 8:45 am]BILLING CODE 4333-15-P

**Load-Date:** October 10, 2020

**End of Document**



[***Climate Change (Kyoto Protocol) Order 2020***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:61JR-T7C1-JDG9-Y40Y-00000-00&context=1516831)

Impact News Service

December 18, 2020 Friday

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**Length:** 11325 words

**Body**

Wellington: Parliamentary Counsel Office, New Zealand has issued the following news release:

Climate Change (Kyoto Protocol) Order 2020

Patsy Reddy, Governor-GeneralOrder in Council

At Wellington this 14th day of December 2020

Present:The Right Hon Jacinda Ardern presiding in Council

This order is made under section 50(8) of the Climate Change Response Act 2002 on the advice and with the consent of the Executive Council.Contents1 Title 2 Commencement 3 Principal Act 4 Schedule 2 replaced ScheduleSchedule 2 replaced Explanatory note Administrative Information Order1 Title

This order is the Climate Change (Kyoto Protocol) Order 2020.2 Commencement

This order comes into force on 31 December 2020.3 Principal Act

This order amends the Climate Change Response Act 2002 (the principal Act).4 Schedule 2 replaced

Replace Schedule 2 with the Schedule 2 set out in the Schedule of this order.Schedule Schedule 2 replaced

r 4Schedule 2 Kyoto Protocol to the United Nations Framework Convention on Climate Change

s 4

The Parties to this Protocol,

Being Parties to the United Nations Framework Convention on Climate Change, hereinafter referred to as '“the Convention”',

In pursuit of the ultimate objective of the Convention as stated in its Article 2,

Recalling the provisions of the Convention,

Being guided by Article 3 of the Convention,

Pursuant to the Berlin Mandate adopted by decision 1/CP . 1 of the Conference of the Parties to the Convention at its first session,

Have agreed as follows:Article 1

For the purposes of this Protocol, the definitions contained in Article 1 of the Convention shall apply. In addition:1.

'“Conference of the Parties”' means the Conference of the Parties to the Convention.2.

'“Convention”' means the United Nations Framework Convention on Climate Change, adopted in New York on 9 May 1992.3.

'“Intergovernmental Panel on Climate Change”' means the Intergovernmental Panel on Climate Change established in 1988 jointly by the World Meteorological Organization and the United Nations Environment Programme.4.

'“Montreal Protocol”' means the Montreal Protocol on Substances that Deplete the Ozone Layer, adopted in Montreal on 16 September 1987 and as subsequently adjusted and amended.5.

'“Parties present and voting”' means Parties present and casting an affirmative or negative vote.6.

'“Party”' means, unless the context otherwise indicates, a Party to this Protocol.7.

'“Party included in Annex I”' means a Party included in Annex I to the Convention, as may be amended, or a Party which has made a notification under Article 4, paragraph 2(g), of the Convention.Article 21.

Each Party included in Annex I, in achieving its quantified ***emission*** limitation and reduction commitments under Article 3, in order to promote sustainable development, shall:(a)

Implement and/or further elaborate policies and measures in accordance with its national circumstances, such as:(i)

Enhancement of energy efficiency in relevant sectors of the national economy;(ii)

Protection and enhancement of sinks and reservoirs of greenhouse gases not controlled by the Montreal Protocol, taking into account its commitments under relevant international environmental agreements; promotion of sustainable ***forest*** management practices, afforestation and reforestation;(iii)

Promotion of sustainable forms of ***agriculture*** in light of climate change considerations;(iv)

Research on, and promotion, development and increased use of, new and renewable forms of energy, of carbon dioxide sequestration technologies and of advanced and innovative environmentally sound technologies;(v)

Progressive reduction or phasing out of market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all greenhouse gas emitting sectors that run counter to the objective of the Convention and application of market instruments;(vi)

Encouragement of appropriate reforms in relevant sectors aimed at promoting policies and measures which limit or reduce ***emissions*** of greenhouse gases not controlled by the Montreal Protocol;(vii)

Measures to limit and/or reduce ***emissions*** of greenhouse gases not controlled by the Montreal Protocol in the transport sector;(viii)

Limitation and/or reduction of methane ***emissions*** through recovery and use in waste management, as well as in the production, transport and distribution of energy;(b)

Cooperate with other such Parties to enhance the individual and combined effectiveness of their policies and measures adopted under this Article, pursuant to Article 4, paragraph 2(e) (i), of the Convention. To this end, these Parties shall take steps to share their experience and exchange information on such policies and measures, including developing ways of improving their comparability, transparency and effectiveness. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session or as soon as practicable thereafter, consider ways to facilitate such cooperation, taking into account all relevant information.2.

The Parties included in Annex I shall pursue limitation or reduction of ***emissions*** of greenhouse gases not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through the International Civil Aviation Organization and the International Maritime Organization, respectively.3.

The Parties included in Annex I shall strive to implement policies and measures under this Article in such a way as to minimize adverse effects, including the adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties and in particular those identified in Article 4, paragraphs 8 and 9, of the Convention, taking into account Article 3 of the Convention. The Conference of the Parties serving as the meeting of the Parties to this Protocol may take further action, as appropriate, to promote the implementation of the provisions of this paragraph.4.

The Conference of the Parties serving as the meeting of the Parties to this Protocol, if it decides that it would be beneficial to coordinate any of the policies and measures in paragraph 1(a) above, taking into account different national circumstances and potential effects, shall consider ways and means to elaborate the coordination of such policies and measures.Article 31.

The Parties included in Annex I shall, individually or jointly, ensure that their aggregate anthropogenic carbon dioxide equivalent ***emissions*** of the greenhouse gases listed in Annex A do not exceed their assigned amounts, calculated pursuant to their quantified ***emission*** limitation and reduction commitments inscribed in Annex B and in accordance with the provisions of this Article, with a view to reducing their overall ***emissions*** of such gases by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012.1 bis.

The Parties included in Annex I shall, individually or jointly, ensure that their aggregate anthropogenic carbon dioxide equivalent ***emissions*** of the greenhouse gases listed in Annex A do not exceed their assigned amounts, calculated pursuant to their quantified ***emission*** limitation and reduction commitments inscribed in the third column of the table contained in Annex B and in accordance with the provisions of this Article, with a view to reducing their overall ***emissions*** of such gases by at least 18 per cent below 1990 levels in the commitment period 2013 to 2020.1 ter.

A Party included in Annex B may propose an adjustment to decrease the percentage inscribed in the third column of Annex B of its quantified ***emission*** limitation and reduction commitment inscribed in the third column of the table contained in Annex B. A proposal for such an adjustment shall be communicated to the Parties by the secretariat at least three months before the meeting of the Conference of the Parties serving as the meeting of the Parties to this Protocol at which it is proposed for adoption.1 quater.

An adjustment proposed by a Party included in Annex I to increase the ambition of its quantified ***emission*** limitation and reduction commitment in accordance with Article 3, paragraph 1 ter, above shall be considered adopted by the Conference of the Parties serving as the meeting of the Parties to this Protocol unless more than three-fourths of the Parties present and voting object to its adoption. The adopted adjustment shall be communicated by the secretariat to the Depositary, who shall circulate it to all Parties, and shall enter into force on 1 January of the year following the communication by the Depositary. Such adjustments shall be binding upon Parties.2.

Each Party included in Annex I shall, by 2005, have made demonstrable progress in achieving its commitments under this Protocol.3.

The net changes in greenhouse gas ***emissions*** by sources and ***removals*** by sinks resulting from direct human-induced ***land***-use change and forestry activities, limited to afforestation, reforestation and deforestation since 1990, measured as verifiable changes in carbon stocks in each commitment period, shall be used to meet the commitments under this Article of each Party included in Annex I. The greenhouse gas ***emissions*** by sources and ***removals*** by sinks associated with those activities shall be reported in a transparent and verifiable manner and reviewed in accordance with Articles 7 and 8.4.

Prior to the first session of the Conference of the Parties serving as the meeting of the Parties to this Protocol, each Party included in Annex I shall provide, for consideration by the Subsidiary Body for Scientific and Technological Advice, data to establish its level of carbon stocks in 1990 and to enable an estimate to be made of its changes in carbon stocks in subsequent years. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session or as soon as practicable thereafter, decide upon modalities, rules and guidelines as to how, and which, additional human-induced activities related to changes in greenhouse gas ***emissions*** by sources and ***removals*** by sinks in the ***agricultural*** soils and the ***land***-use change and forestry categories shall be added to, or subtracted from, the assigned amounts for Parties included in Annex I, taking into account uncertainties, transparency in reporting, verifiability, the methodological work of the Intergovernmental Panel on Climate Change, the advice provided by the Subsidiary Body for Scientific and Technological Advice in accordance with Article 5 and the decisions of the Conference of the Parties. Such a decision shall apply in the second and subsequent commitment periods. A Party may choose to apply such a decision on these additional human-induced activities for its first commitment period, provided that these activities have taken place since 1990.5.

The Parties included in Annex I undergoing the process of transition to a market economy whose base year or period was established pursuant to decision 9/CP . 2 of the Conference of the Parties at its second session shall use that base year or period for the implementation of their commitments under this Article. Any other Party included in Annex I undergoing the process of transition to a market economy which has not yet submitted its first national communication under Article 12 of the Convention may also notify the Conference of the Parties serving as the meeting of the Parties to this Protocol that it intends to use an historical base year or period other than 1990 for the implementation of its commitments under this Article. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall decide on the acceptance of such notification.6.

Taking into account Article 4, paragraph 6, of the Convention, in the implementation of their commitments under this Protocol other than those under this Article, a certain degree of flexibility shall be allowed by the Conference of the Parties serving as the meeting of the Parties to this Protocol to the Parties included in Annex I undergoing the process of transition to a market economy.7.

In the first quantified ***emission*** limitation and reduction commitment period, from 2008 to 2012, the assigned amount for each Party included in Annex I shall be equal to the percentage inscribed for it in Annex B of its aggregate anthropogenic carbon dioxide equivalent ***emissions*** of the greenhouse gases listed in Annex A in 1990, or the base year or period determined in accordance with paragraph 5 above, multiplied by five. Those Parties included in Annex I for whom ***land***-use change and forestry constituted a net source of greenhouse gas ***emissions*** in 1990 shall include in their 1990 ***emissions*** base year or period the aggregate anthropogenic carbon dioxide equivalent ***emissions*** by sources minus ***removals*** by sinks in 1990 from ***land***-use change for the purposes of calculating their assigned amount.7 bis.

In the second quantified ***emission*** limitation and reduction commitment period, from 2013 to 2020, the assigned amount for each Party included in Annex I shall be equal to the percentage inscribed for it in the third column of the table contained in Annex B of its aggregate anthropogenic carbon dioxide equivalent ***emissions*** of the greenhouse gases listed in Annex A in 1990, or the base year or period determined in accordance with paragraph 5 above, multiplied by eight. Those Parties included in Annex I for whom ***land***-use change and forestry constituted a net source of greenhouse gas ***emissions*** in 1990 shall include in their 1990 ***emissions*** base year or period the aggregate anthropogenic carbon dioxide equivalent ***emissions*** by sources minus ***removals*** by sinks in 1990 from ***land***-use change for the purposes of calculating their assigned amount.7 ter.

Any positive difference between the assigned amount of the second commitment period for a Party included in the Annex I and average annual ***emissions*** for the first three years of the preceding commitment period multiplied by eight shall be transferred to the cancellation account of that Party.8.

Any Party included in Annex I may use 1995 as its base year for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride, for the purposes of the calculations referred to in paragraph 7 and 7 bis above.8 bis.

Any Party included in Annex I may use 1995 or 2000 as its base year for nitrogen trifluoride for the purposes of the calculation referred to in paragraph 7 bis above.9.

Commitments for subsequent periods for Parties included in Annex I shall be established in amendments to Annex B to this Protocol, which shall be adopted in accordance with the provisions of Article 21, paragraph 7. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall initiate the consideration of such commitments at least seven years before the end of the first commitment period referred to in paragraph 1 above.10.

Any ***emission*** reduction units, or any part of an assigned amount, which a Party acquires from another Party in accordance with the provisions of Article 6 or of Article 17 shall be added to the assigned amount for the acquiring Party.11.

Any ***emission*** reduction units, or any part of an assigned amount, which a Party transfers to another Party in accordance with the provisions of Article 6 or of Article 17 shall be subtracted from the assigned amount for the transferring Party.12.

Any certified ***emission*** reductions which a Party acquires from another Party in accordance with the provisions of Article 12 shall be added to the assigned amount for the acquiring Party.12 bis.

Any units generated from market-based mechanisms to be established under the Convention or its instruments may be used by Parties included in Annex I to assist them in achieving compliance with their quantified ***emission*** limitation and reduction commitments under Article 3. Any such units which a Party acquires from another Party to the Convention shall be added to the assigned amount for the acquiring Party and subtracted from the quantity of units held by the transferring Party.12 ter.

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall ensure that, where units from approved activities under market-based mechanisms referred to in paragraph 12 bis above are used by Parties included in Annex I to assist them in achieving compliance with their quantified ***emission*** limitation and reduction commitments under Article 3, a share of these units is used to cover administrative expenses, as well as to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation if these units are acquired under Article 17.13.

If the ***emissions*** of a Party included in Annex I in a commitment period are less than its assigned amount under this Article, this difference shall, on request of that Party, be added to the assigned amount for that Party for subsequent commitment periods.14.

Each Party included in Annex I shall strive to implement the commitments mentioned in paragraph 1 above in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. In line with relevant decisions of the Conference of the Parties on the implementation of those paragraphs, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session, consider what actions are necessary to minimize the adverse effects of climate change and/or the impacts of response measures on Parties referred to in those paragraphs. Among the issues to be considered shall be the establishment of funding, insurance and transfer of technology.Article 41.

Any Parties included in Annex I that have reached an agreement to fulfil their commitments under Article 3 jointly, shall be deemed to have met those commitments provided that their total combined aggregate anthropogenic carbon dioxide equivalent ***emissions*** of the greenhouse gases listed in Annex A do not exceed their assigned amounts calculated pursuant to their quantified ***emission*** limitation and reduction commitments inscribed in Annex B and in accordance with the provisions of Article 3. The respective ***emission*** level allocated to each of the Parties to the agreement shall be set out in that agreement.2.

The Parties to any such agreement shall notify the secretariat of the terms of the agreement on the date of deposit of their instruments of ratification, acceptance or approval of this Protocol, or accession thereto, or on the date of deposit of their instruments of acceptance of any amendment to Annex B pursuant to Article 3, paragraph 9. The secretariat shall in turn inform the Parties and signatories to the Convention of the terms of the agreement.3.

Any such agreement shall remain in operation for the duration of the commitment period specified in Article 3 to which it relates.4.

If Parties acting jointly do so in the framework of, and together with, a regional economic integration organization, any alteration in the composition of the organization after adoption of this Protocol shall not affect existing commitments under this Protocol. Any alteration in the composition of the organization shall only apply for the purposes of those commitments under Article 3 that are adopted subsequent to that alteration.5.

In the event of failure by the Parties to such an agreement to achieve their total combined level of ***emission*** reductions, each Party to that agreement shall be responsible for its own level of ***emissions*** set out in the agreement.6.

If Parties acting jointly do so in the framework of, and together with, a regional economic integration organization which is itself a Party to this Protocol, each member State of that regional economic integration organization individually, and together with the regional economic integration organization acting in accordance with Article 24, shall, in the event of failure to achieve the total combined level of ***emission*** reductions, be responsible for its level of ***emissions*** as notified in accordance with this Article.Article 51.

Each Party included in Annex I shall have in place, no later than one year prior to the start of the first commitment period, a national system for the estimation of anthropogenic ***emissions*** by sources and ***removals*** by sinks of all greenhouse gases not controlled by the Montreal Protocol. Guidelines for such national systems, which shall incorporate the methodologies specified in paragraph 2 below, shall be decided upon by the Conference of the Parties serving as the meeting of the Parties to this Protocol at its first session.2.

Methodologies for estimating anthropogenic ***emissions*** by sources and ***removals*** by sinks of all greenhouse gases not controlled by the Montreal Protocol shall be those accepted by the Intergovernmental Panel on Climate Change and agreed upon by the Conference of the Parties at its third session. Where such methodologies are not used, appropriate adjustments shall be applied according to methodologies agreed upon by the Conference of the Parties serving as the meeting of the Parties to this Protocol at its first session. Based on the work of, inter alia, the Intergovernmental Panel on Climate Change and advice provided by the Subsidiary Body for Scientific and Technological Advice, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall regularly review and, as appropriate, revise such methodologies and adjustments, taking fully into account any relevant decisions by the Conference of the Parties. Any revision to methodologies or adjustments shall be used only for the purposes of ascertaining compliance with commitments under Article 3 in respect of any commitment period adopted subsequent to that revision.3.

The global warming potentials used to calculate the carbon dioxide equivalence of anthropogenic ***emissions*** by sources and ***removals*** by sinks of greenhouse gases listed in Annex A shall be those accepted by the Intergovernmental Panel on Climate Change and agreed upon by the Conference of the Parties at its third session. Based on the work of, inter alia, the Intergovernmental Panel on Climate Change and advice provided by the Subsidiary Body for Scientific and Technological Advice, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall regularly review and, as appropriate, revise the global warming potential of each such greenhouse gas, taking fully into account any relevant decisions by the Conference of the Parties. Any revision to a global warming potential shall apply only to commitments under Article 3 in respect of any commitment period adopted subsequent to that revision.Article 61.

For the purpose of meeting its commitments under Article 3, any Party included in Annex I may transfer to, or acquire from, any other such Party ***emission*** reduction units resulting from projects aimed at reducing anthropogenic ***emissions*** by sources or enhancing anthropogenic ***removals*** by sinks of greenhouse gases in any sector of the economy, provided that:(a)

Any such project has the approval of the Parties involved;(b)

Any such project provides a reduction in ***emissions*** by sources, or an enhancement of ***removals*** by sinks, that is additional to any that would otherwise occur;(c)

It does not acquire any ***emission*** reduction units if it is not in compliance with its obligations under Articles 5 and 7; and(d)

The acquisition of ***emission*** reduction units shall be supplemental to domestic actions for the purposes of meeting commitments under Article 3.2.

The Conference of the Parties serving as the meeting of the Parties to this Protocol may, at its first session or as soon as practicable thereafter, further elaborate guidelines for the implementation of this Article, including for verification and reporting.3.

A Party included in Annex I may authorize legal entities to participate, under its responsibility, in actions leading to the generation, transfer or acquisition under this Article of ***emission*** reduction units.4.

If a question of implementation by a Party included in Annex I of the requirements referred to in this Article is identified in accordance with the relevant provisions of Article 8, transfers and acquisitions of ***emission*** reduction units may continue to be made after the question has been identified, provided that any such units may not be used by a Party to meet its commitments under Article 3 until any issue of compliance is resolved.Article 71.

Each Party included in Annex I shall incorporate in its annual inventory of anthropogenic ***emissions*** by sources and ***removals*** by sinks of greenhouse gases not controlled by the Montreal Protocol, submitted in accordance with the relevant decisions of the Conference of the Parties, the necessary supplementary information for the purposes of ensuring compliance with Article 3, to be determined in accordance with paragraph 4 below.2.

Each Party included in Annex I shall incorporate in its national communication, submitted under Article 12 of the Convention, the supplementary information necessary to demonstrate compliance with its commitments under this Protocol, to be determined in accordance with paragraph 4 below.3.

Each Party included in Annex I shall submit the information required under paragraph 1 above annually, beginning with the first inventory due under the Convention for the first year of the commitment period after this Protocol has entered into force for that Party. Each such Party shall submit the information required under paragraph 2 above as part of the first national communication due under the Convention after this Protocol has entered into force for it and after the adoption of guidelines as provided for in paragraph 4 below. The frequency of subsequent submission of information required under this Article shall be determined by the Conference of the Parties serving as the meeting of the Parties to this Protocol, taking into account any timetable for the submission of national communications decided upon by the Conference of the Parties.4.

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall adopt at its first session, and review periodically thereafter, guidelines for the preparation of the information required under this Article, taking into account guidelines for the preparation of national communications by Parties included in Annex I adopted by the Conference of the Parties. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall also, prior to the first commitment period, decide upon modalities for the accounting of assigned amounts.Article 81.

The information submitted under Article 7 by each Party included in Annex I shall be reviewed by expert review teams pursuant to the relevant decisions of the Conference of the Parties and in accordance with guidelines adopted for this purpose by the Conference of the Parties serving as the meeting of the Parties to this Protocol under paragraph 4 below. The information submitted under Article 7, paragraph 1, by each Party included in Annex I shall be reviewed as part of the annual compilation and accounting of ***emissions*** inventories and assigned amounts. Additionally, the information submitted under Article 7, paragraph 2, by each Party included in Annex I shall be reviewed as part of the review of communications.2.

Expert review teams shall be coordinated by the secretariat and shall be composed of experts selected from those nominated by Parties to the Convention and, as appropriate, by intergovernmental organizations, in accordance with guidance provided for this purpose by the Conference of the Parties.3.

The review process shall provide a thorough and comprehensive technical assessment of all aspects of the implementation by a Party of this Protocol. The expert review teams shall prepare a report to the Conference of the Parties serving as the meeting of the Parties to this Protocol, assessing the implementation of the commitments of the Party and identifying any potential problems in, and factors influencing, the fulfilment of commitments. Such reports shall be circulated by the secretariat to all Parties to the Convention. The secretariat shall list those questions of implementation indicated in such reports for further consideration by the Conference of the Parties serving as the meeting of the Parties to this Protocol.4.

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall adopt at its first session, and review periodically thereafter, guidelines for the review of implementation of this Protocol by expert review teams taking into account the relevant decisions of the Conference of the Parties.5.

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, with the assistance of the Subsidiary Body for Implementation and, as appropriate, the Subsidiary Body for Scientific and Technological Advice, consider:(a)

The information submitted by Parties under Article 7 and the reports of the expert reviews thereon conducted under this Article; and(b)

Those questions of implementation listed by the secretariat under paragraph 3 above, as well as any questions raised by Parties.6.

Pursuant to its consideration of the information referred to in paragraph 5 above, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall take decisions on any matter required for the implementation of this Protocol.Article 91.

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall periodically review this Protocol in the light of the best available scientific information and assessments on climate change and its impacts, as well as relevant technical, social and economic information. Such reviews shall be coordinated with pertinent reviews under the Convention, in particular those required by Article 4, paragraph 2(d), and Article 7, paragraph 2(a), of the Convention. Based on these reviews, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall take appropriate action.2.

The first review shall take place at the second session of the Conference of the Parties serving as the meeting of the Parties to this Protocol. Further reviews shall take place at regular intervals and in a timely manner.Article 10

All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, without introducing any new commitments for Parties not included in Annex I, but reaffirming existing commitments under Article 4, paragraph 1, of the Convention, and continuing to advance the implementation of these commitments in order to achieve sustainable development, taking into account Article 4, paragraphs 3, 5 and 7, of the Convention, shall:(a)

Formulate, where relevant and to the extent possible, cost-effective national and, where appropriate, regional programmes to improve the quality of local ***emission*** factors, activity data and/or models which reflect the socio-economic conditions of each Party for the preparation and periodic updating of national inventories of anthropogenic ***emissions*** by sources and ***removals*** by sinks of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies to be agreed upon by the Conference of the Parties, and consistent with the guidelines for the preparation of national communications adopted by the Conference of the Parties;(b)

Formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change and measures to facilitate adequate adaptation to climate change:(i)

Such programmes would, inter alia, concern the energy, transport and industry sectors as well as ***agriculture***, forestry and waste management. Furthermore, adaptation technologies and methods for improving spatial planning would improve adaptation to climate change; and(ii)

Parties included in Annex I shall submit information on action under this Protocol, including national programmes, in accordance with Article 7; and other Parties shall seek to include in their national communications, as appropriate, information on programmes which contain measures that the Party believes contribute to addressing climate change and its adverse impacts, including the abatement of increases in greenhouse gas ***emissions***, and enhancement of and ***removals*** by sinks, capacity building and adaptation measures;(c)

Cooperate in the promotion of effective modalities for the development, application and diffusion of, and take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies, know-how, practices and processes pertinent to climate change, in particular to developing countries, including the formulation of policies and programmes for the effective transfer of environmentally sound technologies that are publicly owned or in the public domain and the creation of an enabling environment for the private sector, to promote and enhance the transfer of, and access to, environmentally sound technologies;(d)

Cooperate in scientific and technical research and promote the maintenance and the development of systematic observation systems and development of data archives to reduce uncertainties related to the climate system, the adverse impacts of climate change and the economic and social consequences of various response strategies, and promote the development and strengthening of endogenous capacities and capabilities to participate in international and intergovernmental efforts, programmes and networks on research and systematic observation, taking into account Article 5 of the Convention;(e)

Cooperate in and promote at the international level, and, where appropriate, using existing bodies, the development and implementation of education and training programmes, including the strengthening of national capacity building, in particular human and institutional capacities and the exchange or secondment of personnel to train experts in this field, in particular for developing countries, and facilitate at the national level public awareness of, and public access to information on, climate change. Suitable modalities should be developed to implement these activities through the relevant bodies of the Convention, taking into account Article 6 of the Convention;(f)

Include in their national communications information on programmes and activities undertaken pursuant to this Article in accordance with relevant decisions of the Conference of the Parties; and(g)

Give full consideration, in implementing the commitments under this Article, to Article 4, paragraph 8, of the Convention.Article 111.

In the implementation of Article 10, Parties shall take into account the provisions of Article 4, paragraphs 4, 5, 7, 8 and 9, of the Convention.2.

In the context of the implementation of Article 4, paragraph 1, of the Convention, in accordance with the provisions of Article 4, paragraph 3, and Article 11 of the Convention, and through the entity or entities entrusted with the operation of the financial mechanism of the Convention, the developed country Parties and other developed Parties included in Annex II to the Convention shall:(a)

Provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in advancing the implementation of existing commitments under Article 4, paragraph 1(a), of the Convention that are covered in Article 10, subparagraph (a); and(b)

Also provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of advancing the implementation of existing commitments under Article 4, paragraph 1, of the Convention that are covered by Article 10 and that are agreed between a developing country Party and the international entity or entities referred to in Article 11 of the Convention, in accordance with that Article.

The implementation of these existing commitments shall take into account the need for adequacy and predictability in the flow of funds and the importance of appropriate burden sharing among developed country Parties. The guidance to the entity or entities entrusted with the operation of the financial mechanism of the Convention in relevant decisions of the Conference of the Parties, including those agreed before the adoption of this Protocol, shall apply mutatis mutandis to the provisions of this paragraph.3.

The developed country Parties and other developed Parties in Annex II to the Convention may also provide, and developing country Parties avail themselves of, financial resources for the implementation of Article 10, through bilateral, regional and other multilateral channels.Article 121.

A clean development mechanism is hereby defined.2.

The purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist Parties included in Annex I in achieving compliance with their quantified ***emission*** limitation and reduction commitments under Article 3.3.

Under the clean development mechanism:(a)

Parties not included in Annex I will benefit from project activities resulting in certified ***emission*** reductions; and(b)

Parties included in Annex I may use the certified ***emission*** reductions accruing from such project activities to contribute to compliance with part of their quantified ***emission*** limitation and reduction commitments under Article 3, as determined by the Conference of the Parties serving as the meeting of the Parties to this Protocol.4.

The clean development mechanism shall be subject to the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to this Protocol and be supervised by an executive board of the clean development mechanism.5.

***Emission*** reductions resulting from each project activity shall be certified by operational entities to be designated by the Conference of the Parties serving as the meeting of the Parties to this Protocol, on the basis of:(a)

Voluntary participation approved by each Party involved;(b)

Real, measurable, and long-term benefits related to the mitigation of climate change; and(c)

Reductions in ***emissions*** that are additional to any that would occur in the absence of the certified project activity.6.

The clean development mechanism shall assist in arranging funding of certified project activities as necessary.7.

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session, elaborate modalities and procedures with the objective of ensuring transparency, efficiency and accountability through independent auditing and verification of project activities.8.

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall ensure that a share of the proceeds from certified project activities is used to cover administrative expenses as well as to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation.9.

Participation under the clean development mechanism, including in activities mentioned in paragraph 3(a) above and in the acquisition of certified ***emission*** reductions, may involve private and/or public entities, and is to be subject to whatever guidance may be provided by the executive board of the clean development mechanism.10.

Certified ***emission*** reductions obtained during the period from the year 2000 up to the beginning of the first commitment period can be used to assist in achieving compliance in the first commitment period.Article 131.

The Conference of the Parties, the supreme body of the Convention, shall serve as the meeting of the Parties to this Protocol.2.

Parties to the Convention that are not Parties to this Protocol may participate as observers in the proceedings of any session of the Conference of the Parties serving as the meeting of the Parties to this Protocol. When the Conference of the Parties serves as the meeting of the Parties to this Protocol, decisions under this Protocol shall be taken only by those that are Parties to this Protocol.3.

When the Conference of the Parties serves as the meeting of the Parties to this Protocol, any member of the Bureau of the Conference of the Parties representing a Party to the Convention but, at that time, not a Party to this Protocol, shall be replaced by an additional member to be elected by and from amongst the Parties to this Protocol.4.

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall keep under regular review the implementation of this Protocol and shall make, within its mandate, the decisions necessary to promote its effective implementation. It shall perform the functions assigned to it by this Protocol and shall:(a)

Assess, on the basis of all information made available to it in accordance with the provisions of this Protocol, the implementation of this Protocol by the Parties, the overall effects of the measures taken pursuant to this Protocol, in particular environmental, economic and social effects as well as their cumulative impacts and the extent to which progress towards the objective of the Convention is being achieved;(b)

Periodically examine the obligations of the Parties under this Protocol, giving due consideration to any reviews required by Article 4, paragraph 2(d), and Article 7, paragraph 2, of the Convention, in the light of the objective of the Convention, the experience gained in its implementation and the evolution of scientific and technological knowledge, and in this respect consider and adopt regular reports on the implementation of this Protocol;(c)

Promote and facilitate the exchange of information on measures adopted by the Parties to address climate change and its effects, taking into account the differing circumstances, responsibilities and capabilities of the Parties and their respective commitments under this Protocol;(d)

Facilitate, at the request of two or more Parties, the coordination of measures adopted by them to address climate change and its effects, taking into account the differing circumstances, responsibilities and capabilities of the Parties and their respective commitments under this Protocol;(e)

Promote and guide, in accordance with the objective of the Convention and the provisions of this Protocol, and taking fully into account the relevant decisions by the Conference of the Parties, the development and periodic refinement of comparable methodologies for the effective implementation of this Protocol, to be agreed on by the Conference of the Parties serving as the meeting of the Parties to this Protocol;(f)

Make recommendations on any matters necessary for the implementation of this Protocol;(g)

Seek to mobilize additional financial resources in accordance with Article 11, paragraph 2;(h)

Establish such subsidiary bodies as are deemed necessary for the implementation of this Protocol;(i)

Seek and utilize, where appropriate, the services and cooperation of, and information provided by, competent international organizations and intergovernmental and non-governmental bodies; and(j)

Exercise such other functions as may be required for the implementation of this Protocol, and consider any assignment resulting from a decision by the Conference of the Parties.5.

The rules of procedure of the Conference of the Parties and financial procedures applied under the Convention shall be applied mutatis mutandis under this Protocol, except as may be otherwise decided by consensus by the Conference of the Parties serving as the meeting of the Parties to this Protocol.6.

The first session of the Conference of the Parties serving as the meeting of the Parties to this Protocol shall be convened by the secretariat in conjunction with the first session of the Conference of the Parties that is scheduled after the date of the entry into force of this Protocol. Subsequent ordinary sessions of the Conference of the Parties serving as the meeting of the Parties to this Protocol shall be held every year and in conjunction with ordinary sessions of the Conference of the Parties, unless otherwise decided by the Conference of the Parties serving as the meeting of the Parties to this Protocol.7.

Extraordinary sessions of the Conference of the Parties serving as the meeting of the Parties to this Protocol shall be held at such other times as may be deemed necessary by the Conference of the Parties serving as the meeting of the Parties to this Protocol, or at the written request of any Party, provided that, within six months of the request being communicated to the Parties by the secretariat, it is supported by at least one third of the Parties.8.

The United Nations, its specialized agencies and the International Atomic Energy Agency, as well as any State member thereof or observers thereto not party to the Convention, may be represented at sessions of the Conference of the Parties serving as the meeting of the Parties to this Protocol as observers. Any body or agency, whether national or international, governmental or non-governmental, which is qualified in matters covered by this Protocol and which has informed the secretariat of its wish to be represented at a session of the Conference of the Parties serving as the meeting of the Parties to this Protocol as an observer, may be so admitted unless at least one third of the Parties present object. The admission and participation of observers shall be subject to the rules of procedure, as referred to in paragraph 5 above.Article 141.

The secretariat established by Article 8 of the Convention shall serve as the secretariat of this Protocol.2.

Article 8, paragraph 2, of the Convention on the functions of the secretariat, and Article 8, paragraph 3, of the Convention on arrangements made for the functioning of the secretariat, shall apply mutatis mutandis to this Protocol. The secretariat shall, in addition, exercise the functions assigned to it under this Protocol.Article 151.

The Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation established by Articles 9 and 10 of the Convention shall serve as, respectively, the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation of this Protocol. The provisions relating to the functioning of these two bodies under the Convention shall apply mutatis mutandis to this Protocol. Sessions of the meetings of the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation of this Protocol shall be held in conjunction with the meetings of, respectively, the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation of the Convention.2.

Parties to the Convention that are not Parties to this Protocol may participate as observers in the proceedings of any session of the subsidiary bodies. When the subsidiary bodies serve as the subsidiary bodies of this Protocol, decisions under this Protocol shall be taken only by those that are Parties to this Protocol.3.

When the subsidiary bodies established by Articles 9 and 10 of the Convention exercise their functions with regard to matters concerning this Protocol, any member of the Bureaux of those subsidiary bodies representing a Party to the Convention but, at that time, not a party to this Protocol, shall be replaced by an additional member to be elected by and from amongst the Parties to this Protocol.Article 16

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, as soon as practicable, consider the application to this Protocol of, and modify as appropriate, the multilateral consultative process referred to in Article 13 of the Convention, in the light of any relevant decisions that may be taken by the Conference of the Parties. Any multilateral consultative process that may be applied to this Protocol shall operate without prejudice to the procedures and mechanisms established in accordance with Article 18.Article 17

The Conference of the Parties shall define the relevant principles, modalities, rules and guidelines, in particular for verification, reporting and accountability for ***emissions*** trading. The Parties included in Annex B may participate in ***emissions*** trading for the purposes of fulfilling their commitments under Article 3. Any such trading shall be supplemental to domestic actions for the purpose of meeting quantified ***emission*** limitation and reduction commitments under that Article.Article 18

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session, approve appropriate and effective procedures and mechanisms to determine and to address cases of non-compliance with the provisions of this Protocol, including through the development of an indicative list of consequences, taking into account the cause, type, degree and frequency of non-compliance. Any procedures and mechanisms under this Article entailing binding consequences shall be adopted by means of an amendment to this Protocol.Article 19

The provisions of Article 14 of the Convention on settlement of disputes shall apply mutatis mutandis to this Protocol.Article 201.

Any Party may propose amendments to this Protocol.2.

Amendments to this Protocol shall be adopted at an ordinary session of the Conference of the Parties serving as the meeting of the Parties to this Protocol. The text of any proposed amendment to this Protocol shall be communicated to the Parties by the secretariat at least six months before the meeting at which it is proposed for adoption. The secretariat shall also communicate the text of any proposed amendments to the Parties and signatories to the Convention and, for information, to the Depositary.3.

The Parties shall make every effort to reach agreement on any proposed amendment to this Protocol by consensus. If all efforts at consensus have been exhausted, and no agreement reached, the amendment shall as a last resort be adopted by a three-fourths majority vote of the Parties present and voting at the meeting. The adopted amendment shall be communicated by the secretariat to the Depositary, who shall circulate it to all Parties for their acceptance.4.

Instruments of acceptance in respect of an amendment shall be deposited with the Depositary. An amendment adopted in accordance with paragraph 3 above shall enter into force for those Parties having accepted it on the ninetieth day after the date of receipt by the Depositary of an instrument of acceptance by at least three fourths of the Parties to this Protocol.5.

The amendment shall enter into force for any other Party on the ninetieth day after the date on which that Party deposits with the Depositary its instrument of acceptance of the said amendment.Article 211.

Annexes to this Protocol shall form an integral part thereof and, unless otherwise expressly provided, a reference to this Protocol constitutes at the same time a reference to any annexes thereto. Any annexes adopted after the entry into force of this Protocol shall be restricted to lists, forms and any other material of a descriptive nature that is of a scientific, technical, procedural or administrative character.2.

Any Party may make proposals for an annex to this Protocol and may propose amendments to annexes to this Protocol.3.

Annexes to this Protocol and amendments to annexes to this Protocol shall be adopted at an ordinary session of the Conference of the Parties serving as the meeting of the Parties to this Protocol. The text of any proposed annex or amendment to an annex shall be communicated to the Parties by the secretariat at least six months before the meeting at which it is proposed for adoption. The secretariat shall also communicate the text of any proposed annex or amendment to an annex to the Parties and signatories to the Convention and, for information, to the Depositary.4.

The Parties shall make every effort to reach agreement on any proposed annex or amendment to an annex by consensus. If all efforts at consensus have been exhausted, and no agreement reached, the annex or amendment to an annex shall as a last resort be adopted by a three-fourths majority vote of the Parties present and voting at the meeting. The adopted annex or amendment to an annex shall be communicated by the secretariat to the Depositary, who shall circulate it to all Parties for their acceptance.5.

An annex, or amendment to an annex other than Annex A or B, that has been adopted in accordance with paragraphs 3 and 4 above shall enter into force for all Parties to this Protocol six months after the date of the communication by the Depositary to such Parties of the adoption of the annex or adoption of the amendment to the annex, except for those Parties that have notified the Depositary, in writing, within that period of their non-acceptance of the annex or amendment to the annex. The annex or amendment to an annex shall enter into force for Parties which withdraw their notification of non-acceptance on the ninetieth day after the date on which withdrawal of such notification has been received by the Depositary.6.

If the adoption of an annex or an amendment to an annex involves an amendment to this Protocol, that annex or amendment to an annex shall not enter into force until such time as the amendment to this Protocol enters into force.7.

Amendments to Annexes A and B to this Protocol shall be adopted and enter into force in accordance with the procedure set out in Article 20, provided that any amendment to Annex B shall be adopted only with the written consent of the Party concerned.Article 221.

Each Party shall have one vote, except as provided for in paragraph 2 below.2.

Regional economic integration organizations, in matters within their competence, shall exercise their right to vote with a number of votes equal to the number of their member States that are Parties to this Protocol. Such an organization shall not exercise its right to vote if any of its member States exercises its right, and vice versa.Article 23

The Secretary-General of the United Nations shall be the Depositary of this Protocol.Article 241.

This Protocol shall be open for signature and subject to ratification, acceptance or approval by States and regional economic integration organizations which are Parties to the Convention. It shall be open for signature at United Nations Headquarters in New York from 16 March 1998 to 15 March 1999. This Protocol shall be open for accession from the day after the date on which it is closed for signature. Instruments of ratification, acceptance, approval or accession shall be deposited with the Depositary.2.

Any regional economic integration organization which becomes a Party to this Protocol without any of its member States being a Party shall be bound by all the obligations under this Protocol. In the case of such organizations, one or more of whose member States is a Party to this Protocol, the organization and its member States shall decide on their respective responsibilities for the performance of their obligations under this Protocol. In such cases, the organization and the member States shall not be entitled to exercise rights under this Protocol concurrently.3.

In their instruments of ratification, acceptance, approval or accession, regional economic integration organizations shall declare the extent of their competence with respect to the matters governed by this Protocol. These organizations shall also inform the Depositary, who shall in turn inform the Parties, of any substantial modification in the extent of their competence.Article 251.

This Protocol shall enter into force on the ninetieth day after the date on which not less than 55 Parties to the Convention, incorporating Parties included in Annex I which accounted in total for at least 55 per cent of the total carbon dioxide ***emissions*** for 1990 of the Parties included in Annex I, have deposited their instruments of ratification, acceptance, approval or accession.2.

For the purposes of this Article, “the total carbon dioxide ***emissions*** for 1990 of the Parties included in Annex I” means the amount communicated on or before the date of adoption of this Protocol by the Parties included in Annex I in their first national communications submitted in accordance with Article 12 of the Convention.3.

For each State or regional economic integration organization that ratifies, accepts or approves this Protocol or accedes thereto after the conditions set out in paragraph 1 above for entry into force have been fulfilled, this Protocol shall enter into force on the ninetieth day following the date of deposit of its instrument of ratification, acceptance, approval or accession.4.

For the purposes of this Article, any instrument deposited by a regional economic integration organization shall not be counted as additional to those deposited by States members of the organization.Article 26

No reservations may be made to this Protocol.Article 271.

At any time after three years from the date on which this Protocol has entered into force for a Party, that Party may withdraw from this Protocol by giving written notification to the Depositary.2.

Any such withdrawal shall take effect upon expiry of one year from the date of receipt by the Depositary of the notification of withdrawal, or on such later date as may be specified in the notification of withdrawal.3.

Any Party that withdraws from the Convention shall be considered as also having withdrawn from this Protocol.Article 28

The original of this Protocol, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations.

DONE at Kyoto this eleventh day of December one thousand nine hundred and ninety-seven.

IN WITNESS WHEREOF the undersigned, being duly authorized to that effect, have affixed their signatures to this Protocol on the dates indicated.Annex AGreenhouse gases

Carbon dioxide (CO2)

Methane (CH4)

Nitrous oxide (N2O)

Hydrofluorocarbons (HFCs)

Perfluorocarbons (PFCs)

Sulphur hexafluoride (SF6)

Nitrogen trifluoride (NF3)1Sectors/source categories

Energy

Fuel combustion

Energy industries

Manufacturing industries and construction

Transport

Other sectors

Other

Fugitive ***emissions*** from fuels

Solid fuels

Oil and natural gas

Other

Industrial processes

Mineral products

Chemical industry

Metal production

Other production

Production of halocarbons and sulphur hexafluoride

Consumption of halocarbons and sulphur hexafluoride

Other

Solvent and other product use

***Agriculture***

Enteric fermentation

Manure management

Rice cultivation

***Agricultural*** soils

Prescribed burning of savannas

Field burning of ***agricultural*** residues

Other

Waste

Solid waste disposal on ***land***

Wastewater handling

Waste incineration

Other

Annex B1 2 3 4 5 6Party Quantified ***emission*** limitation or reduction commitment (2008–2012) (percentage of base year or period) Quantified ***emission*** limitation or reduction commitment (2013–2020) (percentage of base year or period) Reference year1 Quantified ***emission*** limitation or reduction commitment (2013–2020) (expressed as percentage of reference year)1 Pledges for the reduction of greenhouse gas ***emissions*** by 2020 (percentage of reference year)2Australia 108 99.5 2000 98 –5 to –15% or –25%3Austria 92 804 NA NA Belarus5\* 88 1990 NA –8%Belgium 92 804 NA NA Bulgaria\* 92 804 NA NA Croatia\* 95 806 NA NA –20%/–30%7Cyprus 804 NA NA Czech Republic\* 92 804 NA NA Denmark 92 804 NA NA Estonia\* 92 804 NA NA European Union 92 804 1990 NA –20%/–30%7Finland 92 804 NA NA France 92 804 NA NA Germany 92 804 NA NA Greece 92 804 NA NA Hungary\* 94 804 NA NA Iceland 110 808 NA NA Ireland 92 804 NA NA Italy 92 804 NA NA Kazakhstan\* 95 1990 95 –7%Latvia\* 92 804 NA NA Liechtenstein 92 84 1990 84 –20%/–30%9Lithuania\* 92 804 NA NA Luxembourg 92 804 NA NA Malta 804 NA NA Monaco 92 78 1990 78 –30%Netherlands 92 804 NA NA Norway 101 84 1990 84 –30% to –40%10Poland\* 94 804 NA NA Portugal 92 804 NA NA Romania\* 92 804 NA NA Slovakia\* 92 804 NA NA Slovenia\* 92 804 NA NA Spain 92 804 NA NA Sweden 92 804 NA NA Switzerland 92 84.2 1990 NA –20% to –30%11Ukraine\* 100 7612 1990 NA –20%United Kingdom of Great Britain and Northern Ireland 92 804 NA NA Canada13 94 Japan14 94 New Zealand15 100 Russian Federation16\* 100

Abbreviation: NA = not applicable.

\* Countries that are undergoing the process of transition to a market economy.

All footnotes below, except for footnotes 1, 2 and 5, have been provided through communications from the respective Parties.

1 A reference year may be used by a Party on an optional basis for its own purposes to express its quantified ***emission*** limitation or reduction commitment (QELRC) as a percentage of ***emissions*** of that year, that is not internationally binding under the Kyoto Protocol, in addition to the listing of its QELRC(s) in relation to the base year in the second and third columns of this table, which are internationally legally binding.

2 Further information on these pledges can be found in documents FCCC/SB/2011/INF . 1/Rev . 1 and FCCC/KP/AWG/2012/MISC . 1, Add . 1 and Add . 2.

3 Australia’s QELRC under the second commitment period of the Kyoto Protocol is consistent with the achievement of Australia’s unconditional 2020 ***target*** of 5 per cent below 2000 levels. Australia retains the option later to move up within its 2020 ***target*** of 5 to 15, or 25 per cent below 2000 levels, subject to certain conditions being met. This reference retains the status of these pledges as made under the Cancun Agreements and does not amount to a new legally binding commitment under this Protocol or its associated rules and modalities.

4 The QELRCs for the European Union and its member States for a second commitment period under the Kyoto Protocol are based on the understanding that these will be fulfilled jointly with the European Union and its member States, in accordance with Article 4 of the Kyoto Protocol. The QELRCs are without prejudice to the subsequent notification by the European Union and its member States of an agreement to fulfil their commitments jointly in accordance with the provisions of the Kyoto Protocol.

5 Added to Annex B by an amendment adopted pursuant to decision 10/CMP . 2. This amendment has not yet entered into force.

6 Croatia’s QELRC for a second commitment period under the Kyoto Protocol is based on the understanding that it will fulfil this QELRC jointly with the European Union and its member States, in accordance with Article 4 of the Kyoto Protocol. As a consequence, Croatia’s accession to the European Union shall not affect its participation in such joint fulfilment agreement pursuant to Article 4 or its QELRC.

7 As part of a global and comprehensive agreement for the period beyond 2012, the European Union reiterates its conditional offer to move to a 30 per cent reduction by 2020 compared to 1990 levels, provided that other developed countries commit themselves to comparable ***emission*** reductions and developing countries contribute adequately according to their responsibilities and respective capabilities.

8 The QELRC for Iceland for a second commitment period under the Kyoto Protocol is based on the understanding that it will be fulfilled jointly with the European Union and its member States, in accordance with Article 4 of the Kyoto Protocol.

9 The QELRC presented in column three refers to a reduction ***target*** of 20 per cent by 2020 compared to 1990 levels. Liechtenstein would consider a higher reduction ***target*** of up to 30 per cent by 2020 compared to 1990 levels under the condition that other developed countries commit themselves to comparable ***emission*** reductions and that economically more advanced developing countries contribute adequately according to their responsibilities and respective capabilities.

10 Norway’s QELRC of 84 is consistent with its ***target*** of 30 per cent reduction of ***emissions*** by 2020, compared to 1990. If it can contribute to a global and comprehensive agreement where major emitting Parties agree on ***emission*** reductions in line with the 2° C ***target***, Norway will move to a level of 40 per cent reduction for 2020 based on 1990 levels. This reference retains the status of the pledge made under the Cancun Agreements and does not amount to a new legally binding commitment under this Protocol.

11 The QELRC presented in the third column of this table refers to a reduction ***target*** of 20 per cent by 2020 compared to 1990 levels. Switzerland would consider a higher reduction ***target*** up to 30 per cent by 2020 compared to 1990 levels subject to comparable ***emission*** reduction commitments from other developed countries and adequate contribution from developing countries according to their responsibilities and capabilities in line with the 2° C ***target***. This reference retains the status of the pledge made under the Cancun Agreements and does not amount to a new legally binding commitment under this Protocol or its associated rules and modalities.

12 Should be full carry-over and there is no acceptance of any cancellation or any limitation on use of this legitimately acquired sovereign property.

13 On 15 December 2011, the Depositary received written notification of Canada’s withdrawal from the Kyoto Protocol. This action will become effective for Canada on 15 December 2012.

14 In a communication dated 10 December 2010, Japan indicated that it does not have any intention to be under obligation of the second commitment period of the Kyoto Protocol after 2012.

15 New Zealand remains a Party to the Kyoto Protocol. It will be taking a quantified economy-wide ***emission*** reduction ***target*** under the United Nations Framework Convention on Climate Change in the period 2013 to 2020.

16 In a communication dated 8 December 2010 that was received by the secretariat on 9 December 2010, the Russian Federation indicated that it does not intend to assume a quantitative ***emission*** limitation or reduction commitment for the second commitment period.

Michael Webster,Clerk of the Executive Council.Explanatory note

This note is not part of the order, but is intended to indicate its general effect.

This order, which comes into force on 31 December 2020, gives effect to New Zealand’s acceptance of the Doha Amendment (the amendment) to the Kyoto Protocol (the Protocol) of the United Nations Framework Convention on Climate Change.

The order amends the Climate Change Response Act 2002 by replacing Schedule 2 with new Schedule 2, which contains the updated text of the Protocol following entry into force of the amendment for New Zealand.

The amendment comes into force for New Zealand on 31 December 2020 in accordance with Article 20(4) of the Protocol, which provides that an amendment enters into force for those Parties that have '“accepted it on the ninetieth day after the date of receipt by the Depositary of an instrument of acceptance by at least three fourths of the Parties to this Protocol”'.National interest analysis

The Ministry for the Environment produced a national interest analysis (which incorporated all of the elements of a regulatory impact statement) on 14 October 2015 to help inform the decisions taken by the Government relating to the contents of this instrument.

A copy of this national interest analysis can be found at [*https://www.mfe.govt.nz/climate-change/why-climate-change-matters/global-response/new-zealand-and-united-nations-framework*](https://www.mfe.govt.nz/climate-change/why-climate-change-matters/global-response/new-zealand-and-united-nations-framework)

Issued under the authority of the Legislation Act 2012.

Date of notification in Gazette: 17 December 2020.

This order is administered by the Ministry for the Environment.

1 Applies only from the beginning of the second commitment period.

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[***New Coalition “Forest for All NYC” Releases NYC Urban Forest Agenda***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62WW-9GD1-F0YC-N3YB-00000-00&context=1516831)

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**Body**

Arlington, Virginia: The Nature Conservancy has issued the following press release:

A new coalition, ***Forest*** for All NYC, announced today the release of the NYC Urban ***Forest*** Agenda, a first-of-its-kind report that provides a clear, visionary roadmap for New York City’s urban ***forest***. The NYC Urban ***Forest*** Agenda is a strategic plan to protect, maintain, expand, and promote the urban ***forest***, and build a more resilient and equitable New York City. A cross-sector group, including environmental justice, conservation, non-profit, business, and government leaders and organizations, spent two years developing the Agenda. Now, the new and growing ***Forest*** for All NYC coalition has launched to advance the Agenda’s goals.

New York City’s urban ***forest*** is comprised of all the trees in the city on both public and private property and the physical and social infrastructure that support them. More than 7 million trees make up New York City’s urban ***forest***, enhancing quality of life, improving public health, protecting New Yorkers from climate change, and providing recreation year-round. These 7 million trees are cared for and maintained by thousands of paid and volunteer tree stewards, researchers, advocates, and other practitioners.

Despite delivering an estimated $260 million in environmental, public health, infrastructure, and energy benefits to New Yorkers annually, there is no dedicated, long-term funding to care for this essential asset, nor a coordinated vision or plan for its management. The city also lacks a long-term Master Plan to ensure the urban ***forest*** is equitably distributed and accessible, particularly to low-income communities and communities of color who are most harmed by pollution, extreme heat, and environmental racism. Unless strategic action is taken, the future of the urban ***forest*** will remain in jeopardy. ***Forest*** for All NYC is advancing the NYC Urban ***Forest*** Agenda to present a clear vision and plan to restore, protect, and grow the urban ***forest***.

'Every person who lives and works in New York City deserves to be in a neighborhood with healthy trees and all the benefits they provide. This report is a cross-sector, collaborative effort in service towards making that a reality. As the city enters hurricane season in our new normal, where it is projected to be increasingly more destructive with each passing year, the NYC Urban ***Forest*** Agenda provides a clear roadmap for investing in the future of New York so it can endure increasing heat waves and extreme weather, as well as combat environmental injustice and health and educational disparities. ” – Emily Nobel Maxwell, New York Cities Program Director, The Nature Conservancy

'The Natural Areas Conservancy is an enthusiastic member of ***Forest*** for All NYC, and we celebrate the release of the NYC Urban ***Forest*** Agenda. New York City’s urban ***forest*** provides New Yorkers with countless benefits, including hundreds of miles of nature trails. The NYC Urban ***Forest*** Agenda presents a timely and important vision for the role of ***forests*** in advancing the goals of equity, resilience, and quality of life for all residents.' – Sarah Charlop-Powers, Executive Director, Natural Areas Conservancy

'To build a more resilient city, New York City must prioritize nature-based solutions that address disproportionate heat vulnerability and air quality issues, while providing greater access to green spaces. Growing and maintaining our city's urban ***forest*** is an integral piece of environmental justice, and the NYC Urban ***Forest*** Agenda provides a pathway forward.' – Annel Hernandez, Associate Director, New York City Environmental Justice Alliance

“REBNY is proud to be part of crafting the NYC Urban ***Forest*** Agenda. We all have a responsibility to support the NYC urban ***forest***, which plays an important role in advancing our shared goals of supporting public health, protecting our environment, and improving New York City’s streets, parks, and private and public spaces. ” – James Whelan, President, Real Estate Board of New York

'***Forests*** are critical to our communities and our planet. They purify our air, clean our water, ***remove*** carbon from the atmosphere, and mitigate the urban heat island effect. Preventing the loss of ***forest*** ecosystems and promoting their restoration is one of the most powerful – and least expensive – solutions for combating climate change. We are excited to join the ***Forest*** for All NYC coalition to advocate for a long-term plan to fund, preserve, and expand our urban ***forests***.' – Carlos Castell Croke, Associate for New York City Programs, NY League of Conservation Voters

'A healthy and robust urban ***forest*** is more important now than ever. Every year the effects of climate change are becoming more evident. Extreme weather events, like record-breaking heatwaves and flash floods, place extra stress on our environment. The NYC Urban ***Forest*** Agenda outlines a comprehensive plan to expand and diversify our urban ***forest*** and tree advocates across the city are coming together to realize this vision! Together, ***Forest*** for All NYC will expand and diversify our urban ***forest*** so that every neighborhood in New York City enjoys the numerous benefits that trees offer. ” – Nelson Villarrubia, Executive Director, Trees New York

“It has been encouraging to work with such a dedicated group of organizations around the NYC Urban ***Forest*** Agenda, which centers issues of equity and acknowledges that the best way to achieve our urban forestry goals is through inclusive and sustainable collaboration.' – Siobhan Watson, Program Manager, Capital Projects Recovery and Resiliency, NYCHA and Delma Palma, Community Design Architect, NYCHA

“The NYC Urban ***Forest*** Agenda presents an important vision for a future New York City that prioritizes sustainability, resiliency, and better quality of life for all New Yorkers, both in our parks and open spaces and along our streets. We need New York City leaders to pay close attention to this comprehensive plan, which aligns with our Five Point Plan for Park Equity to prioritize investments that will help New York City create a 21st century parks system. ” – Adam Ganser, Executive Director of New Yorkers for Parks

“The NYC Urban ***Forest*** Agenda offers a collaborative vision and set of ***targeted*** actions for expanding and supporting New York City's urban ***forest*** as a resilient, equitable resource for all New Yorkers. This work aligns with the USDA ***Forest*** Service's mission of ‘caring for the ***land*** and serving people’ and leverages ***Forest*** Service research expertise on environmental stewardship and ***forest*** health. ” – Lindsay Campbell, Research Social Scientist, U.S Department of ***Agriculture*** ***Forest*** Service, NYC Urban Field Station

'New York City’s urban ***forest*** is a critical asset for all New Yorkers. The NYC Urban ***Forest*** Agenda presents a real opportunity to expand the urban ***forest*** and reframe New York City’s green and open spaces as critical urban infrastructure to ensure the multiple benefits reach those most vulnerable to the impacts of COVID-19, climate change, and other extreme events.' – Timon McPhearson, Director of the Urban Systems Lab, The New School

'The West 80s Neighborhood Association and Love Your Street Tree Day are thrilled to have been a founding member of the Urban ***Forest*** Task Force and now look forward to continuing our street tree care volunteer work and advocacy for street tree stewardship with the ***Forest*** for All NYC coalition. To align with so many other environmental and community groups that similarly promote the benefits of urban trees for our residents, visitors, and the environment has been a rewarding and uplifting experience, especially as we were able to continue our productive meetings virtually during the pandemic. This diverse and creative coalition, spearheaded by The Nature Conservancy of New York, filled an important municipal void by drafting the NYC Urban ***Forest*** Agenda – a holistic plan that we hope will be implemented in order to increase, maintain, and protect our beautiful New York City trees while serving the public good.' – Melissa Elstein, Co-founder of the West 80s Neighborhood Association & Love Your Street Tree Day

'The DEC is proud to have been a part of developing a new, bigger and better NYC Urban ***Forest*** Agenda. By bringing people of all backgrounds together and including their perspectives and comments, this new coalition--***Forest*** for All NYC--is confident it created an urban forestry plan that will improve and enhance the city’s trees and green spaces for all its residents' – Rob Davies, NYS ***Forester*** and Director of the NYS Department of Environmental Conservation Division of ***Lands*** and ***Forests***

“Humans love trees. They've given us shelter, food, tools, and a spiritual connection to nature. We can add one more item to the list. In the face of a warmer climate, trees can keep our cities and towns habitable, according to the NYC Urban ***Forest*** Agenda. Trees are Mother Nature's air conditioners!' – Len Maniace, Board Member of the Jackson Heights Beautification Group

'As I explore the Brooklyn Botanic Garden’s plant family collections, I’ve come to understand that they reflect the diversity of this vibrant city. We can learn many things from these trees and the thousands of other plant species that comprise the vegetation of New York City. Beyond the symbolic lessons of living in community, they also serve as tangible teachers of how climate change will impact these plants, and how trees and other plants can be crucial tools to mitigate the impacts and slow the growth of climate change.' – Adrian Benepe, President of the Brooklyn Botanic Garden

“Our urban ***forest*** improves our quality of life and helps the future. ” – Scott Marotta, Specialist, ConEdison

“The NYC Urban ***Forest*** Agenda gives a voice to one of the city’s most valuable assets, its trees. New York City’s street trees, park woodlands, and vestigial ***forests*** enhance our quality of life through their beauty, ability to clean the air we breathe, and shelter they provide. As stewards of the urban landscape, we embrace this agenda as a powerful social and environmental framework to protect and expand the tree canopy across the five boroughs for generations to come. ” – Gail Wittwer-Laird, Principal of Starr Whitehouse Landscape Architects and Planners

“The evidence is clear that time in nature is beneficial for our health and well-being. A collaborative effort to protect, maintain, and expand access to green space is critical for helping all New Yorkers experience nature and its many health benefits. ” – Tracy Perrizo, Program Officer, Helmsley Charitable Trust’s New York City Program, the lead funder of the NYC Urban ***Forest*** Agenda

“***Forest*** for All NYC’s Urban ***Forest*** Agenda creates a tremendous opportunity to achieve an ambitious but necessary goal. As we move forward, any tree removed in New York City should be replaced in kind or beyond to create a sustainable future. ” - Pamela Pettyjohn, President of Coney Island Beautification Project

The heart of the NYC Urban ***Forest*** Agenda is a comprehensive call to action with a dozen recommendations to strengthen New York City’s Urban ***Forest*** through planning, managing, funding, research, and policy and ensure equitable access to this vital resource for everyone:

Achieve 30% Canopy Cover by 2035 Support Development of Community-Scale Urban ***Forest*** Plans and Goals Establish a Master Plan for the Urban ***Forest*** Grow and Sustain the ***Forest*** for All NYC Coalition Cultivate Urban ***Forest*** Careers Increase and Equitably Distribute Funding for Urban Forestry Projects Strengthen Tree Regulations and Establish Incentive Programs Set Tree Planting and Management Standards Develop Conditions to Transform Wood Waste into a Sustainable Local Resource Create an Urban Forestry Research and Monitoring Agenda Establish Citywide Educational and Tree Stewardship Events Monitor Urban ***Forest*** Environment and Health

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**End of Document**



[***Study shows only 2-3% of Earth's land is ecologically intact. Here's what we can do***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62FH-FBN1-JDG9-Y3SG-00000-00&context=1516831)

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**Body**

Cologny: World Economic Forum has issued the following press release:

A new study published in Frontiers in ***Forests*** and Global Change has revealed that only 2% - 3% of the Earth’s terrestrial surface can be considered ecologically intact. This percentage is significantly lower than previous assessments, which estimated this figure at 20% - 40%. This is because the more recent study included the loss of species from intact habitat in addition to reduced populations. On a positive note, the study has revealed that a focus of restoration of specific species in intact habitat could restore ecosystems to 20% of ***land***.

Only between 2% and 3% of the Earth’s terrestrial surface can be considered ecologically intact, according to a new study published in Frontiers in ***Forests*** and Global Change. This percentage is drastically lower than past assessments, which estimated it to be between 20% and 40%, because it factored in loss of species from intact habitat as well as reduced populations of species. The findings show however that a focus of restoration of specific species in intact habitat could recover ecological integrity to about 20% of ***land***.

More than 30 years ago, wilderness areas – natural areas that have not been considerably modified by humans – were identified as priorities of conservation and protection actions. Only recently has there been a push to define how to measure wilderness, with a focus on intact habitats. The integrity of natural ecosystems has also been recognized by the UN Convention on Biological Diversity as an important goal in the post-2020 global biodiversity framework. “We know intact habitat is increasingly being lost and the values of intact habitat have been demonstrated for both biodiversity and people,” says Dr Andrew Plumptre from the Key Biodiversity Areas Secretariat in Cambridge, lead author of the study, “but this study found that much of what we consider as intact habitat is missing species that have been hunted by people, or lost because of invasive species or disease. ”Have you read?

Almost 90% of the world's animal species will lose some habitat to ***agriculture*** by 2050 23% of Earth's natural habitats could be gone by 2100, study finds Can we really protect natural habitats to ‘offset’ those we are destroying every day?

Defining intactness

Currently, there is no common definition of intactness. Past assessments, which focused on mapping human influence on habitat intactness, created maps of anthropogenic impact that independently estimated that between 20% and 40% of the planet’s terrestrial surface remains free from major human disturbance (such as human settlements, roads, and light and noise pollution).

In the new study, Plumptre and colleagues took a different approach. Instead of focusing on human impact, they made a scoping of Key Biodiversity Areas (KBA) Criterion C sites, which states that an intact ecological community has the full complement of species known to occur in a particular site in their natural abundances (ie no known loss of animals in that area), relative to a regionally appropriate benchmark. As a benchmark, the authors chose the year 1500 CE, as this is the baseline date for assessing species extinctions within the IUCN Red List of Threatened Species. In addition to habitat intactness, the authors also assessed faunal intactness (ie, without any loss of animal species) and functional intactness (no loss of animal densities below a level that would affect the healthy functioning of an ecosystem).Biodiversity ***Forests*** The Ocean How to Save the PlanetOnly 2% - 3% of the Earth’s terrestrial surface can be considered ecologically intact.Image: Frontiers in ***Forests*** and Global Change

Restoring intact habitats

The authors explored how applying these 3 measures of intactness reduces the number of sites that might qualify under KBA Criterion C. They found that only between 2% an 3% of Earth’s terrestrial surface qualifies if Criterion C is defined as sites which are functionally intact, 10 times lower than previously estimated. Worryingly, only 11% of the measured sites are covered by protected areas. Many of the identified areas coincide with territories managed by indigenous communities, who play a crucial role in maintaining them. “Areas identified as functionally intact included east Siberia and northern Canada for boreal and tundra biomes, parts of the Amazon and Congo basin tropical ***forests***, and the Sahara Desert,” according to the authors.

However, there is hope. The authors say that up to 20% of the planet’s ***land*** surface could be restored to faunal intactness through reintroductions of only a few species into remaining intact habitat. Plumptre says: “The results show that it might be possible to increase the area with ecological intactness back to up to 20% through the ***targeted*** reintroductions of species that have been lost in areas where human impact is still low, provided the threats to their survival can be addressed and numbers rebuilt to a level where they fulfil their functional role. ”How does the World Economic Forum encourage biological diversity?How does the World Economic Forum encourage biological diversity?

In the last 100 years, more than 90 percent of crop varieties have disappeared from farmers’ fields, and all of the world’s 17 main fishing grounds are now being fished at or above their sustainable limits.

These trends have reduced diversity in our diets, which is directly linked to diseases or health risk factors, such as diabetes, obesity and malnutrition.

One initiative which is bringing a renewed focus on biological diversity is the Tropical ***Forest*** Alliance.

This global public-private partnership is working on ***removing*** deforestation from four global commodity supply chains – palm oil, beef, soy, and pulp and paper.

The Alliance includes businesses, governments, civil society, indigenous people and communities, and international organizations.

Enquire to become a member or partner of the Forum and help stop deforestation linked to supply chains.

In the future, identifying areas under KBA Criterion C can help focus attention on these sites for conservation and restoration, according to Plumptre, “It has been shown that intact habitat has important benefits for both wildlife and people and as a result needs to be a critical ***target*** of the ongoing negotiations of the Convention on Biological Diversity post-2020 global biodiversity framework. Recognition of these special places within intact habitat, where you have full functional intactness, is needed and plans to focus restoration in areas where ecological integrity might be recovered. ”

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**End of Document**



[***Vegetation uptake of mercury and impacts on global cycling***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:693W-H851-F129-P0HJ-00000-00&context=1516831)

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**Body**

Introduction

Mercury (Hg) is a globally abundant pollutant found in all major environmental reservoirs. Hg is mainly distributed through the atmosphere, transporting Hg from ***emission*** sources (such as industrial centres) to remote aquatic and terrestrial ecosystems–. Thus, in 2013, the was signed to curb anthropogenic Hg ***emissions*** and to reduce Hg risks to humans and the environment. In 2015, an estimated 2,000–3,000 Mg per year of Hg was emitted to the atmosphere by anthropogenic activities. Approximately, an additional 200–600 Mg per year of Hg is emitted through biomass burning–, with another 1,000–1,600 Mg per year through terrestrial geogenic ***emissions*** and from soils and vegetation,–. Indeed, legacy ***emissions*** are now considered to dominate global Hg ***emissions*** to the atmosphere, mostly emitted over oceans (about 2,700–3,400 Mg per year),–.

In terrestrial ecosystems, the dominant source of Hg is related to vegetation assimilation of atmospheric Hg and subsequent transfer to soils and watersheds through the washing of vegetation by precipitation (throughfall); when vegetation sheds leaves (litterfall),; or when vegetation dies off. Additionally, plant roots take up Hg from soils, which impacts soil Hg availability and stabilizes Hg below ground (referred to as phytostabilization)–. Hg-contaminated soils have the potential to lead to enhanced Hg levels in crops and rice plants, so that control and remediation of contaminated sites is an important step to increase food safety.

Recognition of the critical importance of vegetation for terrestrial Hg cycling began in the 1990s, when it was found that litterfall and throughfall Hg deposition in ***forests*** exceeded direct open-field wet deposition (by rain and snow) severalfold,,–. Since these early studies, it has been shown that vegetation impacts Hg cycling in all major Earth system compartments. For example, field deposition studies show that plant-derived deposition dominates as a Hg source in ecosystems with high plant net primary productivity. Atmospheric observations indicate that vegetation uptake of atmospheric Hg(0) — the gaseous, elemental and dominant type of Hg (>95%) in the atmosphere — modulates both its seasonality and concentrations in the boundary layer,. Moreover, soil and sediment studies show that vegetation shapes Hg loads across landscapes, with densely vegetated ecosystems and productive watersheds exhibiting the highest Hg loads–. Hg assimilated by vegetation is subsequently exported from watersheds via streams–, where it can dominate as a source of Hg in rivers and ocean sediments,, and is found to bioaccumulate in fish–.

In this Review, we discuss Hg uptake by vegetation and its impact on global Hg cycling. We compile published Hg concentration data in vegetation tissue from 440 sites into a global database and analyze Hg distribution patterns across ecosystem types, plant functional groups and plant tissues. We describe Hg uptake, transport within plants and isotopic fractionation; foliage–atmosphere exchange of Hg; and the representation of vegetation Hg dynamics in global models. The importance of vegetation uptake in atmospheric Hg fluxes is examined and further research priorities are detailed.

Hg in vegetation

To understand Hg dynamics in vegetation globally, we built a comprehensive database by collecting peer-reviewed published data on Hg concentrations measured in vegetation tissues. Data stretch from 1976 to 2020 and include 440 different sites, derive from 230 scientific studies and consist of 2,490 reported data representing over 35,000 individual plant tissue measurements (). Hg concentrations are separated into different tissue groups (including leaves, needles, roots, woody tissues including bole wood, bark and branches), plant functional types (including lichens, mosses and such as grassland plants, shrubs and trees), species and geographic areas (Fig. ). Currently available vegetation data are unevenly distributed globally (Fig. , Supplementary Fig. ), with most foliage and litterfall measurements taken in Europe (46.6%), followed by North America (23.0%), Asia (17.2%) and South America (13.1%). Most vegetation data stem from deciduous trees (77.9%) and coniferous trees (9.1%), whereas evergreen broadleaved trees (4.8%), grasslands (4.3%) and wetlands (3.9%) have been sampled less (Fig. ). Foliar data, which include leaves, needles and litterfall, represent about 78% of all available data (Fig. ). Less data are available from woody tissues, branches, bark and grassland plants, which, even combined, account for less than 9.8% of the data (Fig. ).

Global distribution of foliar Hg samples.

a | Spatial coverage of foliar and litterfall mercury (Hg) samples from the database compiled here, including both background and Hg-enriched areas, with concentration averaged by site. b | Box plots of Hg concentrations of foliage in background sites separated by biomes and/or plant community types. c | Box plots of Hg concentrations for various tissue types from background sites. Numbers in parentheses represent the number of data points per group. Boxes represent quartile ranges, lines mark medians and squares mark means. Whiskers show minimum and maximum values, and stars denote 1st and 99th percentiles. Different letters represent statistical differences among groups (P < 0.05). Corresponding data for Hg-enriched sites are shown in Supplementary Fig. .

Foliage and litterfall Hg concentrations were highest in South America, followed by Europe and Asia, and were lowest in North America, with similar spatial patterns observed amongst the other tissues (Fig. , Supplementary Fig. ). Differences were pronounced in some tissues, with foliage Hg concentrations in South America (median: 54 μg kg−1 [interquartile range (IQR): 8–123 μg kg−1]) more than double the concentrations in North America (20 μg kg−1 [3–41 μg kg−1]). However, owing to large differences in investigated ***forest*** types, non-random sampling procedures and some studies including regional (natural or anthropogenic) Hg contamination hotspots (Box ), spatial comparisons are likely to be biased. Across unpolluted areas, median Hg concentrations derived from our database across functional groups and vegetation tissues varied in the following order: lichen (median: 78 μg kg−1, [IQR: 10–180 μg kg−1]) > moss (51 μg kg−1 [2–165 μg kg−1]) > litterfall (43 μg kg−1 [4–83 μg kg−1]) > foliage (20 μg kg−1 [2–62 μg kg−1]) > bark (11 μg kg−1 [1–36 μg kg−1]) > branch (12 μg kg−1 [0.2–37 μg kg−1]) > root (7 μg kg−1 [2–70 μg kg−1] > grass (5 μg kg−1 [1–31 μg kg−1]) > wood (2 μg kg−1 [0.1–6.8 μg kg−1]) (Fig. ). A similar order of Hg concentrations was observed for vegetation grown in polluted areas (Box ; Supplementary Fig. ). In this section, we discuss detailed pathways and mechanism of Hg uptake and transport behaviour within vegetation that explain these observed concentration patterns.

Box 1 The role of vegetation in Hg-enriched areas

In addition to anthropogenic mercury (Hg) contamination from urban and industrial, mining or smelting sites, natural Hg enrichments exist on the global mercuriferous belts found along Earth plate margins, leading to large-scale Hg mineralization zones: Circum-Pacific, Mediterranean, Central Asia and Mid-Atlantic ridges, with many Hg mines distributed along these zones. When exposed to high soil and atmospheric Hg levels, plant growth can be decreased due to Hg toxicity–. However, most plants grow normally under lightly to moderately polluted areas, but will show substantial Hg enrichments in their tissues. In comparison with remote, non-enriched sites, median Hg concentrations of vegetation from Hg-enriched areas in our database show significantly higher Hg concentrations (P < 0.01) by factors of 1.2–5.7 across all tissues. Specific tissue responses are dependent on the type of exposure, with soil Hg contamination resulting largely in elevated root Hg concentrations, while not significantly affecting above-ground tissue concentrations. In turn, atmospheric Hg contamination significantly elevates Hg levels in above-ground Hg concentrations (P < 0.01) but did not impact below-ground tissues.

The potential use of plant Hg uptake has received interest as an alternative method for traditional physico-chemical methods of remediation of Hg-enriched sites, termed phytoremediation. In summary, there are three main approaches of Hg phytoremediation: phytostabilization, phytovolatilization and phytoextraction. Phytostabilization immobilizes Hg in soil through biochemical processes, either via Hg accumulation in roots or chelating Hg in the root zone. Candidate plants used for phytostabilization have extensive root systems, are tolerant to Hg toxicity and are adaptive to site-specific environments–. Phytovolatilization refers to the uptake of elements by plant roots, translocation through the xylem and subsequent ***emission*** to the atmosphere. Phytovolatilization is unique to Hg owing to its relatively high volatility; however, there are few studies on phytovolatilization of Hg via vegetation, in part, because of its inefficiency (<0.98% remediation), difficulties in monitoring volatilization fluxes and possibly related to concern over secondary contamination by emitting Hg to the atmosphere.

Instead, most studies on phytoremediation have focused on phytoextraction, whereby Hg is removed from soil by harvesting vegetation that has taken up Hg from soils. No plant has been identified as a Hg hyperaccumulator, which are plants that are capable of growing under high contamination and take up metals via roots and bioconcentrate them in their shoots. Vegetation known to show a potential to bioaccumulate Hg have been shown to ***remove*** less than 0.2% of the Hg in Hg-enriched soils, even when chemically assisted–. Hence, in contrast to some other toxic trace metals where phytoextraction is highly efficient (such as 32.4–84.5% ***removal*** of soil cadmium by Sedum plumbizincicola), phytoextraction is considered of low efficiency for Hg.

Vascular plants

Vascular plants uptake Hg through stomatal and cuticular uptake in foliage–, surface adsorption of atmospheric Hg to foliage and bark,, and soil uptake of Hg through roots,– (Fig. ). There is strong evidence that most Hg originates from assimilation of atmospheric uptake in above-ground tissues. Many lines of evidence, including from flux measurements– and stable Hg isotope analyses–, show that approximately 90% of Hg in leaves and needles is derived from atmospheric uptake of gaseous Hg(0) and that translocation of Hg from soils to above-ground tissues is limited. For example, 11% of Hg in a canopy originated from soils via xylem transport in boreal trees and less than 5% of soil solution root Hg uptake was translocated to shoots in a variety of different plant species,,. Most leaf Hg (90–96%) is integrated into internal tissues and a only minor part adsorbed to outer leaf surfaces.

Pathways of plant Hg uptake.

Plants uptake atmospheric mercury (Hg) through their foliage via stomatal and cuticular uptake, and transport Hg through leaf tissues and translocate Hg via phloem transport to woody tissues. Plants also uptake Hg from the soil through their roots, with little transport of Hg through root tissues into xylem. Finally, there is passive uptake of atmospheric Hg to bark. Leaf cross section adapted from ref., Springer Nature Limited.

Inside leaves, Hg is incorporated in epidermal and stomatal cell walls, as well as in parenchyma cell nuclei (Fig. ). This Hg is present as divalent Hg(II), so there must be an oxidation step after leaf uptake of Hg(0), although it is currently unknown where and when the oxidation step occurs. Both stomatal and non-stomatal uptake pathways in leaves have been proposed, although several studies point towards a dominance of stomatal uptake,,,,, based on isotopically labelled Hg(0) exposures,,, natural abundant Hg stable isotopes,, sequential leaf extractions, and foliage–atmosphere exchange studies,. However, observed Hg(0) uptake at night also suggests that non-stomatal, cuticular Hg(0) uptake occurs–. Stomatal Hg(0) uptake is likely controlled by enzymatic processes (such as catalase activity), which has also been linked to Hg oxidation in leaves. Hg species stored in leaves include sulfur nanoparticulate (β-HgS) and dithiolate complexes (Hg(SR)2), and Hg binding to thiol ligands such as cysteine residues,.

Concentrations of Hg in vascular plants are highest in leaves and needles (Fig. ), and, because Hg is taken up from the atmosphere, these concentrations are highly sensitive to variations in atmospheric Hg concentrations. Growth chamber and laboratory studies have shown that atmospheric Hg(0) concentrations linearly and positively correlate with Hg concentrations in shoots, leaves and needles,,–,,. Similarly, field observations show significant positive correlations between Hg(0) concentrations in the atmosphere and foliage,. Based on our global database, we observed a significant positive linear correlation between leaf and needle Hg concentrations and atmospheric Hg concentrations across unpolluted sites (n = 33, r2 = 0.32, P < 0.01; Supplementary Fig. ).

Other factors have been associated with variability in Hg accumulation in foliage, including underlying geology, solar radiation (in particular, ultraviolet), temperature, atmospheric turbulence, leaf age,, specific leaf area,, number of and leaf physiological parameters, such as stomatal conductance,, rate of net photosynthesis, the presence of waxy , catalase activity and ascorbic acid. Many of these processes can be linked to stomatal control of Hg uptake (such as stomatal conductance, number of stomata, catalase activity), whereas others can be linked to non-stomatal uptake pathways (such as waxy cuticles and specific leaf area). Hg concentrations in foliage have been consistently shown to increase with leaf age, both over a growing season, and over multiple years in coniferous needles–. Higher concentrations have been reported in evergreen coniferous tissues than in broadleaf trees, owing to the multi-year lifetime of coniferous needles,,. When comparing foliage of the same age, however, coniferous needles exhibit lower Hg concentrations than deciduous leaves, which is attributed to a lower metabolic activity of needles and is consistent with reduced deposition on needles, as observed using dynamic flux bag measurements,,,,,. Although in our database we cannot account for leaf age, we, indeed, find significantly higher Hg concentrations in deciduous leaves (median: 28 μg kg−1 [IQR: 2–70 μg kg−1]) compared with coniferous needles (15 μg kg−1 [2–47 μg kg−1]), and the highest concentrations in tropical broadleaf evergreen leaves (56 μg kg−1 [7–131 μg kg−1]) (Fig. ).

In addition to varying amongst foliage, concentrations of Hg vary among woody tissues (Fig. ). The outermost bark, characterized by a high porosity and relative chemical inertness, lacks metabolic processes and, thus, likely absorbs airborne Hg via non-physiological adsorption processes,. Across the bark, Hg concentrations markedly decrease from the outermost to the innermost layers (including the phloem), indicating little transport through the bark. Potential pathways for Hg in bole wood include root uptake and translocation through the xylem, foliage uptake and translocation by phloem transport, and transfer from the bark (Fig. ). However, Hg uptake to bole wood, which is the tissue showing by far the lowest Hg concentrations (Fig. ; Supplementary Fig. ), is considered to be dominated by translocation of foliage Hg to tree rings through phloem transport, whereas transport through translocation from roots and bark is likely negligible–. Notably, this transport could enable the use of tree ring Hg to track historic, local, regional and global Hg exposures,,–.

Below ground, plant roots and excretions (chelators) can induce pH variations and redox reactions in soils, which, subsequently, lead to cation exchange of divalent Hg and solubilization of Hg from nearly insoluble soil Hg precipitates, (Fig. ). Hg then likely penetrates into root cells as a hitch-hiker using transporters for other elements,, as Hg is a non-essential element. Absorbed Hg is largely restricted to the cell walls of the outer layers of the root cortical cylinder, as well as to the central cylinder and parenchyma cell nuclei. Accumulation in root cells can reduce the movement of Hg from the root into the xylem, and transport of Hg–phytochelatin complexes into vacuoles can restrict phloem mobility,. Low Hg translocation from soils to above-ground tissues has been attributed to effective Hg retention in roots. However, no specific transport molecules involved in Hg uptake by roots and translocation in roots are known.

Root Hg concentrations have been shown to linearly correlate with soil concentrations,, and show low sensitivity to air Hg concentrations, leading to the view that Hg in roots is derived primarily from soil uptake. However, exceptions have been reported in quaking aspen and wheat, under very high atmospheric Hg exposures (20–40 times ambient air concentrations). Moreover, stable Hg isotope studies have pointed to contrasting Hg origins in roots. For example, rice plants grown in contaminated soils showed root Hg with the same isotopic signature as the surrounding soil, indicating root uptake. In contrast, substantial foliage-to-root Hg transport was observed in a ***forest***, where atmospheric Hg(0) uptake via foliage accounted for 44–83% of Hg in tree roots. In the latter study, large roots showed somewhat higher proportions of atmospheric Hg(0) compared with small roots (59% versus 64%), possibly related to lower surface areas and reduced absorptive potential of large roots,. The role of atmospheric uptake in root Hg merits further detailed investigations, as this phenomenon would substantially increase estimates of plant Hg uptake from the atmosphere due to high turnover rates of roots, which could equal that of leaf litterfall.

Non-vascular vegetation

, including lichens and mosses (slow-growing cryptogamic organisms without root systems or thick waxy cuticles), generally show much higher Hg concentrations compared with vascular plants (Fig. ; Supplementary Fig. ). Hg bioaccumulation in mosses and lichens is controlled by numerous biotic and abiotic factors, including: species, whereby different moss and lichen species show large differences in Hg concentrations under the same exposures–; substrate and local soil–; growth rate and surface area–; exposure to pollution source; temporal variation; and chemical composition of wet and dry deposition,. Metals accumulate in mosses and lichens through intracellular and extracellular processes, as a lack of thick waxy cuticles in lichens and mosses allows cations to diffuse readily through cell walls. In the extracellular process, metals are intercepted and adsorbed and/or absorbed by exchange sites outside of cell walls and plasma membrane surface. In the intracellular process, Hg is subsequently trapped as particles on the cell surface layer or translocated inside the cell,–. In addition to surface deposition of oxidized atmospheric Hg (reactive gaseous Hg and particulate-bound Hg), Hg(0) assimilation could contribute to trapping and sequestering Hg in moss and lichen tissue, but the specific methods of uptake, binding and accumulation from the atmosphere are unknown. After uptake, Hg(0) is oxidized to Hg(II) and subsequently immobilized in moss and lichens for 4–5 weeks,,. Lichens show significantly higher Hg concentrations (78 μg kg−1 [10–180 μg kg−1]) than mosses (51 μg kg−1 [2–165 μg kg−1]) in our data set (P < 0.05) (Fig. ). This difference is likely related to the different morpho-physiological properties and abilities to intercept airborne particles of lichens and mosses, as lichens often accumulate higher contents of atmosphile elements (derived from atmospheric sources), whereas mosses have shown higher contents of lithophile elements, such as dust–.

Staple isotope analyses indicate that atmospheric Hg(0) accounts for 76% and 86% in ground and tree mosses, with the remaining 24% and 14% originating from Hg(II) contribution. Hence, where lichens and mosses represent a significant component of plant communities, such as in the Arctic tundra, their high tissue concentrations are responsible for high atmospheric deposition loads via uptake of atmospheric Hg exceeding Hg deposition by vascular plants,. Furthermore, Hg concentrations in mosses and lichens can maintain a state of dynamic equilibrium with atmospheric Hg concentrations,, and lichens and mosses increase Hg(0) uptake from the atmosphere when exposure is high. Passive biomonitoring using lichens and mosses for atmospheric Hg could, hence, be cost-effective and benefit from abundant distribution, structural simplicity, rapid growth rate and ease of sampling,,, but this application has shown limited success. For example, there were weak correlations between atmospheric Hg deposition and Hg accumulation in moss and soils across large south-to-north gradients in Norway. In contrast, there was a lack of correlation between modelled atmospheric Hg deposition and moss concentrations across a large network of sites in Europe, and moss collected in Norway showed no distinct north-to-south patterns, in spite of expected gradients in atmospheric Hg pollution. Therefore, and consistent with previous reviews,, we conclude that Hg concentrations in lichens and mosses are impacted by many environmental variables, which complicates its use as a biomonitor for atmospheric Hg concentrations and deposition.

Vegetation–atmosphere Hg exchange

Foliage and the atmosphere show dynamic and complex exchanges of Hg, including via the following three pathways: bidirectional Hg(0) exchange at the interface of foliage and the atmosphere,,,–,,–; assimilation of divalent Hg(II) wet and particle deposition (particulate-bound Hg and reactive gaseous Hg) by foliage, followed by partial or full re-***emission*** to the atmosphere as Hg(0) after photochemical reduction,,; and transpiration of Hg from soils to foliage, whereby Hg(0) is subsequently emitted, either directly or after photochemical reduction,,,,. Several studies, however, have shown that soil Hg concentrations generally do not influence leaf–atmosphere exchange fluxes,,,,, supporting the idea that there is limited root-to-atmosphere transport of Hg (such as via transpiration).

Most foliage flux studies show net uptake of Hg(0), providing evidence of foliar sinks of atmospheric Hg(0) (ref.), but bidirectional exchanges of Hg(0) were also observed. For example, foliage was a net sink in broadleaved ***forest***, coniferous ***forests*** and a wetland,,,, whereas other measurements (such as those taken in a salt marsh and a subtropical coniferous ***forest***) indicated vegetation was net Hg(0) sources to the atmosphere,. Some variability among studies could be explained by differences in solar radiation, as radiation favours photochemical re-***emissions***, an observation further supported by diurnal flux variability that shows net ***emissions*** during peak solar radiation at midday,. However, variability in flux directions over foliage could also be attributable to methodological challenges, as these fluxes are small and difficult to measure. Exposures to elevated Hg(0) concentrations generally increase net deposition to leaves,,, and it has been proposed that foliage–atmosphere fluxes are dependent on atmospheric compensation points,. Most compensation points are reported to be near or lower than ambient atmospheric Hg concentrations, so that, under non-contaminated conditions, net Hg deposition to foliage should dominate,. Canopies also shield soil surfaces from incident solar radiation, which strongly reduces underlying soil Hg(0) ***emission***,–.

Studies of ***land***–atmosphere Hg fluxes at the ecosystem level are used to quantify dry gaseous component of Hg(0) deposition over ***land***. Whole-ecosystem Hg(0) exchange flux studies are largely based on micrometeorological tower techniques and commonly report net Hg(0) deposition during peak vegetation season,,,,–, supporting net Hg assimilation by vegetation. Although time-extended measurements are rare, a few annual time series exist and show net annual deposition of gaseous Hg(0) between 2 and 29 μg m−2 per year over grassland and tundra ecosystems,,. Studies over wetlands, in contrast, report net Hg(0) ***emissions*** (9.4–18.4 μg m−2 per year),, as do ***forests*** impacted by regional pollution (58 and 2.6 μg m−2 per year). The dominance of net Hg(0) deposition measured during peak vegetation in upland, non-polluted ecosystems is also in contrast with studies of ***agricultural*** and bare soil surfaces, in which net Hg(0) ***emissions*** dominated (55.3 ng m−2 h−1 over bare soil, corn and snow-covered fields in Canada, and 5.5–10.8 ng m−2 h−1 over bare soil, wheat and corn in ***agricultural*** fields in China). Notably, though, a review of available terrestrial surface–atmosphere Hg(0) flux studies reveals that, based on the current measurements available, global assimilation by vegetation cannot be determined accurately, as global flux uncertainty over canopies ranges from a net deposition of 513 Mg to a net ***emission*** of 1,353 Mg per year.

Hg stable isotopes provide a fingerprint of the sources and transformation processes in environmental samples,,. The seven stable isotopes of Hg undergo mass-dependent fractionation (δ202Hg) and mass-independent fractionation of odd-mass (odd-MIF, Δ199Hg and Δ201Hg) and even-mass (even-MIF, Δ200Hg and Δ204Hg) numbered isotopes. Even-MIF is thought to be exclusively produced in the upper atmosphere, providing a conservative tracer for atmospheric Hg species deposited to the Earth surface. Atmospheric Hg(0) and Hg(II) in rainfall are characterized by distinct isotope even-MIF signatures (Fig. ). Specifically, Δ200Hg of Hg(II) in rainfall exhibits positive anomalies of 0.2‰ (0.13‰ to –0.24‰ IQR, n = 115) and the corresponding pool of atmospheric Hg(0) slightly negative Δ200Hg values of −0.05‰ (−0.07‰ to −0.03‰ IQR, n = 117),,–. Δ200Hg measured in foliage of −0.02‰ (−0.05‰ to 0.00‰ IQR, n = 120) is similar to the Δ200Hg of atmospheric Hg(0) (refs,,–), and a mass balance calculation based on Δ200Hg reveals that 88% (79–100% IQR) of Hg in vegetation originates from the uptake of atmospheric Hg(0).

Hg stable isotopes in foliage.

Composition of atmospheric gaseous elemental mercury (Hg(0)) and divalent mercury (Hg(II)) sources, and sources of mercury (Hg) in vegetation and in terrestrial sinks (organic and mineral soils and runoff), plotted as even-mass-independent (Δ200Hg) versus mass-dependent (δ202Hg) isotopes. The solid green arrow represents the Hg isotope fractionation during uptake of Hg(0) by foliage and the light red dashed arrow represents the fractionation of residual Hg(0) in the atmosphere. The figure includes all currently available, peer-reviewed isotope data on vegetation Hg.

Foliar uptake of Hg(0) discriminates against heavier Hg isotopes (straight arrow in Fig. ), resulting in the negative δ202Hg values (−1% to −3% relative to atmospheric Hg(0)),,,,, typically observed in foliage,,,–, depending on the plant species and proximity to anthropogenic Hg ***emission*** sources. Indeed, foliar uptake fractionation factors of −2.6‰ and −4.2‰ have been reported based on δ202Hg depletion of atmospheric Hg(0). As a result of plant uptake of lighter Hg(0), corresponding enrichments of heavier Hg(0) isotopes in the residual atmospheric Hg(0) pool of the boundary layer has been observed above a high-altitude peat bog in Europe, an Arctic tundra and deciduous and evergreen ***forests*** in Southeast Asia, as indicated by higher δ202Hg values (light red circles in Fig. ). Vegetation activity, with foliar uptake resulting in higher residual δ202Hg values, and anthropogenic ***emissions*** have been identified as the two main drivers for spatial and temporal variation of atmospheric Hg(0) isotope compositions in the Northern Hemisphere. A global Hg isotope box model based on δ202Hg and Δ200Hg constraints also supports the findings that terrestrial dry Hg(0) deposition is a critical global flux, supporting a vegetation control on seasonal variation of atmospheric Hg(0) concentrations and in support of vegetation acting as a critical sink for atmospheric Hg(0).

Re-***emissions*** of Hg(0) from foliage from an evergreen ***forest*** was associated with odd-MIF, suggesting that Hg incorporated in the leaf structure is photochemically reduced and results in a bidirectional flux of Hg(0) across stomata. Similarly, small depletions in odd-MIF Δ199Hg of approximately −0.1 ‰ in surface soils have been attributed to small losses by photochemical reduction in foliage and litterfall,. Overall, odd-MIF values show small but consistent re-***emission*** signatures on foliar Hg (Supplementary Fig. ), providing a promising tool for quantitative assessments of deposition and losses at the ecosystem scale in the future.

Deposition of atmospheric Hg(0) by means of litterfall constitutes the major source of Hg in plants, organic and mineral soils, and watershed runoff (Fig. ). Average source contributions of atmospheric Hg(0) deposition to soils was 57–94% in North America,, 70% to Arctic tundra soils in Alaska in the USA, 79% to a high-altitude peatland in the Pyrenees in France, 90% to boreal ***forest*** soils in Sweden and 26% in surface soils of Tibetan wetlands in China. Notably, the estimate in Arctic tundra soils derived by stable Hg isotopes was almost identical to the contribution of Hg(0) to total deposition (71%) based on exchange and deposition measurements. Global-scale mass balance estimations, based on Δ200Hg patterns, reveal contributions of atmospheric Hg(0)-derived Hg of 62% (53–89% IQR) in organic soils,,–,, and 84 % (70–92% IQR) in mineral soils (albeit when neglecting geogenic Hg sources),,–,,. Similarly, in runoff of terrestrial ecosystems, 76% (60–92% IQR) of Hg is derived from deposition of atmospheric Hg(0) (refs,). The major role and isotope fractionation of foliar uptake of atmospheric Hg(0) results in a characteristic terrestrial fingerprint, which is propagated to and found to be dominant in freshwater and coastal sediments and biota,,–.

Global impact of vegetation Hg uptake

Empirical evidence and model results strongly suggest that the dominant pathway of atmospheric Hg deposition in terrestrial ecosystems is dry Hg(0) deposition via vegetation uptake,,–. Moreover, the primary driver of Hg accumulation and storage in surface soils is vegetation uptake of atmospheric Hg(0) (refs,). In turn, plant Hg(0) uptake controls seasonal variations and global distribution of atmospheric Hg concentrations. Climate-change-induced alterations in vegetation and human-induced ***land*** use changes have substantial impacts on global Hg cycling,. Here, we review studies on the global impacts of vegetation Hg assimilation on environmental and ecosystem processes based on published empirical studies and modelling results.

Empirical studies

Global estimates of Hg uptake by vegetation are available based on field-based litterfall and throughfall measurements. These studies show that ***forests*** are strong sinks of atmospheric Hg(0) (refs,,,,), mainly driven by litterfall, which exceeds all other pathways of Hg inputs. Global Hg litterfall fluxes are estimated between 1,180 ± 710 Mg per year and 1,232 Mg per year — approximately cycling one-quarter of the total global atmospheric Hg pool each year (~4,400–5,300 Mg) — based on measurement from over 90 ***forest*** sites–. Litterfall deposition has been proposed to decrease along with primary productivity from tropical to temperate to boreal regions, with approximately 70% of global litterfall deposition estimated to occur in tropical and subtropical regions. However, estimated annual mean Hg(0) dry deposition in terrestrial ecosystems could be enhanced by up to 20% in the northern mid-latitudes by 2050, owing to increases in plant productivity associated with CO2 fertilization. Throughfall Hg deposition might be of similar magnitude as litterfall deposition and, although much more uncertain than the litterfall estimates, could globally account for 1,340 Mg per year, contributing additional Hg deposition in the range of 90%, 75% and 143% of litterfall Hg deposition in China, Europe and North America, respectively.

The sum of litterfall plus throughfall deposition represents a lower-bound estimate of total vegetation Hg uptake because it does not account for Hg deposition via woody tissues, non-vascular lichen and mosses, and whole-plant die-off (such as tree blowdown), nor does it account for direct soil uptake. For example, studies report that Hg mass in tree wood is severalfold higher than the Hg mass contained in canopies–, and woody tissues (tree turnover) could account for 60% of litterfall deposition, in spite of relatively slow wood turnover rates. Indeed, analysis along a ***forest*** succession suggests that combined woody biomass, moss and throughfall deposition exceeds that of litterfall, thus, using litterfall deposition only would strongly underestimate Hg accumulation in ***forest*** soils. If substantial amounts of root Hg are, indeed, also derived from atmospheric uptake, root turnover will further increase atmospheric dry deposition. After plant-bound Hg is transferred to soils and ***forest*** floors, the fate and mobility of Hg in soils and watersheds depends on litter decomposition and biogeochemical cycling of organic matter,–. During litter decomposition, the total mass and concentrations of Hg increase, owing to relatively stronger losses of carbon compared with Hg and to continued absorption of Hg from precipitation and throughfall during the initial stages of litter decomposition,,. Stable Hg isotope studies suggest that microbial reduction and photoreduction also play a role in Hg losses from litter and soils,, possibly leading to large re-evasion losses over long time periods. Still, large amounts of plant-derived Hg are likely retained in soils, leading to large pools of soil Hg globally,,.

Vegetation Hg uptake in models

In addition to empirical measurements, global models are used to investigate terrestrial–atmosphere Hg exchange processes,,,. The dry deposition of Hg, driven by advection–diffusion in air and heterogeneous uptake by surfaces, is generally parameterized in models using an inferential approach (in other words, as the product of ambient Hg concentration and modelled dry deposition velocity),–. Dry deposition velocities over vegetation canopies are estimated through a resistance analogy that includes aerodynamic, soil, stomatal and cuticle resistances–. Parameters for oxidized Hg(II) species deposition are selected based on similarity of solubility and reactivity of Hg with other well-studied atmospheric compounds. A wide range of Hg(0) dry deposition schemes have been implemented in models; early studies assumed small and constant deposition velocities over vegetated surfaces or neglected Hg(0) deposition altogether, whereas resistance-based Hg(0) deposition schemes are commonly employed now. Terrestrial Hg(0) ***emissions*** are parameterized as a function of environmental conditions (including temperature, solar irradiance and leaf area index) and soil Hg content, and often include a fraction of recently deposited Hg to soils, vegetation and snow as prompt re-***emissions***–.

A few bidirectional air–surface Hg exchange schemes have been developed and implemented in regional models,,,. For example, Hg exchange fluxes over canopies have been formulated as concentration gradients across air–foliage by defining dynamic compensation points based on partitioning coefficients. This model was subsequently revised by updating surface resistances,, and implementing photochemical reduction of Hg in foliage. In another example, Hg(0) compensation points over a variety of canopies and environmental conditions in North America were reviewed (range 0.5–33 ng m−3), and a bidirectional air–surface exchange model based on a dry deposition scheme, and empirical compensation points was developed. However, dry deposition parameterization is highly sensitive to resistance parameters, some of which are poorly constrained for Hg (refs,). In addition, bidirectional Hg exchange schemes depend on numerous ill-constrained parameters and oversimplified chemistry,,. Based on direct micrometeorological measurements of Hg(0) fluxes, it has been recommended that current models should increase stomatal resistances to reduce overestimation of stomatal uptake of Hg(0) (for example, by a factor of 5–7) and simultaneously increase ground and cuticular uptake to mimic night-time and wintertime Hg(0) deposition (by factors of 3–4 and 2–4, respectively). In general, there is a need for mechanistic bidirectional air–foliage Hg partitioning schemes that incorporate biome-specific biomass data, plant , redox chemistry and environmental variables (temperature, light, moisture, atmospheric turbulence),.

Model simulations

We performed two global model simulations using the GEM-MACH-Hg model,,,– to assess the impacts of vegetation Hg uptake on contemporary atmospheric Hg cycling (year 2015); one with and a second without the presence of vegetation (see details of the modelling approach in the ). The simulation without vegetation cover was configured by replacing all biome types to desert, while keeping primary (geogenic and anthropogenic) and secondary (recycling of historic deposition) Hg ***emissions*** unchanged. These simulations allowed examination of the impact of vegetation Hg uptake on the residence time of Hg in the atmosphere and spatiotemporal distribution of Hg in air and Hg deposition to the Earth’s ecosystems (Fig. ; Supplementary Table ).

Global Hg cycle.

Mercury (Hg) ***emissions*** include natural, anthropogenic and legacy sources. Terrestrial deposition includes dry (62–74% of terrestrial deposition) and wet (26–38%) deposition, where dry deposition is separated further into vegetation Hg uptake (gaseous elemental mercury (Hg(0)) and divalent mercury (Hg(II))), which accounts for 76% of terrestrial uptake, and deposition to non-vegetation surfaces (soils, snow and water; 24% of uptake) using GEM-MACH-Hg model simulations (this Review). GEM-MACH-Hg model estimates are in bold and peer-reviewed literature ranges are in parentheses. Origins of literature fluxes are given in Supplementary Table . The units for the ***emission*** and deposition are in Mg Hg per year.

GEM-MACH-Hg simulations here estimate global annual total Hg deposition of approximately 6,400 Mg, with about 44% deposited to terrestrial ecosystems (~2,800 Mg per year, in line with the literature range of 2,200–3,600 Mg per year),,. Global terrestrial wet deposition is estimated to be in the range of 730–1,070 Mg per year, accounting for only 26–38% of total terrestrial deposition. Estimated dry Hg deposition (combined surface uptake and particulate gravitational settling) dominates across terrestrial environments and is in the range of 1,730–2,070 Mg per year (62–74% of terrestrial deposition). Direct vegetation uptake accounts for the largest portion of this deposition (1,310–1,570 Mg per year). Hg(0) accounts for approximately 90% of foliage Hg uptake and represents the single largest terrestrial ***removal*** pathway of atmospheric Hg (1,180–1,410 Mg per year). Global oceans are a net sink for atmospheric Hg, with annual net deposition (deposition minus ***emission***) reported in the literature ranging from 400 to 1,700 Mg per year,,, and a GEM-MACH-Hg model estimate here of 1,300 Mg per year.

Comparison of GEM-MACH-Hg simulations with and without vegetation show that Hg uptake by vegetation reduces the residence time of atmospheric Hg(0) from 10 to 8 months (thus, reduces global atmospheric Hg(0) concentrations) (Fig. ,) and lessens the global atmospheric Hg(0) burden from 5,120 to 4,460 Mg. The vegetation Hg sink notably reduces air concentrations of Hg(0) over ***forested*** regions, by 25% over eastern North America and by 35% over boreal ***forests*** in Europe, for example (Fig. ,). Uptake of Hg transported out of the source regions by local and regional vegetation lowers the long-range transport and deposition of Hg in remote regions such as the Arctic and global oceans (Fig. ,). In the absence of vegetation cover, the majority of emitted Hg would be removed from the atmosphere by wet deposition (over ***land*** and oceans), thereby, repartitioning the deposition between ***land*** (29%) and ocean (71%), and increasing the Hg deposition to global oceans by approximately 960 Mg per year (Fig. ).

Global surface air concentrations and annual deposition of Hg.

a | Global annual average surface air gaseous elemental mercury (Hg(0)) concentrations simulated by the GEM-MACH-Hg model for the year 2015 with vegetation cover present. Available observations of Hg(0) concentrations are indicated in circles; nearby sites are combined and replaced with median values. b | Simulation with vegetation cover absent. c | Simulated annual mercury (Hg) deposition (total wet and dry deposition) for the year 2015 with vegetation cover present (hatched areas indicate regions of ***forested*** vegetation). d | Simulated annual Hg deposition with vegetation cover absent. Observations from: CAPMoN, ECCC; AMNet; EMEP; GMOS; Mace Head; Cape Point and Amsterdam Island; Cape Grim; Gunn Point; Mount Lulin.

Vegetation Hg uptake reduces the inter-hemispheric gradient (Northern Hemisphere versus Southern Hemisphere) of Hg(0) from 1.8:1.1 ng m−3 to 1.5:1.0 ng m−3 (Fig. ). Seasonal atmospheric Hg(0) concentrations are characterized by winter to early spring maxima and late summer to fall minima, especially over vegetated surfaces in the Northern Hemisphere (Fig.  and Supplementary Figs –). In contrast, Southern Hemispheric locations lack systematic seasonal cycles (Fig. ; Supplementary Fig. ). Our model analyses suggest that Northern Hemispheric seasonal Hg(0) cycles over ***land*** are controlled by (in order of importance): vegetation uptake (summer and fall maximum); terrestrial soil and vegetation ***emissions*** (summer maximum); cryosphere re-***emissions*** (spring peak and fall minimum); and wildfire ***emissions*** (spring to summer). Continued deposition of Hg(0) to the biosphere into the fall results in hemispheric-scale depletion of ambient Hg(0) concentrations in late summer to fall months. In the absence of Hg uptake by vegetation, atmospheric Hg(0) concentrations increase and pronounced seasonal variations are lost (yellow lines, Fig.  and Supplementary Figs –). In the Southern Hemisphere, more variable and less distinct seasonal cycles of Hg(0) are reported (Fig. ; Supplementary Fig. ). These model results are consistent with a previous global analysis of atmospheric data that concluded that seasonality in Hg(0) was strongly related to leaf area cover, and that summertime minima at remote sites in the Northern Hemisphere were best explained by seasonal vegetation uptake.

Surface air Hg(0) concentrations.

a | Average surface air gaseous elemental mercury (Hg(0)) concentrations, along with the global hemispheric gradient, simulated by GEM-MACH-Hg for 2015 with and without vegetation cover present. Blue line represents model simulation with vegetation present, yellow line represents model simulation without vegetation present and red dots represent measurement observations. Model simulated lines represent averaged Hg(0) concentrations in 0.5° latitude bands including oceanic regions; observations represent sites mostly located over ***land*** and in North America and Europe. b | Average measured and simulated (by the GEM-MACH-Hg model at the observation sites) seasonal cycles of surface air Hg(0) concentrations in the Northern Hemisphere; coastal and urban sites were excluding from averaging in the Northern Hemisphere. Blue and yellow lines represent model simulations with vegetation present and without vegetation present, respectively, for 2015. Red line and shaded area represent median of available measurements between 2009 and 2018 and 5th–95th percentiles, respectively. c | Seasonal surface air Hg(0) concentrations in the Southern Hemisphere. Seasonal cycle is the average of two sites, Cape Point and Amsterdam Island.

Global Hg deposition is largest in areas of high atmospheric Hg concentrations associated with anthropogenic ***emission*** regions (such as Southeast Asia) and areas of high biomass production (such as the Amazon region and the Congo Basin) (Fig. ). GEM-MACH-Hg estimates of annual (median) dry deposition Hg fluxes to major global biomes are as follows (see comparison with litterfall-inferred values in Supplementary Table ): tropical moist broadleaf ***forests***: 27.3 μg m−2 per year; tropical dry broadleaf ***forests***: 24.6 μg m−2 per year; temperate broadleaf/mixed ***forests***: 18.3 μg m−2 per year; tropical grasslands: 16.4 μg m−2 per year, temperate conifers: 14.3 μg m−2 per year; temperate grasslands: 9.2 μg m−2 per year; boreal ***forests***: 8.3 μg m−2 per year; and Arctic tundra: 4.2 μg m−2 per year. Underestimation of model deposition to vegetation in tropical ***forests*** might be linked to the adsorption of wet deposition on foliage,, as partitioning of Hg wet deposition between foliage and ground is currently not represented in models.

Moreover, there are uncertainties in the analyses here related to the representation of redox processes and heterogeneous Hg chemistry in terrestrial components such as vegetation, soils and snow (reflected in the estimated range of fluxes), as well as legacy Hg cycling in soils (such as from past deposition), which was not examined. Overall, the impacts of vegetation on legacy Hg fluxes are complex and require further knowledge of terrestrial Hg accumulation, speciation and lifetime for formulations in three-dimensional atmosphere–***land***–ocean biogeochemical models, ().

Summary and future perspectives

Vegetation uptake of atmospheric Hg is the most important Hg deposition pathway to the terrestrial environment. Studies based on Hg stable isotopes, enriched isotope tracer experiments, laboratory and ecosystem-level flux measurements, and model simulations consistently show that approximately 90% of Hg in foliage originates from the uptake of atmospheric Hg(0). Ultimately, atmospheric Hg taken up by vegetation and deposited to soils is transferred to downstream aquatic freshwater ecosystems and coastal seas, representing a major source of Hg for aquatic organisms.

A number of areas require further research in order to improve our understanding of the processes controlling Hg uptake by vegetation and its implications to global Hg cycling. In particular, assessment of the impact of climate and ***land*** use changes on global Hg cycling are currently hampered by a series of shortcomings in process understanding, observational constraints and model representations. For example, important knowledge gaps exist with respect to the vegetation interfacial Hg exchange processes; a mechanistic and quantitative knowledge of heterogeneous biochemical processes of plant tissue and soil Hg uptake, considering physiological and environmental drivers, is needed. Progress in these fields could be reached via extended use and interpretations of stable Hg isotopes, molecular and cellular-level tracing experiments to determine transport and biochemical behaviour of Hg in plant cells and tissues, high-resolution mapping of Hg distribution within plant tissues and improved chemical speciation of Hg in plants, such as using synchrotron-based X-ray absorption spectroscopy techniques.

In order to allow better comparison of data, future field studies on Hg in vegetation should report detailed descriptions of the sampling, such as locations within the canopy, time of sampling and needle age in coniferous trees, and, ideally, follow standardized sampling protocols and report environmental exposures (atmosphere and soils). We call for the integration of Hg data in litterfall and throughfall deposition monitoring networks across all biomes, with a particular focus given to areas of high net primary production, such as tropical ***forests*** and biomes, where, currently, observational data are scarce, such as grasslands.

Although frequently taken, litterfall and throughfall measurements alone are not sufficient to estimate whole-ecosystem Hg deposition, as they do not account for the deposition by woody tissues, translocation to roots, uptake by cryptogamic vegetation and direct sorption of Hg(0) to soils and ***forest*** floors. Hence, we recommend measurements of annual time series of ecosystem-level Hg(0) deposition across all major representative global biomes to constrain their net sinks. Furthermore, substantial uncertainties exist in the model parameterizations of surface uptake processes of Hg species, preventing accurate determination of the relative roles of wet and dry deposition and elemental and oxidized Hg species in atmosphere–terrestrial Hg exchange processes.

Finally, amounts and geospatial distribution of soil Hg and secondary Hg ***emissions*** (legacy soil and wildfire ***emissions***) are profoundly impacted by foliage Hg uptake, and changes in vegetation cover would alter these. Dynamically coupled Hg models of atmosphere, terrestrial and ocean environments are needed to simulate the effects of both direct and indirect changes in vegetation; measurement and modelling innovations providing mechanistic knowledge of Hg processes in terrestrial ecosystems is critical to achieving this goal.

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**Notes**

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**Body**

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Mr. MARKEY (for himself, Mr. Wyden, Ms. Warren, Mr. Sanders, Mr. Padilla, Mr. Van Hollen, Mr. Blumenthal, Mrs. Gillibrand, Mr. Merkley, Mr. Murphy, Ms. Hirono, Ms. Klobuchar, and Mr. Booker) submitted the following resolution; which was referred to the Committee on Environment and Public Works: S. Res. 166 Whereas the October 2018 report entitled ``Special Report on Global Warming of 1.5 by the Intergovernmental Panel on Climate Change and the November 2018 Fourth National Climate Assessment report found that-- (1) human activity is the dominant cause of observed climate change over the past century; (2) a changing climate is causing sea levels to rise and an increase in wildfires, severe storms, droughts, and other extreme weather events that threaten human life, healthy communities, and critical infrastructure; (3) global warming at or greater than 2 degrees Celsius beyond preindustrialized levels will cause-- (A) mass migration from the regions most affected by climate change; (B) more than $500,000,000,000 in lost annual economic output in the United States by the year 2100; (C) wildfires that, by 2050, will annually burn at least twice as much ***forest*** area in the western United States than was typically burned by wildfires in the years preceding 2019; (D) a loss of more than 99 percent of all coral reefs on Earth; (E) more than 350,000,000 more people to be exposed globally to deadly heat stress by 2050; and (F) a risk of damage to $1,000,000,000,000 of public infrastructure and coastal real estate in the United States; and (4) global temperatures must be kept less than 1.5 degrees Celsius above preindustrialized levels to avoid the most severe impacts of a changing climate, which will require-- (A) global reductions in greenhouse gas ***emissions*** from human sources of 40 to 60 percent from 2010 levels by 2030; and (B) net-zero global ***emissions*** by 2050; Whereas, because the United States has historically been responsible for a disproportionate amount of greenhouse gas ***emissions***, having emitted 20 percent of global greenhouse gas ***emissions*** through 2014, and has a high technological capacity, the United States must take a leading role in reducing ***emissions*** through economic transformation; Whereas the United States is currently experiencing several related crises, with-- (1) life expectancy declining while basic needs, such as clean air, clean water, healthy food, and adequate health care, housing, transportation, and education, are inaccessible to a significant portion of the United States population; (2) a 4-decade trend of wage stagnation, deindustrialization, and antilabor policies that has led to-- (A) hourly wages overall stagnating since the 1970s despite increased worker productivity; (B) the third-worst level of socioeconomic mobility in the developed world before the Great Recession; (C) the erosion of the earning and bargaining power of workers in the United States; and (D) inadequate resources for public sector workers to confront the challenges of climate change at the Federal, State, and local level; and (3) the greatest income inequality since the 1920s, with-- (A) the top 1 percent of earners accruing 91 percent of gains in the first few years of economic recovery after the Great Recession; (B) a large racial wealth divide amounting to a difference of 20 times more wealth between the average White family and the average Black family; and (C) a gender earnings gap that results in women earning approximately 80 percent as much as men, at the median; Whereas climate change, pollution, and environmental destruction have exacerbated systemic racial, regional, social, environmental, and economic injustices (referred to in this preamble as ``systemic injustices'') by disproportionately affecting indigenous peoples, communities of color, migrant communities, deindustrialized communities, depopulated rural communities, the poor, low-income workers, women, the elderly, the unhoused, people with disabilities, and youth (referred to in this preamble as ``frontline and vulnerable communities''); Whereas, climate change constitutes a direct threat to the national security of the United States-- (1) by impacting the economic, environmental, and social stability of countries and communities around the world; and (2) by acting as a threat multiplier; Whereas the Federal Government-led mobilizations during World War II and the New Deal created the greatest middle class that the United States has ever seen, but many members of frontline and vulnerable communities were excluded from many of the economic and societal benefits of those mobilizations; and Whereas the Senate recognizes that a new national, social, industrial, and economic mobilization on a scale not seen since World War II and the New Deal era is a historic opportunity-- (1) to create millions of good, high-wage jobs in the United States; (2) to provide unprecedented levels of prosperity and economic security for all people of the United States; and (3) to counteract systemic injustices: Now, therefore, be it Resolved, That it is the sense of the Senate that-- (1) it is the duty of the Federal Government to create a Green New Deal-- (A) to achieve the greenhouse gas and toxic ***emissions*** reductions needed to stay under 1.5 degrees Celsius of warming, through a fair and just transition for all communities and workers; (B) to create millions of good, high-wage union jobs and encourage collective bargaining agreements to ensure prosperity and economic security for all people of the United States; (C) to invest in the infrastructure and industry of the United States to sustainably meet the challenges of the 21st century; (D) to secure for all people of the United States for generations to come-- (i) clean air and water; (ii) climate and community resiliency; (iii) healthy food; (iv) access to nature; and (v) a sustainable environment; and (E) to promote justice and equity by stopping current, preventing future, and repairing historic oppression of indigenous peoples, communities of color, migrant communities, deindustrialized communities, depopulated rural communities, the poor, low-income workers, women, the elderly, the unhoused, [[Page S2087]] people with disabilities, and youth (referred to in this resolution as ``frontline and vulnerable communities''); (2) the goals described in subparagraphs (A) through (E) of paragraph (1) (referred to in this resolution as the ``Green New Deal goals'') should be accomplished through a 10-year national mobilization (referred to in this resolution as the ``Green New Deal mobilization'') that will require-- (A) building resiliency against climate change-related disasters, such as extreme weather, including by leveraging funding and providing investments for community-defined projects and strategies; (B) repairing and upgrading the infrastructure in the United States, including-- (i) by eliminating pollution and greenhouse gas ***emissions*** as much as technologically feasible; (ii) by guaranteeing universal access to clean water; (iii) by reducing the risks posed by climate impacts; and (iv) by ensuring that any infrastructure bill considered by Congress addresses climate change; (C) meeting 100 percent of the power demand in the United States through clean, renewable, and zero-***emission*** energy sources, including-- (i) by dramatically expanding and upgrading renewable power sources; and (ii) by deploying new capacity; (D) building or upgrading to energy-efficient, distributed, and ``smart'' power grids and ensuring affordable access to electricity; (E) upgrading all existing buildings in the United States and building new buildings to achieve maximum energy efficiency, water efficiency, safety, affordability, comfort, and durability, including through electrification; (F) spurring massive growth in clean manufacturing in the United States and ***removing*** pollution and greenhouse gas ***emissions*** from manufacturing and industry as much as is technologically feasible, including by expanding renewable energy manufacturing and investing in existing manufacturing and industry; (G) working collaboratively with farmers and ranchers in the United States to ***remove*** pollution and greenhouse gas ***emissions*** from the ***agricultural*** sector as much as is technologically feasible, including-- (i) by supporting family farming; (ii) by investing in sustainable farming and ***land*** use practices that increase soil health; and (iii) by building a more sustainable food system that ensures universal access to healthy food; (H) overhauling transportation systems in the United States to ***remove*** pollution and greenhouse gas ***emissions*** from the transportation sector as much as is technologically feasible, including through investment in-- (i) zero-***emission*** vehicle and non-motorized alternative modes of transportation infrastructure and manufacturing; (ii) clean, affordable, and accessible public transit; and (iii) high-speed rail; (I) mitigating and managing the long-term adverse health, economic, and other effects of pollution and climate change, including by providing funding for community-defined projects and strategies; (J) ***removing*** greenhouse gases from the atmosphere and reducing pollution by restoring natural ecosystems through proven low-tech solutions that increase soil carbon storage, such as ***land*** preservation and afforestation; (K) restoring and protecting threatened, endangered, and fragile ecosystems through locally appropriate and science- based projects that enhance biodiversity and support climate resiliency; (L) cleaning up existing hazardous waste sites and abandoned sites and ensuring economic development and sustainability on those sites; (M) identifying other ***emission*** and pollution sources and creating solutions to ***remove*** them; and (N) promoting the international exchange of technology, expertise, products, funding, and services, with the aim of making the United States the international leader on climate action and to help other countries achieve a Green New Deal; (3) a Green New Deal must be developed through transparent and inclusive consultation, collaboration, and partnership with frontline and vulnerable communities, labor organizations, worker cooperatives, civil society groups, academia, and businesses; and (4) to achieve the Green New Deal goals and mobilization, a Green New Deal will require-- (A) providing and leveraging, in a way that ensures that the public receives appropriate ownership stakes and returns on investment, adequate capital (including through community grants, public banks, and other public financing), technical expertise, supporting policies, and other forms of assistance to communities, organizations, Federal, State, and local government agencies, and businesses working on the Green New Deal mobilization; (B) ensuring that the Federal Government takes into account the complete environmental and social costs and impacts of ***emissions*** through-- (i) existing laws; (ii) new policies and programs; and (iii) ensuring that frontline and vulnerable communities shall not be adversely affected; (C) providing resources, training, and high-quality education, including higher education, to all people of the United States, with a focus on frontline and vulnerable communities, so that all people of the United States may be full and equal participants in the Green New Deal mobilization; (D) making public investments in the research and development of new clean and renewable energy technologies and industries; (E) directing investments to spur economic development, deepen and diversify industry and business in local and regional economies, and build wealth and community ownership, while prioritizing high-quality job creation and economic, social, and environmental benefits in frontline and vulnerable communities, and deindustrialized communities, that may otherwise struggle with the transition away from greenhouse gas intensive industries; (F) ensuring the use of democratic and participatory processes that are inclusive of and led by frontline and vulnerable communities and workers to plan, implement, and administer the Green New Deal mobilization at the local level; (G) ensuring that the Green New Deal mobilization creates high-quality union jobs that pay prevailing wages, hires local workers, offers training and advancement opportunities, and guarantees direct replacement of lost wages, health care, retirement, and other benefits for workers affected by the transition; (H) guaranteeing a job with a family-sustaining wage, adequate family and medical leave, paid vacations, and retirement security to all people of the United States; (I) strengthening and protecting the right of all workers to organize, unionize, and collectively bargain free of coercion, intimidation, and harassment; (J) strengthening and enforcing labor, workplace health and safety, antidiscrimination, and wage and hour standards across all employers, industries, and sectors; (K) enacting and enforcing trade rules, procurement standards, and border adjustments with strong labor and environmental protections-- (i) to stop the transfer of jobs and pollution overseas; and (ii) to grow domestic manufacturing in the United States; (L) ensuring that public ***lands***, waters, and oceans are protected and that eminent domain is not abused; (M) obtaining the free, prior, and informed consent of indigenous peoples for all decisions that affect indigenous peoples and their traditional territories, honoring all treaties and agreements with indigenous peoples, and protecting and enforcing the sovereignty and ***land*** rights of indigenous peoples; (N) ensuring a commercial environment where every businessperson is free from unfair competition and domination by domestic or international monopolies; and (O) providing all people of the United States with-- (i) high-quality health care; (ii) affordable, safe, and adequate housing; (iii) economic security; and (iv) clean water, clean air, healthy and affordable food, and access to nature.

**Load-Date:** April 21, 2021

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[***Environmentalists cast doubt on carbon offsets***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:634F-V401-JCM7-G1N7-00000-00&context=1516831)

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July 13, 2021 Tuesday

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**Length:** 933 words

**Byline:** Sarah Murray

**Body**

Critics of carbon offsets often compare them to the medieval Catholic practice of allowing people to pay for “indulgences”, which were meant to lessen the punishment for sins.

But advocates say that, with the right standards and verification, “nature-based” offsets can contribute to the world’s transition to net-zero greenhouse gas ***emissions*** and the adoption of more sustainable ***agricultural*** practices.

By allowing businesses to buy offsets, money can be raised to pay for environmental benefits, such as tree planting, farming with minimal soil disturbance, and promoting wetlands. All of these initiatives can help to ***remove*** carbon from the atmosphere.

The voluntary offset market, in which companies opt to pay for carbon-reducing activities to “offset” their own pollution, has expanded rapidly. Transactions reached about $282m in 2019, according to Ecosystem Marketplace, the information provider. A task force co-founded by Mark Carney, the former Bank of England governor,  [*has estimated*](https://www.ft.com/content/de5e8631-bdf2-4c2e-8b7f-83c0c80cdea8) that the market could be worth $50bn by 2030.

That worries many climate activists, however. They argue that companies buying carbon offset “credits” can claim they are working towards climate ***targets*** while they fail to address ***emissions*** from their own operations and carry on polluting.

“If they’re not used appropriately, they can be an excuse for not cutting ***emissions*** in the first place,” says Thomas Maddox, ***forests*** director at CDP (formerly the Carbon Disclosure Project), a non-profit that helps companies report their climate impact. “They have to be a last resort, once you’ve cut your ***emissions*** as far as possible.”

With few standards in place, it is questionable how much impact is being made by the farming and forestry practices that offsets pay for, in terms of reducing global greenhouse gases. “Everything is very, very murky at this point,” says Tim Searchinger, a senior research scholar at Princeton University.

He points to several problems with offsets. The first, known as “additionality”, is ensuring that the ***emissions*** reduction generating an offset credit would not have happened anyway. “The person selling you the cheapest credit for not cutting down their trees is the person who wasn’t going to cut them down anyway,” he explains.

The second problem, known as “leakage”, is the fact that ***emissions*** avoided by one project may be generated elsewhere. In the case of deforestation for the creation of ***agricultural*** ***land***, for example, purchasing carbon credits linked to the prevention of ***land*** clearance will not necessarily result in a net reduction in deforestation.

“Say you’re cutting down the trees to grow soy beans,” says Searchinger. “The demand for soy beans hasn’t gone away, so somebody else does it.”

Even when credits linked to afforestation (where new trees are planted in areas where there were no trees before) or capturing carbon in soil are credible, their impact only lasts as long as the trees are not cut down or the fields are not tilled.

“Nature-based carbon solutions are inherently temporary,” notes Peter Elwin, head of the ***land*** use programme at Planet Tracker, a think-tank focused on financial markets and planetary resources.

But Elwin, Maddox and others argue that, while flawed, carbon credits linked to soil carbon or afforestation can contribute to reducing global greenhouse gases.

“It’s recognised in most IPCC [Intergovernmental Panel on Climate Change] scenarios that there needs to be some level of carbon sequestration to meet our ***targets***,” says Maddox.

However, he warns against seeing offsetting purely in terms of climate change. “Nature-based solutions, focused on forestry and ***agriculture***, can be cost efficient and they have lots of other benefits,” he points out, since they also contribute to everything from soil quality to water conservation and biodiversity. “If you just look at [carbon offsetting] through a climate lens, you might conclude that it’s not worth doing, If you look through a wider lens, it’s definitely worth doing.”

One initiative taking this wider approach is the Ecosystem Services Market Consortium. It is developing a trading system, expected to launch in 2022, that will support and incentivise farmers to improve soil health, by enabling them to sell carbon credits based on achieving such improvements.

Debbie Reed, ESMC’s executive director, stresses that the programme’s impact goes beyond its ability to generate carbon credits. Practices that aid the sequestration of carbon in the soil, she explains, also improve its water-holding capacity, making it more resistant to drought and erosion.

“That water-holding capacity reduces need for water use such as irrigation,” she says. “And, if you have healthy soils, reducing your fertiliser inputs, you can reduce the leaching of nitrogen and phosphorus into ground and surface water.”

Like others, though, Reed believes accountability must accompany the development of the offset market.

“We are very concerned about integrity and credibility,” she says. “So our protocols are developed to meet all market standards . . . and we use third-party verification in all instances.”

Other efforts are being made to ensure offsets have more credibility, allowing the market to play a bigger role in greenhouse gas reduction. The Taskforce on Scaling Voluntary Carbon Markets, co-founded by Carney, is developing recommendations for increasing transparency and verification in the voluntary markets.

“If you do it through a legitimate structure, properly verified, with a nature-positive impact and as part of comprehensive carbon reduction, that’s a good thing,” says Elwin.

**Load-Date:** July 13, 2021

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[***Almost everything you need to know about carbon capture technology***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62FB-VXD1-JBNF-W2CJ-00000-00&context=1516831)

The Independent (United Kingdom)

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**Section:** INDEPENDENT PREMIUM,LONG READS; Version:2

**Length:** 2923 words

**Byline:** Andy Martin

**Highlight:** Elon Musk is offering $100m to create the best carbon capture technology but the truth is there are already many ways we can capture harmful carbon out of the air, writes Andy Martin

**Body**

If you could go back in time and reverse the history of the 20th century, where would you start - and where would you stop? Bump off Hitler perhaps (and/or Stalin/Pol Pot, etc). Maybe save JFK. Call a halt to the Holocaust. Or, bearing in the mind the climate change catastrophe that is now upon us, what about trying to stop the juggernaut of the oil industry in its tracks, neutralise Exxon, Esso and BP, and thereby cool global warming?

The good news is that this science fiction fantasy - a kind of palindromic history - is starting to happen: at least the last bit. It is now possible to rewind the movie and put [*fossil fuels*](https://www.independent.co.uk/topic/fossil-fuels) right back where they came from and were safely stored for millions of years, in the interior of the Earth, not flowing and floating around the exterior. The nascent [*carbon capture*](https://www.independent.co.uk/topic/carbon-capture) industry is plucking [*CO2*](https://www.independent.co.uk/topic/co2) right out of the air and diverting it down other much safer avenues (in the business, "***removal***" refers to extracting molecules already in the atmosphere, whereas "capture" operates on the source of ***emissions***; I use "carbon capture" to include both).

Obviously we have been talking about it - from Hollywood to Holyrood. But the point about carbon capture is that it is moving out of the realm of pure talk and into the more important realm of people who are actually doing it.

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* Scientists race to track shrinking carbon-store sea meadows

I recently spoke to a finance specialist about carbon capture and he said that it was great, and it would happen, but there was as yet no way to make it commercial - "costs are prohibitive". But it turns out he's wrong - it's already happening and it's now possible to make it work economically too.In 2007 Richard Branson launched his Virgin Earth Challenge, offering a prize of $25m for the best carbon capture technology company. Ten thousand wannabes stepped forward. In 2019, Branson shut the scheme down, having handed out no prizes. But in January this year, Elon Musk launched a new climate beauty contest, offering a full $100m to serious carbon capturers, able to pull at least a ton a day out of the air or the ocean. This time somebody has to win, I reckon. And there is no shortage of contenders. Momentum behind new kinds of carbon-munching tech has been building in 2020. In the pre-industrial revolution era, atmospheric CO2 stood at around 280 parts per million. When we started measuring it in 1958 14,000 feet up at the beautiful Mauna Loa mountaintop observatory in Hawaii, it was 316 ppm; now it's well over 400; in another 50 years we will hit 500 (if we follow the "Keeling Curve"). Bill Gates estimates 51 billion tons (US) of greenhouse gases per annum going up in smoke. Temperatures will keep soaring, ***forests*** will keep burning, islands will go under, glaciers will melt, corals will die and jellyfish will take over the oceans. Unless we can do something about it. Very few companies actually want to emit greenhouse gases - and least of all to be known as dirty. Everyone (eg Patagonia, Unilever, Ikea) is running around trying to reduce their carbon footprint, minimising the amount of ***emissions*** and offsetting like mad. But the fundamental reality is we will never reduce it quite enough in this century. Look at all those industries (like steel and cement) who basically can't eradicate their dependence on fossil fuels. So we have no option but to claw back the CO2 out of the atmosphere where it ends up if we want to keep increased warming down to 1.5 degrees (the maximum proposed by the Intergovernmental Panel on Climate Change). The simple but inescapable equation is that "if we want to get to net-zero we have to subtract as much CO2 as we are adding", says Albert Howard, head of sustainability at Sourceful.Think of all those old movies in which oil is gushing up out of the ground. Now rewind the film. Shove the black stuff back in againNo one has yet captured the Elon Musk prize, but three outstanding carbon capturers from around the world have recently been spotlighted by Sourceful Climate. "We're pointing the way," says Howard. Sourceful do good things to the supply chain, helping other companies to clean up their act and source the right stuff to make their products more sustainable. They are already shrinking carbon footprints. Now they have backed their three carbon ***removal*** companies, nominated by an independent panel of academics, with an offer of 1:1 funding to match other contributions. One of them, Greensand, based in the Netherlands, has already been around for a few years. It began back in 2008 when Eddy Wijnker went to the Beijing Olympics. Wijnker had started off as lead guitar in a Dutch rock band but morphed into a sound engineer. He was supposed to be in Beijing to keep an ear on the sound systems, but he got sidetracked by a green stone that nearly hit him on the head in the middle of an earthquake. That stone turned out to be olivine. Olivine is a naturally occurring mineral - it makes up some 25 per cent of the Earth's crust - but Wijnker discovered that it has the wonderful property (like trees) of being able to absorb CO2. For the last 12 years Wijnker has been trying to persuade the world to replace the use of sand and stone with olivine. And it looks as if he is succeeding. Rotterdam has bought 16,000 tons for its railroad and bus paths. Every ton of olivine will ***remove*** a ton of CO2. But everyone can chip in, no matter how humble. You can buy a two kilo bag of olivine for your back garden for around 5 - thereby capturing two kilos of CO2. You can have a rock garden or a gravel path made out of greensand. Wijnker has a vision of the beaches of the future that have - literally and metaphorically - gone green. It's not quite a world in a grain of greensand, but it's close.The process of carbon capturing already happens in nature but it's slow. "For three billion years the planet has been doing that. We just need to do it more." Wijnker has sped it up by grinding olivine down to fragments or sand - greensand. The smaller the stone the faster the sequestration. All that is needed is rain to persuade the carbon dioxide to bond with the stone. And it's good for your plants too since it releases magnesium and silicate. "If everyone sprinkles a bit of it we solve the problem," says Wijnker. Or as Professor Olaf Schuiling (Wijnker calls him his "spiritual father") puts it in his book, Olivine, the Philosopher's Stone, "Let the Earth help save the Earth." You don't have to be a rocket scientist to work on carbon capture, but it probably helps. Fortunately, Shaun Meehan is a rocket scientist, or was until recently. Meehan started off as a teenager working in a laser lab for fun. And he spent a couple of years at the South Pole, before joining Planet Inc and launching satellites and designing his own rocket. Now, as chief scientist heading up R&D at Charm Industrial, his focus is more terrestrial. Where Greensand was simple and low tech, Charm is more complex and definitely higher tech and, not surprisingly, based in San Francisco. "I love tech," says Meehan. "I'm constantly working on this stuff." He and his girlfriend, Kelly Hering (a mechanical engineer and CTO at Charm), like to discuss hardware and software over lunch and restore old robots in their spare time. Behind them they have a team of 12 "kind engineers" who are highly "mission-motivated".Think of all those old movies (or even The Beverly Hillbillies) in which oil is gushing up out of the ground. Now rewind the film. Shove the black stuff back in again. That's what Charm are doing with their "bio-oil sequestration". We need to remember that a lot of carbon is already captured in soil and plants. So-called "biomass" is grass or wood or ***agricultural*** waste from farms and backyards. "People have tried to make it work as a fuel," says Meehan. "Our discovery was that it doesn't have a high energy content but it does have a high carbon content." Their technique consists of taking biomass and converting it into oil and then re-injecting that back into the Earth's crust whence it came. All those old oil wells can be re-utilised - but in reverse, in what is known as "negative ***emission***". Ironically, there is a symmetry between Charm and the system they are trying to replace. "We have the same architecture," says Meehan. "In the US there's a ton of jobs dependent on oil and gas. We can help re-tool those industries. The oil trucks don't go away. As they fade out we ramp up and use those very same people to do similar jobs, but it's like the opposite. Fuel tankers - and tanker drivers - will still be needed to transport oil around on its way back."That is the dream. They have already delivered 4,000 tons of negative ***emissions***. Their first customer was Stripe, the online payment company. But there are technical challenges every step of the way. They had their best brains working on the problem of how to get grass to flow through a hopper (ultimately coming up with a motorised system involving a lot of good vibrations). They can produce hydrogen too, but it has to be compressed - and that requires energy (and expense). It's also not pure but it might work for industrial facilities. Bio-oil by contrast is dense and sludgy and easy to transport. At present one ton of CO2 costs $600 to ***remove***. The vision is to build a reactor or reactors around the country that are capable of working on the gigaton scale, which will bring the cost right down - to $100, perhaps to as low as $50 a ton. "We anticipate tech developments that will enable us to bridge that gap," says Meehan. "The way I look at it, there's a weird disconnect in the way society looks at the cost of carbon. We're extracting carbon from the atmosphere at the current price point. It should go hand in hand with what it costs to put it there in the first place." The third company backed by Sourceful is Heirloom, also based in San Francisco. They favour a system of "direct air capture with carbon mineralisation". The founder of Heirloom is Shashank Samala, who was born in Hyderabad, studied at an Ivy League university, and set up Tempo Automation - building robots to build circuit boards. Then he read the Intergovernmental Panel on Climate Change report in 2018 and decided he had to do something about it. His head of commercialisation, Max Scholten, sums up the technology they zeroed in on: "We pull carbon dioxide from the air and turn it into stone." Heirloom uses low cost minerals and processes them into a form that reacts with CO2. They have a system that takes the process down from years to days. Then they heat up the stones to extract the carbon and pump it underground. "It will remain there for thousands of years."So we have a way of storing or utilising carbon, but do we in the UK have a shot at capturing CO2 right from the off?Heirloom is something of a synthesis of Greensand and Charm. It's a more charming Greensand. Scholten says that planting trees is "incredibly important for biodiversity, but trees are only a temporary solution to storage". Trees die or burn in fires and then release their stores of carbon. What Heirloom calls "high quality carbon ***removal***" has to be durable and scalable. One advantage of their approach is that they have to extract the minerals in the first place, but since it can be recycled they don't have to keep on extracting. So they minimise the mining.After spending millions on R&D, Greensand turned a profit for the first time in 2020. Carbon capture companies have three main commercial avenues. First, the "voluntary buyers", tech companies like Shopify, Amazon and Microsoft that want to decarbonise and are willing and able to invest in carbon ***removal*** and offsetting. It's not all about goodwill or enhancing the brand. As Scholten says: "For businesses to exist in 100 years we have to solve climate change." Secondly, it's easier in California where the "low carbon fuel standard" not only regulates fuels but also incorporates a protocol offering tax credits in exchange for carbon capture. But similar carbon compliance regulations are springing up around the world, from Canada to China. The third way is "carbon utilisation". Charm and heirloom produce liquefied CO2 gas that can be used in making cement, carbon fibre and industrial diamonds. One British company that could be using some of their excess carbon is Econic, based in Macclesfield. They don't do carbon capture but carbon storage, putting it into useful things like mattresses and insulation and running shoes and skateboard wheels. "We make good products better," says Keith Wiggins, their new CEO. They re-use existing carbon molecules rather than digging up new ones. Wiggins is a chemist by training, so he would say this, wouldn't he, but he is surely right to say, "You can do things with chemistry". The trouble with carbon dioxide, he points out, is that it is "a very stable molecule". It can stick around in the atmosphere for thousands of years. Now they have found a way of stitching it on the back of polymers, he reckons that "one year's production of one average size plant is the equivalent of planting 1.2 million trees". Econic can also retrofit existing producers and Wiggins reckons there are hundreds of plants around the world that can easily be adapted to use Econic tech. "Eventually the oil wells are going to fill up - so you have to do something with it [the spare CO2]." So we have a way of storing or utilising carbon, but do we in the UK have a shot at capturing CO2 right from the off? The good news is that the UK has its own answer to San Francisco in the shape of Leeds, and specifically the chemistry department of Leeds University, which is where C-Capture was born. C-Capture uses a solvent - cheap and readily available - that absorbs CO2; they can then siphon it off and bury it or sell it to Econic. The distinctive feature of their system is that it can hitch up to power plants and other forms of heavy industry and capture the carbon before it can get out and start wreaking havoc (but they can also do ***removal***). Most of the people working there are graduates of the Leeds chemisty department, notably their head of chemistry, Dr Douglas Barnes, who is a graduate student of Professor Chris Rayner, who started the whole thing back in 2009. Barnes came up with the novel chemistry that underpins their methodology. "I was at a presentation and I was mainly staring out of the window, thinking about the carbon capture problem. But there was a slide or a piece of information that set the cogs in my brain whirring. I came into work the next day and we set up an experiment and got a positive result." The Barnes "flight of fancy" (in his words) was back in 2013. Now C-Capture is garlanded with green energy prizes, backed by a multimillion grant from the Department of Business, Energy, and Industrial Strategy, and is even now soaking up CO2 from the Drax power stations. They have a short-term ***target*** of capturing 10,000 tons per day per site. But their longer-term vision is of CCUS (carbon capture utilisation and storage) "clusters" scattered around the four corners of the UK and bestriding assorted industries, connected by pipelines. C-Capture reckon that around 200 years-worth of ***emissions*** can be shoved a couple of kilometres down beneath the seabed, making use of empty gas and oil fields. The C-Capture technology is to be featured in an exhibition at the Science Museum (whenever it opens) on "Our Future Planet". This is tomorrow's world, but to some extent the future is already here.Read More:

* India demands largest historic carbon emitters take responsibility

1. ***Forests***' vital carbon-storing abilities 'failing due to wildfires'
2. EXPLAINER: The real math behind "net zero" carbon ***emissions***

The race is on. I wonder if the bookies have odds on who is most likely to cross the Elon Musk $100m line first. Maybe all the inspiring up-and-coming companies I've mentioned above could be winners. But in any case it is clear that there is no one solution to the problem of reducing CO2 in the atmosphere. The fact is everything is still evolving in the field. Anything could happen. Private enterprise and the public sector are converging. The tech is getting better all the time and the economics of it is making more and more sense. As Helen Atkinson, another of the Leeds graduates at C-Capture, said to me, "It's expensive, but if you compare it to the cost of doing nothing, it's a bargain."

This is not a Pangloss story - I am not arguing that this is the best of all possible worlds. We are already severely messed up. If my figures are right, at present we only have an annual 50 billion or so tons of CO2 and other assorted noxious gases left to worry about. So there is a way to go to achieve net-zero. We are not talking about utopia. But neither are we looking at apocalypse now.

As Douglas Barnes puts it: "***Emissions*** are embedded in everything we do, from the moment we get up to the time we go to bed. We need to rethink everything." But he describes himself as "a climate optimist" and expects to see a decline in our ***emissions*** over the next decade or two. In theory we can capture 95 per cent of the carbon dioxide we emit. We have the resources and the ingenuity to fix things. Our [*climate crisis*](https://www.independent.co.uk/topic/climate-crisis) is not yet terminal. We can still rewind.

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[***Beginning Session, Forum Releases Global Forest Goals Report, as Speakers Underline Ways Conservation Can Be Used to Build Back Better***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62J8-P4D1-JDG9-Y1J8-00000-00&context=1516831)

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**Body**

New York: The United Nation has issued the following press release:

The Forum on ***Forests*** began its sixteenth session in a virtual format today with the launch of its inaugural Global ***Forest*** Goals Report, as speakers highlighted the myriad ways in which the world’s ***forests***, if sustainably managed, can contribute to “building back better” from the COVID-19 pandemic while also achieving the Sustainable Development Goals.

Billed as the Forum’s flagship publication, the 98-page Global ***Forest*** Goals Report — produced by the Department of Economic and Social Affairs and based in large part on 52 voluntary national reports — is the first-ever snapshot of where the world stands in implementing the 6 global ***forest*** goals and 26 ***targets*** set out in the United Nations Strategic Plan for ***Forests*** 2030, which the Forum adopted at a special session in 2017. That Plan is deemed integral to achieving the broader 2030 Agenda for Sustainable Development.

***Forests*** cover 31 per cent of the Earth’s ***land*** surface, or more than 4 billion acres, absorbing roughly 2 billion metric tons of carbon dioxide every year. But, while the pace of deforestation has slowed, the world still is still losing 20 million hectares of ***forest*** every year, notably to large-scale ***agricultural*** production. The biggest declines are in Africa and South America, while net increases in ***forest*** areas since 1990 have been seen in Asia, Europe and Oceania, the report says.

Also before the Forum today was a note of the Forum secretariat on COVID‑19’s impact on ***forests*** and the ***forest*** sector. It found that, globally, the pandemic has aggravated hardship among ***forest***-dependent people, including job losses and lower incomes and remittances. On the other hand, it determined that sustainable ***forest*** management can offset many of the pandemic’s social, economic and environmental impacts, such as poverty and widening inequality. ***Forest***-based solutions should therefore be part of post-pandemic recovery plans, it stated.

“We have our work cut out to meet these challenging times,” said Amina Mohammed, Deputy Secretary-General of the United Nations, at the start of a high‑level round table devoted to COVID-19 and ***forests***. While the coronavirus has been a major setback, it is also an opportunity to recover better, and make peace with nature using the Paris Agreement on climate change and the Sustainable Development Goals. ***Forests*** are ready-to-go solutions, she said, calling for greater investment in ***forest*** conservation, especially in those countries which face a debt crisis aggravated by the pandemic.

Kitty Sweeb (Suriname), Forum Chair, said that the pandemic’s adverse effects have reversed many of the hard-won gains made towards achieving the Sustainable Development Goals. At the same time, however, it has underscored the need for international cooperation. In that context, ***forests*** provide many socioeconomic and environmental benefits, together with immense potential for addressing global crises, she said.

Munir Akram (Pakistan), President of the Economic and Social Council, said that reforestation and nature-based solutions will be central to a post-pandemic recovery that is sustainable, inclusive and resilient. Halting and reversing deforestation can reduce the risks and conditions that lead to the spread of zoonotic diseases, such as COVID-19, he said, adding that it is also essential to identify potential scientific and technological breakthroughs needed to achieve the Sustainable Development Goals.

Volkan Bozkir (Turkey), President of the General Assembly, pointed out the many ways in which COVID-19 brought home the risks of human encroachment of the natural world. “Clearly, our world is telling us that there is a problem in our relationship with nature,” he said, calling on the international community to focus on symptoms rather than underlying conditions — with ***forest*** protection being one of the clearest and easiest solutions available.

The Director-General of the Food and ***Agriculture*** Organization (FAO), the Executive Secretary of the Convention on Biological Diversity, and senior officials of the United Nations Convention to Combat Desertification, United Nations Framework Convention on Climate Change (UNFCCC) and the Pulp Manufacturers Association of South Africa also spoke at the start of the high-level round table, which was followed by an interactive dialogue.

The Forum — which is meeting over four days via video-teleconference — also held a panel discussion today to mark the launch of the Global ***Forest*** Goals Report 2021, with Liu Zhenmin, Under-Secretary-General for Economic and Social Affairs, delivering opening remarks. In addition, delegates heard the introduction of documentation under the various agenda items of its current session.

The Forum on ***Forests*** will reconvene at 9 a.m on Tuesday, 27 April, for panel discussions on, among other things, thematic priorities for 2021-2022 in support of the implementation of the Strategic Plan for ***Forests*** and interlinkages between the global ***forest*** goals and the Sustainable Development Goals.

Elections of Officers

KITTY SWEEB (Suriname), Forum Chair, recalled that through a silence procedure that expired without object on 2 July 2020, the Forum elected her as Chair, and Javed Momeni (Iran) and Jesse Mahoney (Australia) as Vice-Chairs, of its sixteenth and seventeenth session.

She also recalled that the Forum, through a silence procedure that expired on 14 April 2021, adopted an oral decision to elect Musah Abu-Juam (Ghana) and Tomasz Markiewicz (Poland) as Vice-Chairs of is sixteenth and seventeenth session, and to appoint Mr. Momeni (Iran) to serve concurrently as Rapporteur of those same two sessions.

Organization of Work

Ms. SWEEB recalled that, through a silence procedure that expired without objection on 14 April, the Forum decided to adopt two oral decisions containing the provisional agenda (document E/CN.18/2021/1) and the provisional organization of work of its sixteenth session. She added that a concise Chair’s summary of the highlights of the sixteenth session will be shared with delegations towards the end of the week with a view to receiving comments and factual corrections. That summary, also containing a summary of Forum discussions, will serve as input to the 2021 high-level political forum on sustainable development, taking place from 6 to 15 July at Headquarters under the auspices of the Economic and Social Council.

Emerging Issues

ALEXANDER TRIPELKOV, Officer-in-Charge of the United Nations Forum on ***Forests*** secretariat, introduced the note by the secretariat titled “Impact of the pandemic on ***forests*** and the ***forest*** sector” (document E/CN.18/2021/7). Noting that the Forum was among the first intergovernmental bodies to assess the impact of COVID-19 on ***forests***, he explained that the present note is an overview of the key findings of initial assessments based on regional studies. Among other things, it found that, globally, the pandemic aggravated hardship among ***forest***-dependent people, including job losses, lower incomes and remittances, and increased physical isolation. This resulted in less investment, less revenue and higher costs for ***forest*** companies, especially small and medium-sized enterprises. It also found that sustainable ***forest*** management can offset many of the social, economic and environmental impacts of the pandemic, such as poverty and widening inequality. ***Forest***-based solutions should therefore be part of post-pandemic recovery plans.

The note recommends a renewed commitment to internationally agreed ***forest*** goals and ***targets***, the implementation of which should be accelerated, he said, pointing in particular to the United Nations Strategic Plan for ***Forests***, which dovetails with the 2030 Agenda for Sustainable Development. As the world focuses on recovery and resilience-building, there is a unique opportunity to promote ***forests*** as a nature-based solution to global challenges, including climate change and biodiversity loss. He went on to say that post-pandemic efforts must be matched by adequate resources. The role of official financial flows for ***forests*** is more important than ever, as well as capacity-building and multi-stakeholder partnerships, he added, calling for a renewed commitment to live in harmony with nature and to galvanize action for ***forests*** and the people who depend on them.

Round Table

The Forum then held a high-level round table on major ***forest***-related developments followed by an interactive dialogue. Moderated by Ms. Sweeb, it featured statements by Mr. Akram; Volkan Bozkir (Turkey), President of the General Assembly; Amina Mohammed, Deputy Secretary-General of the United Nations; Qu Dongyu, Director-General of the Food and ***Agriculture*** Organization (FAO); and Elizabeth Maruma Mrema, Executive Secretary of the Convention on Biological Diversity.

Tina Birmpili, Deputy Executive Secretary of the United Nations Convention to Combat Desertification; Donald Cooper, Director, Transparency Division, United Nations Framework Convention on Climate Change secretariat; and Jane Molony, Executive Director, Pulp Manufacturers Association of South Africa, spoke as lead discussants.

Ms. SWEEB said that the adverse effects of the COVID-19 pandemic have reversed many of the hard-won gains made towards achieving the Sustainable Development Goals. At the same time, it has underscored the need for international cooperation, she said, stressing the need for greater and faster efforts to achieve the Goals and the global ***forest*** goals. In this context, ***forests*** provide many socioeconomic and environmental benefits. They also have immense potential to address global crises. In addition to their critical role in combating climate change, ***forests*** are home to 80 per cent of the world’s biodiversity in terrestrial ecosystems. Moreover, ***forests*** and mountains provide 75 per cent of all freshwater resources. Today’s round table is an opportunity to promote multilateral actions in sustainable ***forest*** management and to maximize the contribution of ***forests*** to addressing planetary challenges. It will also be an occasion to express collective will to chart ***forest***-based solutions for a sustainable and inclusive recovery from the pandemic, she said.

Mr. AKRAM, underscoring the pandemic’s sweeping impact alongside an ongoing environmental crisis, said that a global recovery must be sustainable, inclusive, and resilient. “Reforestation and nature-based solutions will be a central part of such a sustainable development model,” he said, adding that halting and reversing deforestation can reduce the risks and conditions that lead to the spread of zoonotic diseases such as COVID-19. He cited his country’s Clean and Green Pakistan programme and its “10 billion tree tsunami” initiative as a successful example of reforestation. Financing for sustainable ***forest*** management must be part of efforts to boost liquidity in the global economy, he said, adding that sustainable ***agriculture*** and ***forest*** management goes hand in hand with sustainable infrastructure investments. It is also essential to identify potential scientific and technological breakthroughs needed to achieve the Goals.

Mr. BOZKIR, pointing out the many ways in which COVID-19 brought home the risks of human encroachment of natural world, noted high rates of species extinction and increased global warming. “Clearly, our world is telling us that there is a problem in our relationship with nature,” he said, calling on the international community to focus on symptoms rather than underlying conditions. ***Forest*** protection is one of the clearest and easiest solutions to this, he said, noting their beneficial effects on rainfall patterns, carbon absorption and purification of air and water. Protecting such a multifaceted resource is an obvious solution, he said, calling on policymakers to approach COVID-19 recovery the right way. It is vital to ensure that the Sustainable Development Goals and other related global agendas serve as a blueprint for a more resilient world. The Organization will assist these efforts by supporting the building of political momentum through a series of high-level meetings, he said, highlighting the dialogue on desertification to be held in May. Calling for coordinated environmental action to maximize the impact of collective commitments, he said that 2021 should be the beginning of “a new decade of ecosystem restoration”.

Ms. MOHAMMED, noting the importance of ***forests*** to global freshwater resources and biodiversity, said that, each year, 10 million hectares of ***forests*** are destroyed, an area larger than the United Kingdom. If tropical ***forest*** loss was a country, it would be the third largest emitter of carbon dioxide, she said, adding that “we have our work cut out to meet these challenging times”. While COVID-19 represented a major setback, it is also an opportunity to recover better, and make peace with nature using the Paris Agreement on climate change and the Sustainable Development Goals. ***Forests*** are ready-to-go solutions, she said, identifying financing as an important area for action. Countries must be able to unlock investments for ***forest*** conservation, especially countries that are hampered by the debt crisis. Highlighting the Central African ***Forest*** Initiative for its work at the community level, she said that building ***forest*** consolidation into COVID-19 recovery is a win-win. Every job created in the ***forest*** economy generates 1.5 to 2.5 jobs in the wider economy, she noted, calling on the international community to move from an era of negotiations into a decade of action.

Mr. QU said that healthy ***forests*** are key to building back better, yet deforestation and ***forest*** degradation are still having devastating impact on the environment and on people’s lives. According to FAO’s 2020 Global ***Forest*** Resources Assessment, the world is losing 10 million hectares of ***forest*** each year through deforestation, mostly due to the expansion of ***agriculture***. At the same time, ***land*** degradation affects almost 2 billion hectares — an area larger than South America. Fortunately, solutions are at hand, he said, emphasizing that increasing ***agricultural*** protection and halting deforestation are not mutually exclusive. Flagging the Secretary-General’s “Turning the Tide on Deforestation” initiative, he said that more investment in ***forests*** through stimulus packages can contribute to post-pandemic economic recovery and provide millions of green jobs. He also stressed the need for partnerships, noting that the Collaborative Partnership on ***Forests***, which FAO chairs, brings together 15 international organizations as it helps countries to protect, restore and sustainably manage their ***forests***. “Our generation must be the one that halts deforestation, biodiversity loss and climate change,” he said. “Let’s make it happen”.

Ms. MREMA emphasized the way that deforestation, ***land*** conversion, degradation and unsustainable use of ***forest*** products — together with climate change — are pushing people into closer contact with pathogens. Many interacting pressures foster the potential for new channels of transmission and for new diseases to emerge. “Protecting, restoring and sustainably using ***forests*** is key to ‘building back better’ and guarding ourselves against new pandemics,” she said. Some progress has been recorded under the United Nations Strategic Plan for ***Forests*** and the Aichi Biodiversity ***Targets***, with the rate of deforestation lower than it was in the previous decade and more than 30 per cent of all tropical rainforests, subtropical dry ***forests*** and temperate oceanic ***forests*** now located within protected areas. However, deforestation is accelerating in places, loss of primary ***forest*** continues and much of what we have retained is fragmented, he said. “Reversing these trends must be our utmost priority. ” Noting the start of the United Nations Decade on Ecosystem Restoration, as well as the fifth Global Biodiversity Outlook, published in August 2020, she said that a global focus on natures requires greater ambition and to make full use of opportunities presented by the ***forest*** sector to put the world back on a greener, more sustainable track.

Ms. BIRMPILI said that people who are lucky enough to live in or close to ***forests*** know about their incredible biodiversity and immediate restorative power. ***Forests*** contribute to human and planetary health far beyond their confines by absorbing carbon dioxide, stabilizing rainfall patterns, lowering temperatures and protecting against desertification, sandstorms, dust storms and drought. They can also slow or buffer the spread of zoonotic diseases. However, humanity is still decimating ***forests***, and while the pace of ***forest*** loss is declining, “killing something a little bit slower is not a victory”. Renewed and healthy ***forests*** can, and must, be part of the solution to the many crises our planet faces and now is the time to bring ***forests*** back to life. The way forward includes stronger commitments to ***forest*** restoration in updated pledges under the Paris Agreement, meeting ***land*** restoration commitments under the United Nations Convention to Combat Desertification and by agreeing on a more ambitious biodiversity framework later in 2021. An important short-term opportunity lies in pandemic‑recovery spending, she said, pointing to estimates which suggest that every United States dollar invested in restoring degraded ***forests*** can yield $7 to $30 in economic benefits.

Mr. COOPER said that ***forests*** today are under enormous stress. Deforestation is reducing ***forest*** area in many regions and climate impacts on ***forests*** — including ***forest*** fires, pests and droughts — can be seen all over the world. Initial data meanwhile shows that COVID-19 is adding to the pressure as ***forest*** resources are used as a buffer in times of low legal enforcement and high economic distress. “We must all work together to limit the impact of climate change, and we must also help ***forests*** to adapt to climate change that is already unavoidable. ” If we do so, ***forests*** can continue to provide multiple benefits, including for climate adaptation and mitigation. Properly managed ***forests*** can have the potential to ***remove*** between 2.8 and 26.9 gigatons of carbon dioxide from the atmosphere every year, he said, adding that the difference of 24 gigatons in that estimate is greater than the entire CO2 ***emissions*** of North America, Europe and China combined.

Realizing at least some of that ***forest*** mitigation potential requires overcoming several interrelated challenges and barriers, such as a lack of proper institutions, poor governance, accessibility to finance, ***agricultural*** expansion and poverty, he said. On the other hand, proper implementation can ensure multiple benefits and ecosystem services that contribute to the Goals and various international conventions. Key to improved foreign management is proper data to inform decision‑making and to prove that actions are yielding results, he said, drawing attention to the United Nations Framework Convention on Climate Change secretariat’s enhanced transparency initiative. He went on to underscore the role that the private section can play, adding, however, that attracting its participation will require coherent policies for sustainable ***forest*** management.

Ms. MOLONY said that, during the pandemic, almost all countries treated the ***forest*** product sector as an essential service, testifying to its valued role in society. “Sustainably managed ***forests*** and production of ordinary and innovative products from wood, rather than products from fossil-based materials, can drive global economic and environmental recovery. ” She emphasized the need to support research into drought, pests and disease; to promote the use of certified timber, with certification made more accessible to small-scale growers; and increased consumer understanding that would, in turn, lift demand for responsibly sourced wood and fibre-based products. She also called for Government policies which provide practical regulatory frameworks which minimize environmental impacts and maximize the economic benefits of ***forest***-based green value chains. Citing several examples of good practices, she said that, in Burkina Faso, farmers are using a centuries-old technique to grow trees in drought-stricken areas, while in South Africa, the Sappi Khulisa project gives seedlings, technical assistance and interest-free loans to small-scale farmers, together with a guaranteed market for the timber harvest. Meanwhile, pension fund and asset managers are finally viewing investment in forestry as “a good green bet”. Such initiatives give hope, but more must be done and without delay, she said, adding: “Let’s build back better by building with wood, the ultimate renewable. ”

In the interactive dialogue that followed, speakers raised concerns about the effects of COVID-19 on ***forests*** and shared national experiences in their sustainable management. They also welcomed the Forum’s work towards the second assessment of the pandemic on sustainable ***forest*** management.

The representative of Slovenia called on the international community to overcome the conflict between the economic and environmental functions of ***forests*** and highlighted his country’s expertise in close-to-nature forestry.

The representative of the European Union, noting the close link between ***forest*** health and human health, lauded the Forum for its work in assessing the current scenario and identifying solutions. Stressing the importance of preventing pandemics while also tackling poverty and food security, he voiced the bloc’s commitment to including sustainable ***forest*** management in COVID-19 recovery.

The representative of Honduras pointed out that 65 per cent of his country’s territory is covered by ***forests***, with 41 per cent declared protected area. The public and private sector are actively engaged in the ***forest*** restoration project and in tackling the consequences of climate change. His Government has led groundwater restoration projects and pays special attention to tackling ***forest*** fires in its national reconstruction plan.

The representative of Indonesia highlighted improved reforestation rates in his country, also expressing commitment to “a balanced approach”. He noted that his Government is establishing various recovery policies to stimulate the economy, including by supporting timber-based industries and accelerating development of community ***forests***.

The representative of Germany, pointing out that recreational visits to ***forests*** have doubled in her country, said that woodlands contribute sustainably and inexpensively to climate neutrality. Given the increase in extreme weather events related to climate change, Germany is investing in ***forest*** solutions, she said, calling on the international community to scale up private sector involvement in sustainable supply chains.

The representative of the United States said that her country’s COVID-19 recovery plan pays attention to the conservation of ***lands*** and ***forests***. Natural ecosystems are essential for addressing sustainable economic development, disaster risk mitigation and human well-being, she said, spotlighting the 2020 American Outdoors Act. Her country re-joined the Paris Agreement, she noted, adding that good governance, in partnership with indigenous peoples, is critical for addressing habitat loss and ***land*** degradation.

The representative of China said that the pandemic has had a huge impact on his country’s ***forest*** industry, as well as ecotourism. The Government is addressing this through policies specific to local conditions, he said, adding that ***forest*** restoration and management is getting back to normal, thanks to the effective containment of the pandemic. In the post-pandemic era, it is especially vital to promote employment and poverty alleviation in ***forest*** areas, hand in hand with good forestry practices, he said, voicing China’s commitment to achieving carbon neutrality by 2060.

The representative of Kenya said that his country has instituted various policies to integrate sustainable ***forest*** management into its pandemic recovery plan. Activities such as environmental clean-up in ***forest***‑adjacent areas and tree planting are providing vulnerable groups in his country with income, he said.

LIU ZENHMIN, Under-Secretary-General for Economic and Social Affairs, delivering closing remarks, highlighted some key messages from the discussion. Among other things, sustainable ***forest*** management should be integrated into post‑pandemic recovery strategies. The ***forest*** sector, including agroforestry, can play an important role in addressing unemployment and food insecurity. He underscored the potential of ***forests*** to provide social protection, especially for vulnerable groups, adding that healthy and resilient ***forests*** are vital for effective ecosystem management in the post-pandemic era. He also stressed the importance of improving the interface between science and policy, as well as adequate funding and data analysis, to lower the risk of future pandemics. Stronger intersectoral collaboration is also key to ensuring optimal and efficient ***land***-use planning.

Global ***Forest*** Goals Report 2021

The Forum then began the launch of the first edition of its flagship publication, Global ***Forest*** Goals Report 2021.

Mr. MAHONEY said that the Report, based on voluntary national reports from 52 Member States, marks the first time that the Forum has produced a publication of such depth. It showcases how countries around the world are taking action in support of the 2017 United Nations Strategic Plan for ***Forests*** and integrating ***forests*** into their sustainable development efforts. While the data therein was collected prior to the start of the pandemic, the Report underscores the pressing need to strengthen sustainable ***forest*** management in all countries and regions, she said.

Mr. LIU said the report’s aim is to present an overview of progress so far, highlight where action is being taken and what challenges remain. It also features success stories which showcase best practices. During the pandemic, the ***forest*** sector provided essential health products, such as masks and cleaning supplies. ***Forests*** can also act as a buffer to counter the spread of disease. Investing in ***forests*** is investing in a better future, but, while the pace of deforestation has slowed, some 7 million hectares of ***forest*** are converted every year to other uses, such as large-scale ***agricultural*** production. There are also indications that the coronavirus is exacerbating ***forest*** management challenges. The pandemic has been a harsh wake-up call, but it also presents an opportunity to speed up efforts to meet the ***forest*** goals set out in the 2030 Agenda.

MARIA HELEN SEMEDO, Deputy Director-General, Food and ***Agriculture*** Organization, underscored the way in which the agency is supporting Member States’ efforts to collect, analyse and use ***forest*** data, including by strengthening national capacities for better and more transparent data and using the latest technologies to create engaging outputs and to tailor tools to the needs of individual countries and strategic partners. “Information, knowledge‑sharing and working together is vital. ” Combined with data from FAO’s Global ***Forest*** Resources Assessment 2020, the Report indicates that, despite many challenges, progress is being made towards all six global ***forest*** goals and their associated ***targets***.

Mr. TEPELKOV presented the Report’s key findings, saying that, overall, Member States are rising to the challenge of increasing the total area of the world’s ***forests*** by 3 per cent by 2030, following the Forum’s adoption four years ago of the United Nations Strategic Plan for ***Forests*** 2030. Asia, Europe and Oceania appear to be on track to meet that ***target***. Africa and South America, however, witness a loss of ***forest*** area, albeit at a slower rate than before. Generally speaking, the world as a whole is on track to maintain its ***forest*** carbon stocks. Many actions are being taken to reduce poverty for ***forest***-dependent people, but much remains to be done to measure their effects. As of 2020, nearly 18 per cent of the world’s ***forests*** were legally protected, with Africa, Asia and South America already exceeding Aichi Biodiversity ***Target*** 11. Most regions are on track to maintain or increase the area of ***forest*** subject to long-term management plans, while the area of certified ***forest*** has expanded along with the supply of wood from certified and other sustainably managed ***forests***.

The Report also found that many countries have mobilized increased financial resources for sustainable ***forest*** management, he continued. However, despite many initiatives to increase ***forest*** financing, assessing the scale of their impact is difficult. However, financing for ***forests*** remains below the level needed to achieve the global ***forest*** goals, he said, adding that the Forum’s Global ***Forest*** Financing Facilitation Network is working to address those challenges. Many steps have been taken to strengthen national and subnational ***forest*** authorities and to combat illegal logging and related trade. Overall, the report paints a vibrant picture of ambitious and inspiring action on the ground and around the world, although there are growing concerns that the global recession, especially in donor countries, will lead to reducing international public financing for ***forests***.

The Forum then held a panel discussion on the theme “Launch of the Global ***Forest*** Goals Report 2021”. Moderated by Mr. Mahoney, it featured presentations by Liu Xin, Deputy Director-General, National Forestry and Grassland Administration of China; Julius Kamau, Chief Conservator of ***Forests*** of Kenya; Maureen Whelan, Director, Canadian ***Forest*** Service; Davia Carty, Manager, Strategic Corporate Planning, Forestry Department of Jamaica; Boris Greguska, Chief State Counsellor, Ministry of ***Agriculture*** and Rural Development of Slovakia; and Mette Wilkie, Director, Forestry Division, FAO.

Ms. LIU said that China has seen huge growth in its ***forest*** cover since 1949, adding 105 million hectares in the past four decades alone. One quarter of the increase in the world’s green area has come from China, mostly due to reforestation efforts. That progress reflects the priority that the Government gives to environmental development. China’s national goals are highly consistent with the global ***forest*** goals as it aims to achieve 24.1 per cent national ***forest*** cover by 2025.

Mr. KAMAU described the various actions that Kenya has taken to improve the livelihoods of ***forest***‑dependent people and ***forest***‑adjacent communities. Those include the establishment of a ***forest*** investment facility which provides capacity development for farmers and revolving loans for small‑scale ***forest*** enterprises. It has also developed and implemented a human rights-based approach to ***forest*** protection and management.

Ms. WHELAN said that Canada has 347 million hectares, 95 per cent of which is public ***lands***, which facilitated reporting. Less than one half of 1 per cent of its ***forests*** are harvested each year, she said, adding that fires and insects have a greater impact. The size of Canada’s ***forests*** has remained stable in recent years. More than 200 million hectares of her country’s ***forests*** are under long‑term management plans and the proportion of ***forest*** products from certified ***forest*** ***lands*** has significantly increased.

Ms. CARTY said that 40 per cent of Jamaica is ***forested***, most of it privately owned. It is receiving financial and technical support from the Global ***Forest*** Financing Facilitation Network to develop financing strategies for sustainable ***forest*** management. Approval is pending for a four-year, $10 million programme, supported by FAO, that will focus on mangrove ecosystems. She added that budget allocation for the ***forest*** sector in Jamaica is limited and that greater capacity is needed to source and administer funding.

Mr. GREGUSKA said that, in the case of Slovakia, a major data‑gathering challenge is establishing a proper intersectoral dialogue that would facilitate common understanding among relevant sectors and institutions. Different sectors have different perspectives on what progress may or may not have been made. This is especially relevant for cooperation between the forestry and nature conservation sectors. He went on to express the hope that the Report will be a gamechanger in raising public awareness about sustainable ***forest*** management.

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[***What we must do to tackle the climate and nature crises together***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62WG-20D1-DY4H-K2NT-00000-00&context=1516831)

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**Length:** 1012 words

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**Highlight:** Daisy Dunne explores a major scientific report on how governments and citizens can help halt the destruction of the planet

**Body**

Humans and livestock account for nearly 96 per cent of the [*mammals*](https://www.independent.co.uk/topic/mammals) on the planet. That is just one of many staggering statistics included in a major report from more than 50 of the world's leading [*climate*](https://www.independent.co.uk/topic/climate) and [*nature*](https://www.independent.co.uk/topic/nature) scientists.

The peer-reviewed analysis warns that global temperatures are already up by more than 1C since the start of industrialisation, while more species are at risk of extinction now than at any other time in human history.

The report, the first collaboration from the UN authorities on the climate crisis and biodiversity loss, argues that both issues must be tackled together to be successfully solved.

Within its list of 41 recommendations, the report points to a range of potential "win-win" solutions that offer promise for tackling both temperature rise and nature decline. Below, The Independent explores some of the options.

Plant-based diets

The world's food system accounts for around a third of all greenhouse gas ***emissions***, the report says. Farming is also a major driver of wildlife loss, with a [*recent study*](https://www.independent.co.uk/news/uk/home-news/species-habitat-loss-agriculture-food-b1777097.html) finding that 17,000 species are set to lose at least part of their habitat if ***agricultural*** expansion goes on uncurbed.

Animal ***agriculture*** - particularly [*beef production*](https://www.independent.co.uk/climate-change/red-meat-beef-carbon-footprint-b1854133.html) - is particularly polluting. The main reason for this is because cows and sheep are "ruminants" - meaning they belch out large amounts of the greenhouse gas methane when digesting food. In addition, livestock production requires large amounts of ***forested*** ***land*** to be cleared to create space for grazing cattle or to grow animal feed, which causes further greenhouse gas ***emissions*** to be released.

The report recommends that rich countries switch to plant-based diets, containing more fruit and vegetables and less meat and dairy, to help to tackle the climate crisis and biodiversity loss.

"Our management of the ***land*** is not good for either the climate or biodiversity," said Professor Pete Smith, report author and chair of plant and soil science at the University of Aberdeen.

"Animal ***agriculture*** not only emits 10 to 100 times more greenhouse gases per unit product than plant-based food, it also uses 10 to 100 times more ***land***. So a shift toward more plant-based diets would reduce the pressure on ***land***, meaning farming could be done in a more environmentally friendly way."

The extent to which people should cut back on meat varies from country to country, he said. In the UK, meat eating must fall by [*10 per cent by 2025*](https://www.independent.co.uk/climate-change/news/uk-net-zero-emissions-2050-b1768185.html?r=15243) and 35 per cent by 2050 if the country is to meet its climate goals, according to its independent climate advisers.

Prof Smith added that switching to more sustainable ***agricultural*** practices, such as including trees in cropland and taking care to replenish soils, could also play a role in minimising the environmental impact of the food system.

Rewilding

One of the most important ways the world can tackle the climate and nature crises is by halting the destruction of carbon-rich and biodiverse ecosystems, the report says.

Around 77 per cent of the world's ***land*** and 87 per cent of its oceans have been degraded by humans - putting more species at risk of extinction than at any other time in human history, according to the research.

The assault on natural spaces is also a major driver of the climate crisis, with the clearing of ***forests*** and other carbon-rich ecosystems causing long-held stores of CO2 to be released into the atmosphere.

But in addition to stopping the destruction of ecosystems, humans must go further by rewilding and restoring degraded ***land*** and ocean environments, the report authors say.

Rewilding damaged landscapes could help to ***remove*** CO2 from the atmosphere while providing more space for nature, said Prof Camille Parmesan, a report author and ecologist at Plymouth University.

"We cannot avoid dangerous climate change without sucking up some of the carbon we've already put into the atmosphere," she said.

"At this point reducing ***emissions*** is essential, but not enough, and the best way to suck up carbon is to use the power of plants."

In the UK, protecting and restoring the country's carbon-rich peatlands could deliver a "win-win" for the climate and nature, said Prof Smith.

"The big-ticket option in the UK is peatlands, particularly in the north and west of the country where we have large areas of peatlands - over 80 per cent of which are in relatively poor condition, they've been drained for grazing or otherwise mismanaged," he said.

"They emit huge amounts of carbon. A degraded peatland can be emitting over 30 tonnes of CO2 per hectare per year. To put that in context, an average family car emits about four tonnes of CO2 a year."

"Switching off that big source of ***emissions*** is something that is really important and really good for biodiversity."

Combining nature and technology

Pursuing solutions that combine natural techniques with new technologies could also offer promise for the climate and wildlife, the report says.

One way this could be achieved is by combining technologies to produce renewable electricity with natural ways of restoring the ***land***, the scientists say in their report.

"The combination of nature-based and technology-based climate change solutions on ***land*** and at sea is in its infancy but may provide co-benefits for climate and biodiversity," the report reads.

"For example, [cattle] grazing underneath solar panels can enhance soil carbon stocks, and grazing as well as cropping associated with solar farms could provide food."

In addition, city planners should prioritise building "green infrastructure" that aims to tackle the climate crisis while providing space for nature in urban areas, the report adds.

"Urban greening, including the creation of urban parks, green roofs and urban gardens, reduces [heat], enhances urban biodiversity and improves quality of life including physical and mental well-being," it says.

Read More

[*World will fail unless climate and nature crises are tackled together, says major report*](https://www.independent.co.uk/climate-change/news/climate-crisis-nature-loss-biodiversity-b1863144.html)

[*What your red meat habit is doing to the planet*](https://www.independent.co.uk/climate-change/red-meat-beef-carbon-footprint-b1854133.html)

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[***What we must do together***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:62WM-6GK1-F072-426M-00000-00&context=1516831)

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**Section:** NEWS; Pg. 16

**Length:** 968 words

**Byline:** DAISY DUNNE

**Body**

Humans and livestock account for nearly 96 per cent of the mammals on the planet. That is just one of many staggering statistics included in a major report from more than 50 of the world's leading climate and nature scientists.

The peer-reviewed analysis warns that global temperatures are already up by more than 1C since the start of industrialisation, while more species are at risk of extinction now than at any other time in human history.

The report, the first collaboration from the UN authorities on the climate crisis and biodiversity loss, argues that both issues must be tackled together to be successfully solved.

Within its list of 41 recommendations, the report points to a range of potential "win-win" solutions that offer promise for tackling both temperature rise and nature decline. Below, The Independent explores some of the options.

Plant-based diets

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[***-Walmart's Regenerative Approach: Going Beyond Sustainability***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:60WT-MYC1-JD3Y-Y26W-00000-00&context=1516831)

ENP Newswire

September 22, 2020 Tuesday

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**Length:** 705 words

**Body**

Fifteen years ago, Walmart started on our journey to become a more sustainable company. We set aspirational goals to achieve 100% renewable energy, zero waste and a more sustainable supply chain for people and the planet. This commitment to sustainability came after Hurricane Katrina ravaged the Gulf Coast, when we saw firsthand how climate change could impact communities. We realized then that our scale and unique strengths could make a positive and meaningful difference for communities.

Since then, our associates have worked together, partnered with suppliers, NGOs and academics. And we've made a lot of progress on climate, waste, nature and economic opportunity for people. But it's not enough. Collectively, we must do more.

This Climate Week NYC, Walmart seeks to go beyond sustainability as it is understood and practiced today. By raising our ambition for climate and nature, we have set ourselves on a path toward becoming a regenerative company.

Regenerating means restoring, renewing and replenishing in addition to conserving. It means decarbonizing operations and eliminating waste along the product chain. It means encouraging the adoption of regenerative practices in ***agriculture***, ***forest*** management and fisheries - while advancing prosperity and equity for customers, associates and people across our product supply chains. And, working with our suppliers, customers, NGOs and others, we hope to play a part in transforming the world's supply chains to be regenerative.

The reasons why are all around us - in the air we breathe, the ground we walk on, the world we share. Ice sheets are collapsing. Extreme weather events are increasing. Too often, our days are marked by dire news of a climate crisis in hyper-drive: record temperatures, deadly wildfires of unprecedented scope, hurricanes threatening coasts at 'unsurvivable' speeds.

And we're losing critical landscapes and biodiversity at an alarming rate. Studies show animal populations have declined by around 68% over the past 40 years, and one-fifth of the Amazon's rainforest has disappeared in just 50 years. As a society, we are at an inflection point. If we don't act now, we may not have an opportunity to do something later.

The science is clear and consistent. Fossil fuel combustion is the primary cause of warming, and the world must be more aggressive in moving toward renewable forms of energy. More than that, though, to avoid the worst effects of climate change, the world must reduce, avoid and ***remove*** greenhouse gas ***emissions***. No longer is it enough to 'slow down' climate change and protect what we have left. Society must bend the curve on ***emissions*** and restore nature.

That's why Walmart is ***targeting*** zero ***emissions*** in our own operations by 2040, not just in the U.S., but globally. And we intend to achieve this without carbon offsets by harvesting enough wind, solar and other energy sources to power our facilities with 100% renewable energy by 2035, moving to cooling equipment that uses low-impact refrigerants and electrifying our vehicles, including long-haul trucks, by 2040. These goals are ambitious, and we will need innovation and infrastructure to get there.

And along with elevating our ambition for climate, we are elevating our ambition for nature. Walmart, along with the Walmart Foundation, is committing to help protect, manage or restore at least 50 million acres of ***land*** and one million square miles of ocean by 2030. Through our own actions, supporting those of suppliers and philanthropy, we will focus on critical landscapes that produce food and other consumer products. And we'll do this work by aiming to improve how products are sourced, promote the adoption of nature-friendly policies and certifications, continue supporting preservation efforts and invest in place-based partnerships that combine conservation, restoration and sustainable management.

Our journey continues, but our destination has changed. We want to go beyond sustainability to become a regenerative company dedicated to placing nature and humanity at the center of our business practices. Restore, renew, replenish. That's regeneration. That's a better world.

[Editorial queries for this story should be sent to [*newswire@enpublishing.co.uk*](mailto:newswire@enpublishing.co.uk) ]

**Load-Date:** September 22, 2020

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[***How to identify win–win interventions that benefit human health and conservation***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:671W-P2M1-JCWX-C2C3-00000-00&context=1516831)

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**Length:** 5723 words

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**Body**

Main

Interdependency has been hailed as a curse and a blessing for achieving the United Nations Sustainable Development Goals (SDGs), which encompass 169 sustainability ***targets***–. On the one hand, historical advances toward some sustainable development ***targets*** (for example, SDG 2: Zero Hunger, SDG 8: Decent Work and Economic Growth) have caused declines in others (for example, SDG 6: Clean Water and Sanitation), highlighting trade-offs that might impede achieving all SDGs by 2030,–. On the other hand, synergies between SDG ***targets*** are often proposed as our best hope for getting back on track to reach the 2030 goals; if multiple SDGs can be advanced at the same time, progress may be faster and more cost-effective,. To that end, research and policy pieces often focus on interdependent ***targets***, aiming to maximize synergies, avoid or mediate trade-offs, and ignore other possible outcomes,–.

Acting on interdependent SDGs requires that decision makers can first distinguish among all possible interdependent and independent outcomes. However, terms like ‘synergy’, ‘trade-off’, ‘co-benefit’ and ‘win–win’ are rarely defined in the sustainability or ecosystem services literatures,. At best, synergies are defined as causal positive relationships and trade-offs as causal negative relationships,, where correlation strength is sometimes given a nominal score (for example, +1 is ‘creates conditions that further another ***target***’ and +3 is ‘inextricably linked to the achievement of another ***target***’),. These scores have been applied differently by different teams, highlighting how difficult they are to use consistently in practice. Furthermore, they do not clarify how synergies and trade-offs relate to specific outcomes. For instance, an action that degrades two ***target*** indicators will create a positive correlation (that is, synergy), but not a win–win. What, then, is the difference between a synergy and a win–win? And can win–win solutions ever be created from trade-offs? After finding limited published guidance for navigating these terms, our working group developed an explicit framework for one early step in the SDG implementation process: assessing relationships among intervention ***targets*** and distinguishing among desirable and undesirable outcomes.

Researchers, practitioners and decision makers can use the framework described herein to compare interventions with just a few ***targets***, such as the pairs proposed under the International Union for Conservation of Nature’s Global Standard for Nature-based Solutions, or to complete all pairwise comparisons within the full SDG ***target*** network — an increasingly common exercise,,. With three possible outcomes per ***target*** (win, neutral or lose), there are nine possible correlated or uncorrelated joint outcomes for two ***targets*** (lose–lose, lose–neutral and so on; Fig. ). Unlike previous frameworks, this comparative process retains uncorrelated, neutral outcomes, which can be valuable management options to consider during multi-criteria decision making. Below, we illustrate how to use our framework using examples related to human infectious disease control and conservation.

A framework for evaluating intervention outcomes and their associated values.

Given any two intervention ***targets*** (for example, one related to human health and one related to conservation), there are nine possible joint outcomes that can be differentiated by defining changes from baselines (‘win’, ‘neutral’ or ‘lose’) using data or logic. The joint outcomes on the positive diagonal are positively correlated synergies, and joint outcomes on the negative diagonal are negatively correlated trade-offs. a,b, The values (‘good’ or ‘bad’) associated with outcomes are subjective and depend on the values associated with their baselines; here we show the values associated with changes from mutually ‘healthy’ baselines (a) and mutually ‘unhealthy’ baselines (b).

Start with baselines and outcome directions

To define the relationship between any two ***targets***, one must know how each ***target*** has changed, is changing or will change. This is accomplished by first defining the spatial and temporal baseline for each ***target***. Baselines are usually defined as the conditions that exist before an intervention, such as the prevalence of parasites in a community before a school deworming programme begins. Some baselines will be considered relatively ‘healthy’ and thus worth maintaining, such as a lake that already has high quality water before an intervention. Other baselines will be considered relatively ‘unhealthy’ and worth improving, such as a eutrophic and polluted lake that receives a high volume of ***agricultural*** runoff. Stakeholders might have different perspectives on what the baselines are, and these differences are important to document and discuss. From chosen baselines, we can then define the observed or expected trajectories through time or space (win, lose or neutral), where a decline from relatively healthy conditions indicates degradation (lose), no change from baseline indicates stasis (neutral), and an increase from relatively unhealthy conditions indicates improvement (win; Fig. ). A ‘win’ can occur even when starting conditions are ‘healthy’ (for example, what starts as acceptable water quality becomes pristine water quality; Fig. ) and a ‘loss’ can occur even when baselines are ‘unhealthy’ (for example, what starts as moderate disease burden becomes high disease burden; Fig. ); it is the relative change from baseline that determines the outcome direction. The outcome directions for any two ***targets*** determine where the intervention falls within the nine-panel outcome space in Fig. .

In this direction-based framework, neutral outcomes do not have an inherent value judgement, where we define ‘values’ as ‘reference points for evaluating things as good or bad’. There are many types of values (for example, economic value and societal value), and value judgements often differ among stakeholders. For instance, along the Senegal River in West Africa, dam construction extirpated native, migratory prawns. Before the dam, prawns ate the snails that are intermediate hosts for human schistosome parasites, so prawn extirpation contributed to high human disease burdens that persist to this day,—a lose–lose scenario for ecosystems and human health (but a win for local ***agriculture***, because the dam supported ***agricultural*** irrigation). Any interventions that preserve the current, high disease burdens (an ‘unhealthy’ baseline) would be called ‘neutral’ scenarios for human health in our framework, even though those interventions might be negatively valued by people living near the Senegal River (red neutral–neutral panel; Fig. ). In contrast, schistosomiasis has been eliminated in Japan, so neutral interventions in Japan that preserve the contemporary, ‘healthy’, disease-free baseline would be positively valued (blue neutral–neutral panel; Fig. ). These examples show that the inherent values associated with neutral outcomes depend on the values associated with the baseline conditions (Fig. ).

If desired, value judgements for baselines can be used to determine a ‘level of urgency’ for any given pair of ***targets***. The most urgent ***targets*** might be those that are below standards (‘mutually unhealthy’) and declining. For these scenarios, any neutral outcomes will be negatively valued, and thus only interventions with win–win outcomes will be positively valued (one blue panel in Fig. ). In contrast, ***targets*** that are above standards (‘mutually healthy’) and increasing might have low urgency, and neutral–neutral, win–neutral, neutral–win or win–win outcomes will be positively valued (Fig. ). In the first case, neutral outcomes might be best avoided, whereas in the second case, considering neutral outcomes expands management options for positively valued outcomes. Again, these examples show that the values associated with outcomes depend on the values associated with the baseline conditions (Fig. ).

Neutral outcomes may often be ignored in the sustainability and ecosystem services literatures because most contemporary baselines are considered mutually unhealthy, but mutually healthy baselines do exist (central panel in Fig. ; dashed lines in Fig. ). For instance, it is far more efficient to prevent a disease vector from invading than it would be to control or eradicate an established vector (for example, the mosquitoes that spread Chikungunya virus in Italy or avian malaria in Hawaii). Neutral–neutral interventions that prevent degradation are analogous to ‘preventative healthcare’, where ‘an ounce of prevention is worth a pound of cure’.

‘Sick care’ and ‘preventative care’ within coupled human and natural systems can each create neutral–neutral outcomes.

a, Starting from pristine historical baselines, deforestation increases runoff containing human enteric pathogens and decreases biodiversity, creating a lose–lose for people and nature. From those degraded baselines, reforestation efforts to restore biodiversity, improve water quality and reduce human disease risk would be a win–win solution. b, When comparing pristine historical baselines to final restoration end-points, the degradation–restoration scenario is a net neutral–neutral outcome (that is, ‘sick care’, solid lines). In contrast, if deforestation were prevented, this would be a preventative neutral–neutral outcome (dashed lines).

Unfortunately, many systems are already degraded and need ‘sick care’ to return to historical, mutually healthy baselines. For instance, restoring logged ***forests*** might increase ecosystem integrity and improve human health, because increasing upstream ***forest*** cover is associated with reduced downstream childhood diarrhoea risk (Fig. ),—a win–win if measured from mutually unhealthy, degraded baselines. This scenario would be a net neutral–neutral outcome if the baselines were intact ***forests*** and low childhood diarrhoea (‘mutually healthy’ baselines), which were degraded by logging ***forests*** (a lose–lose) and later restored by reforestation to ‘healthy’ baselines (a win–win; solid lines in Fig. ). Although this net neutral–neutral scenario has the same baselines and outcomes as would a ‘preventative healthcare’ neutral–neutral scenario (that is, never unsustainably logging ***forests*** in the first place), it involves ecosystem degradation, lost human lives and resources spent on reforestation and healthcare. As in this example, many win–win solutions are sick care for degraded systems, and thus represent corrective actions for when preventative care has failed.

Positive correlations suggest win–win potential

In the sustainability literature, synergies are often defined as causal positive relationships between two ***targets*** or outcomes,. Such relationships can exist either because one outcome causes the other (for example, an improved conservation outcome reduces human disease burdens, or reduced human disease burdens improve ecosystem integrity) or because a shared driver affects each outcome (for example, invasive rat control benefits both human health and native wildlife populations through different processes, with rats being a common driver; see section ‘An example with invasive rats in Hawai’i’). Given this definition and our framework, all lose–lose and win–win scenarios are synergies, and some neutral–neutral scenarios are also synergies—all outcomes that occur on the positive diagonal in Fig. . For example, all three synergistic dual-outcomes (win–win, lose–lose and neutral–neutral) are possible when ***forest*** restoration reduces diarrheal risk, depending on the specific baselines and outcome directions considered (Fig. ). This results in an important corollary: lose–lose scenarios have win–win potential, and thus practitioners and decision makers seeking win–win solutions could start by searching for lose–lose scenarios.

In contrast, win–lose and lose–win outcomes represent trade-offs between conservation and human health, where the outcomes are linked by causal, negative relationships, or a shared driver affects the two outcomes in opposite directions. For example, in some parts of Africa, declines in water quality can extirpate freshwater crabs and the larval black flies that attach to them. Reduced black fly larvae abundance causes fewer adult black flies to transmit onchocerciasis to humans, such that a loss for freshwater biodiversity can be a win for human health (lose–win). Because the biodiversity and health outcomes are negatively correlated, acting on this existing relationship cannot produce a win–win scenario. For instance, restoring the freshwater crabs (a conservation improvement from an ‘unhealthy’ baseline) could cause black flies and onchocerciasis to increase again (a health decline from a ‘healthy’ baseline), creating the opposite trade-off scenario (win–lose). Given the difficulty in changing underlying correlations in such trade-off scenarios, the sustainability and ecosystem services literatures often recommend avoiding or mediating trade-offs.

However, the best—but perhaps most difficult—solutions might be those that re-engineer, bypass or break negative associations between conservation and human health,. For instance, in the example where damming the Senegal River extirpated prawns and increased schistosomiasis in humans, there is a lose–win trade-off between prawns and ***agriculture*** and a lose–win trade-off between human infectious disease control and ***agriculture***. To break these negative associations, efforts are underway to design a prawn ladder for the dam that can restore prawn migration upstream from dams. This technological solution would maintain the dam and ***agricultural*** gains while also restoring prawns and human health, turning a trade-off scenario into a win–win.

Finally, there are conservation and health outcomes that are consistently uncorrelated, where an intervention could affect one sector but not the other (win–neutral, neutral–win, lose–neutral and neutral–lose; Fig. , middle column and row). For instance, consider regions where malaria burdens are high (‘unhealthy’ baseline) and freshwater ecosystems are either degraded or pristine (‘unhealthy’ or ‘healthy’ baseline). From these baselines, insecticide-treated bed nets have produced exceptional reductions in malaria burdens at low cost,, with negligible environmental consequences on non-***target*** species (when bed nets have not been co-opted for fishing). This is a win–neutral scenario for health and conservation relative to baselines, and a preferred conservation outcome over other possible interventions, such as wetland draining. These neutral outcomes are often overshadowed by win–wins within SDG ***target*** networks, but once identified, win–neutral interventions implemented by only one sector may promote rapid progress toward achieving SDG goals.

Adding complexity to pairwise comparisons

An intervention might have several conflicting or complementary effects on ecosystem integrity, human health or other sectors. To understand and make decisions in these complex systems, it is common in the SDG literature to create networks of all ***targets*** and then to evaluate the relationship between each pair,,. For example, in Table , we show how 9 out of the 17 SDGs might have been impacted in India by a national policy banning diclofenac, a veterinary medicine that caused widespread vulture declines when vultures fed on toxic livestock carcasses (Fig. ),. The diclofenac ban was implemented to conserve vultures (SDG 15: Life on ***Land***), which was expected to reduce carrion availability, free-ranging dog populations, and human rabies risk from dog bites (SDG 3: Good Health and Well-being; Fig. , Table ). Banning diclofenac was also expected to have positive impacts (wins) on many other SDGs, including reducing poverty and improving water quality (Table )–. The diclofenac ban was not expected to create any trade-offs among SDGs, except perhaps by increasing aeroplane collisions with vultures. Of course, it is unlikely that any intervention in a complex system will improve everything, and there were several neutral outcomes that would likely maintain ‘unhealthy’ baselines (Table ). Therefore, in this example, all pairwise comparisons are expected to be win–wins or win–neutrals. Though neutral outcomes are often ignored, retaining them helps to identify interventions that make improvements in some sectors without creating or exacerbating problems in others.

Banning diclofenac in India and surrounding nations after widespread vulture declines was expected to impact 9 out of 17 Sustainable Development Goals, all of which had relatively unhealthy baselines in 2008

| **Sustainable Development Goal** | **Baseline (in 2008)** | **Expected direction of change** | **References** |
| --- | --- | --- | --- |
| 1. No Poverty | Unhealthy: 31% below poverty line in 2009. | Win: fewer free-ranging dogs and fewer rabid dogs should lead to fewer bites, reducing lost wages due to sickness and/or treatment and money spent on post-exposure treatment. | , |
| 2. Zero Hunger | Unhealthy: food insecurity and undernourishment rates were too high. | Win: food security might increase with reduced expenditures on dog bite treatments and reduced livestock losses due to dog attacks, rabies and potentially other diseases transmitted by carcasses not eaten by vultures (for example, anthrax)a. | , |
| 3. Good Health and Well-being | Unhealthy: millions of people bitten by dogs annually in India required post-exposure treatment. India also had the highest burdens of rabies infections and rabies-associated deaths in the world. | Win: hypothetically, vulture population restoration would reduce free-ranging dog populations, leading to fewer bites, fewer rabies cases and reduced premature death. Vultures might also reduce burdens of other diseases, such as anthrax, by faster carcass ***removal***b. |  |
| 4. Quality Education | Unhealthy: fewer girls than boys in school at all levels of education. | Neutral: vulture conservation is not expected to affect education, unless indirectly through wealth or well-being. |  |
| 5. Gender Equality | Unhealthy: women held a relatively small proportion of parliament positions, composed <50% of the work force and so on. | Neutral: vulture conservation is not expected to affect gender equality, unless indirectly through wealth or well-being. |  |
| 6. Clean Water and Sanitation | Unhealthy: for example, in 2012, hundreds of millions of people living in India practiced open defaecation. | Win: vultures provide sanitation services by consuming carcasses (sources of some diseases), garbage waste, and human and livestock faeces. | , |
| 7. Affordable and Clean Energy | Not applicable | Neutral: not applicable. | - |
| 8. Good Jobs and Economic Growth | Unhealthy: some livelihoods that were dependent on vulture services were experiencing hardships due to vulture declines. | Win: beyond the livestock industry, waste ***removal*** by vultures benefits some livelihoods (for example, livestock butchering, tanning, and bone collecting for fertilizer). Vultures can also provide ecotourism opportunities. | , |
| 9. Industry, Innovation and Infrastructure | Not applicable | Neutral: not applicable. | - |
| 10. Reduced Inequalities | Unhealthy: the poor are disproportionally burdened by dog bites, rabies deaths and lost economic benefits from vultures. | Win: domestic dog management (for example, vaccination) is considered the gold standard rabies intervention by the World Health Organization (WHO) because it is likely the most effective and equitable intervention. Vulture conservation to control dog population dynamics might similarly reduce inequalities. |  |
| 11. Sustainable Cities and Communities | Unhealthy: people living in lower-income neighbourhoods feel unsafe due to bite risks from domestic dogs with rabies. Additionally, in some places, sky burial practices used by the Parsis religion were impeded by vulture declines. | Win: if vulture restoration works to reduce dog populations (especially of feral dogs) through competition, dog bite risks should decline. Vulture restoration might also restore cultural and/or religious values associated with vultures, such as sky burials. |  |
| 12. Responsible Consumption and Production | Not applicable | Neutral: not applicable. | - |
| 13. Climate Action | Not applicable | Neutral: not applicable. | - |
| 14. Life Below Water | Relatively unhealthy: no specific relevant indicators were available, but waste reaching waterways might have been relatively high when vultures declined. | Win: by consuming garbage waste and faeces, vultures might reduce pollution reaching waterways. |  |
| 15. Life on ***Land*** | Unhealthy: more than 95% of populations of three vulture species died from diclofenac poisoning in roughly a decade, altering ecosystem structure and functions. | Win: restored populations of three threatened vulture species; restored nutrient cycling through scavenging; reduced wildlife contacts and wildlife disease transmission at quickly removed carcasses. Potentially also reduced impacts on wildlife that dogs depredate or compete with. | ,, |
| 16. Peace, Justice and Strong Institutions | Not applicable | Neutral: not applicable. | - |
| 17. Partnerships for the Goals | Not applicable | Neutral: not applicable. | - |

For a detailed cost–benefits analysis, see ref. . aReplacement livestock non-steroidal anti-inflammatory drugs (NSAIDs) might be more expensive than diclofenac at first, potentially reducing livestock output for some people, but government subsidies for new NSAIDs would be cost-effective. bVulture restoration might increase air accidents, which would be a loss for human well-being, but it is unclear how large this risk is.

Two complex systems where ecosystem and human health are connected.

a, Vultures play important roles in nutrient cycles and carrion and refuse ***removal*** in India (1). When vultures are poisoned by the veterinary medicine diclofenac (2), free-ranging domestic dog populations might increase with food availability, leading to increased circulation of rabies within dog populations (3). Increased dog populations can lead to increased dog bites and rabies deaths in humans (4). Humans might also experience increased risk of environmental pathogens (5), which accumulate faster in ecosystems without carrion and refuse ***removal*** by vultures. b, Larval rat lungworms are excreted from rats (1) in their faeces (2), which are then consumed by slugs (3). Infected slugs can infect rats and contaminate vegetables (4) consumed by humans (5), leading to human infection. In addition to causing human diseases, invasive rats are also problematic on Hawai’i and other islands because they consume human crops (for example, macadamia nuts (6)) and endemic species (for example, bird eggs (7) and seedlings (8)). The red arrows indicate infectious disease transmission connections and the blue arrows indicate connections that are not related to infectious disease transmission.

In addition to comparing many ***targets*** or SDGs, decision makers might compare many interventions using tools like multi-criteria decision-making analyses. When comparing intervention options in this way, it is useful to consider not only their qualitative outcomes, but also their effect sizes. To do this with our nine-panel framework, the baseline condition can be represented by the plot origin, and neutral outcomes can be placed along the axes that measure impacts on each ***target*** (Fig. ). Associations between ***targets*** can be represented as vectors, and points along vectors are possible endpoints for interventions acting on those relationships. Endpoints can be constrained by some budget or other limited resource pool (Fig. ). Therefore, intervention ranking and subsequent selection will depend on the priorities and resources available to decision makers or practitioners. Our framework makes it easier to define and compare these options.

Multiple interventions can be compared on the basis of not only on their qualitative outcomes, but also on their effect sizes and cost-effectiveness.

The baseline conditions are the origin of this plot, and vectors indicate trajectories that result from investing in an intervention. The blue points show three win–win interventions with the same cost that vary in conservation and human health outcomes, compared to a lose–win intervention (grey point) with the same cost. Neutral outcomes are on the plot axes.

Finally, the relationships between two ***targets*** might be nonlinear (Fig. , Intervention Options 2 and 3) or involve other complexities, such as time lags. For instance, ***forest*** restoration can only increase native biodiversity until the historical baseline is achieved. After that point, improvement or restoration—a win in our framework—is no longer possible and the conservation outcome direction switches to neutral; the outcome saturates with intervention intensity (for example, Fig. , Intervention Option 2). Furthermore, ***forest*** restoration might take decades, and resulting ecosystem services (for example, water purification) might not be achieved quickly, creating a large temporal lag in the correlation between ***forest*** restoration and human health benefits. Long-term outcomes are often the most cost-efficient, but they can be difficult to fund or implement if they require large initial buy-ins or long delays before benefits manifest. Because definitions based on short-term correlations alone might miss these complexities, our directions-based framework encompasses historical conditions and long-term futures.

An example with invasive rats in Hawai’i

Intervention planning, monitoring and evaluation are often accomplished using the ‘theory-of-change’ approach,. Using this process, practitioners and stakeholders collaboratively describe project activities, short-term outputs, long-term outcomes and the causal relationships linking these entities in an explicit theory-of-change (TOC) diagram that illustrates what a successful intervention will look like (Fig. ). By making a few small changes to this workflow, practitioners can adapt this approach to our multi-outcome framework (Fig. ). In particular, after defining their baselines in time and space, all parties can think through their intervention options while considering multi-sector outputs and outcomes, like those for both human infectious disease control and conservation. Outcomes can then be compared to baselines, and outcome directions (win, neutral or lose) can be recorded on the TOC diagram. To illustrate this process, we show example TOC diagrams for two possible interventions that should reduce rat-associated diseases infecting people in Hawai’i, where both interventions involve a ‘win’ for human health, but the conservation outcomes differ between the interventions (Fig. ).

Planning and comparing interventions using theory-of-change diagrams.

a–c, From mutually unhealthy baselines, we use a revised, multi-outcome, baseline- and direction-explicit theory-of-change (TOC) approach (a) to illustrate how two possible interventions would represent future win–neutral (b) and win–win (c) solutions for human health and conservation in Hawai’i. Further details could be added to these TOC diagrams to capture other outcomes (for example, poisoning non-***target*** wildlife and reduced rat predation on ***agricultural*** crops).

Invasive rats cause problems for many stakeholders in Hawai’i (Fig. )–. Each year, several people become sick with rat-associated infectious diseases, such as rat lungworm disease, toxoplasmosis and murine typhus. People can become infected via several transmission routes, such as parasite-contaminated vegetables or bites from flea vectors. Invasive Polynesian, black and Norway rats (Rattus exulans, R. rattus and R. norvegicus) also eat endemic Hawaiian flora and fauna that evolved without rat predators (for example, a ***forest*** bird called the Oahu elepaio (Chasiempis ibidis) and a flowering plant called the superb cyanea (Cyanea superba)), and ***agricultural*** crops such as sugarcane and macadamia nuts. This example shows the complexity in coupled human and natural systems where practitioners are seeking win–win solutions: there are multiple invasive rat species, conservation ***targets*** (one for each endemic species), human infectious disease ***targets*** (one for each parasite), ***targets*** in other sectors, and affected islands and/or habitats. We simplify the example below by summarizing all outcomes into two outcome categories: one for rat-borne human infectious diseases and one for rat-impacted endemic flora and fauna.

To use our framework, we first select appropriate baselines in time and space. We could select the historical human health and conservation baselines that existed 200 or 800 years ago, before black and Norway rats invaded and before Polynesian rats invaded, respectively. From those historical baselines (no rat-associated disease and no rat predation), both human health and endemic species have declined: a lose–lose scenario. However, to compare potential present-day intervention options, we instead use present-day human disease incidence and endemic species population sizes as our baselines. In particular, we consider these baselines to be mutually ‘unhealthy’ (Fig. ), because human disease incidence is above acceptable levels and many endemic species are threatened with further declines and/or extinction due to rat predation. Therefore, this example is one where ‘sick care’ is required.

Human health alone could be improved through educational campaigns to teach people about rat-associated disease risks and personal prevention measures, such as washing vegetables (Fig. ). Within weeks, practitioners could use surveys to measure self-reported changes in behaviour (Fig. , Outputs). These behavioural changes should reduce human infection risks (Fig. , Outcomes) and human disease burdens (Fig. , human infectious disease direction = win), but would need to be maintained indefinitely, because potential transmission pathways from rats to people would still exist (for example, infected rats and slugs would still persist). Similarly, because neither educational campaigns nor human behavioural changes would reduce rat population sizes, this intervention would have no effect on rat predation intensity on wildlife or crops (Fig. , conservation direction = neutral). This win–neutral intervention would be easy to implement and might save lives, but it represents a mixed-value dual-outcome scenario: the outcome value for human infectious disease control is positive (bad to better; win), whereas the outcome values for conservation and ***agriculture*** are negative (bad to equally bad; neutral from an unhealthy baseline). Therefore, educational campaigns alone are not the most beneficial intervention option.

Instead, there is at least one intervention that would be a mutually positive, win–win–win solution: invasive rat control or eradication (Fig. ). Rat control efforts use rat poison or traps, and practitioners monitor success by measuring rat mortality or rat population sizes (Fig. , Outputs), because rat populations are the shared driver linking human health, conservation and ***agriculture*** outcomes. In particular, over months to years, decreasing rat populations should reduce human disease (human health ‘win’), increase endemic species population sizes (conservation ‘win’), and increase crop production (***agricultural*** ‘win’, not shown in Fig. for simplicity). However, this potential win–win–win could have non-***targets*** effects, which could be anticipated and mitigated. For instance, rat poison can be eaten by other wildlife and accumulate in the food web, and thus poisoning might need to be substituted with rat trapping in some contexts. If non-***target*** effects are avoided or minimized, rat control has the potential to be more broadly beneficial than educational campaigns alone.

Conclusions

Whether evaluating an intervention with a few multi-sector ***targets*** or making many pairwise comparisons within an SDG ***target*** network, deciding whether two ***targets*** represent a synergy, a trade-off or independent outcomes requires explicit definitions that can be shared within interdisciplinary teams. Here we present a nuanced guide for identifying and comparing nine possible interdependent and independent outcomes using a process that defines baselines, outcome directions (win, lose or neutral) and associated values. This framework can be used to identify and prevent lose–lose scenarios before they occur (akin to ‘preventative care’) or to identify good opportunities for win–win solutions where damage to human health and to ecosystems has already occurred (akin to ‘sick care’). However, acting on the positive links between people and nature is just one way to safeguard future human well-being while preserving ecosystems and biodiversity; opportunities for positively valued multi-sector outcomes might also be found where people and nature are not interconnected and/or where negative, trade-off links can be avoided or re-engineered. Comparing and contrasting the nine possible dual outcomes reveal more ways that funders, policymakers, researchers and practitioners can intervene to accelerate progress towards the SDGs.

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