

**Date and Time:** Tuesday, April 19, 2022 1:02:00 AM EDT

**Job Number:** 169227474

**Documents (100)**

1. [*AR6 and Sea Level Rise, Part 1*](https://advance.lexis.com/api/document?id=urn:contentItem:651M-PWG1-F03R-N4VP-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

2. [*34 Years of Flawed, Failed & Grossly Misrepresented Global Sea Level Rise Speculation*](https://advance.lexis.com/api/document?id=urn:contentItem:653W-SCJ1-JCMN-Y4VF-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

3. [*As sea levels rise, so do groundwater levels. Beaufort Co. studying impact with $300K grant*](https://advance.lexis.com/api/document?id=urn:contentItem:655D-Y4J1-JC3J-X1J7-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

4. [*County towns preparing for sea level rise; NOAA report says sea level may rise over 12 inches by 2050*](https://advance.lexis.com/api/document?id=urn:contentItem:653S-GM01-DXVP-V52P-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

5. [*Proxy Rates of Sea Level Rise*](https://advance.lexis.com/api/document?id=urn:contentItem:651D-TTY1-JCMN-Y0JC-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

6. [*Germany : Tropical peatland, sea level rise and climate change*](https://advance.lexis.com/api/document?id=urn:contentItem:652M-BBR1-F11P-X23W-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
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7. [*Burlingame plans for projected sea level rise*](https://advance.lexis.com/api/document?id=urn:contentItem:6534-K191-JBCN-43S7-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

8. [*Wide Bay's rising sea levels to impact hundreds by 2100*](https://advance.lexis.com/api/document?id=urn:contentItem:6521-92S1-DY66-5449-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

9. [*New link between greenhouse gases and sea level rise*](https://advance.lexis.com/api/document?id=urn:contentItem:655M-FN21-JCG7-80J0-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

10. [*- MIT - Improving predictions of sea level rise for the next century*](https://advance.lexis.com/api/document?id=urn:contentItem:6545-FN01-F0K1-N06V-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

11. [*Reconstructing Sea-Level Rises In The Red Sea*](https://advance.lexis.com/api/document?id=urn:contentItem:652F-1HV1-F11P-X0G5-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

12. [*bolsa chica ecological reserve Sea level rise seen as threat to wetlands*](https://advance.lexis.com/api/document?id=urn:contentItem:6557-FS61-JBCN-43K0-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

13. [*Trump claims sea level rise means more homes by the ocean. Let's take a look at Mar-a-Lago*](https://advance.lexis.com/api/document?id=urn:contentItem:6516-J441-DY4H-K4M3-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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14. [*Author Jeff Goodell Visits Eckerd College for Presentation on Sea Level Rise*](https://advance.lexis.com/api/document?id=urn:contentItem:655W-2H81-DYG2-R3GJ-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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15. [*Sea-level rise creating 'ghost forests' in North Carolina*](https://advance.lexis.com/api/document?id=urn:contentItem:6516-V9M1-JBCN-455Y-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

16. [*Sea-level rise creating 'ghost forests' in North Carolina*](https://advance.lexis.com/api/document?id=urn:contentItem:650Y-JVM1-JBCN-40KY-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

17. [*IMPROVING PREDICTIONS OF SEA LEVEL RISE FOR THE NEXT CENTURY*](https://advance.lexis.com/api/document?id=urn:contentItem:6546-45J1-DYTH-G0DD-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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18. [*Germany : Tropical peatland, sea level rise and climate change*](https://advance.lexis.com/api/document?id=urn:contentItem:652M-DHS1-F11P-X0S3-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

19. [*Tampa Bay should plan smart, resilient infrastructure now for a prosperous tomorrow | Column Regional leaders must plan to replace aging water and wastewater infrastructure, improve transportation infrastructure, and address building codes that predate sea level rise and growing weather threats.*](https://advance.lexis.com/api/document?id=urn:contentItem:6557-MDY1-JCBJ-Y15B-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

20. [*- MIT - Improving predictions of sea level rise for the next century*](https://advance.lexis.com/api/document?id=urn:contentItem:6545-FMY1-F0K1-N55C-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

21. [*Farmers race rising sea level*](https://advance.lexis.com/api/document?id=urn:contentItem:6527-CT81-DXVP-V51Y-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

22. [*ACCELERATED RISE OF SOUTH CHINA SEA LEVEL BLAMED ON GLOBAL WARMING*](https://advance.lexis.com/api/document?id=urn:contentItem:6558-0061-DYTH-G33T-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

23. [*ENVIRONMENT Bolsa Chica wetlands face dire threat from sea-level rise*](https://advance.lexis.com/api/document?id=urn:contentItem:655D-RB61-DXVP-V1TD-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

24. [*LOWER OTTER RESTORATION PROJECT SAVES RARE PLANTS FROM SEA LEVEL RISE*](https://advance.lexis.com/api/document?id=urn:contentItem:651D-GWV1-JCBF-S50M-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

25. [*Key infra in Mumbai , other coastal cities may submerge by 2050*](https://advance.lexis.com/api/document?id=urn:contentItem:655P-7JD1-JDKC-R42Y-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

26. [*SOLUTIONS 3/18: The Seas are Rising*](https://advance.lexis.com/api/document?id=urn:contentItem:651K-6221-DXVP-V0T4-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

27. [*SOLUTIONS 3/18: The Seas are Rising*](https://advance.lexis.com/api/document?id=urn:contentItem:651K-6221-DXVP-V20R-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

28. [*Mumbai to Chennai : These coastal cities that may drown by 2050*](https://advance.lexis.com/api/document?id=urn:contentItem:655T-K7R1-JDKC-R0KW-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

29. [*SOLUTIONS 3/18: The Seas are Rising*](https://advance.lexis.com/api/document?id=urn:contentItem:651K-6221-DXVP-V0YC-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

30. [*Study: Keys face fierce future flooding*](https://advance.lexis.com/api/document?id=urn:contentItem:651V-RRY1-DXVP-V2PJ-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

31. [*SOLUTIONS 3/18: The Seas are Rising*](https://advance.lexis.com/api/document?id=urn:contentItem:651J-P1B1-DXVP-V1KV-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

32. [*SOLUTIONS 3/18: The Seas are Rising*](https://advance.lexis.com/api/document?id=urn:contentItem:651K-6221-DXVP-V1P9-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

33. [*SOLUTIONS 3/18: The Seas are Rising*](https://advance.lexis.com/api/document?id=urn:contentItem:651K-6221-DXVP-V1J7-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

34. [*United Kingdom: Lower Otter Restoration Project saves rare plants from sea level rise*](https://advance.lexis.com/api/document?id=urn:contentItem:651D-YMT1-DXMS-8238-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

35. [*United Kingdom: Lower Otter Restoration Project saves rare plants from sea level rise*](https://advance.lexis.com/api/document?id=urn:contentItem:651H-V301-JBHT-D2D0-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

36. [*Antarctic sea ice reaches second lowest level in 44 YEARS as scientists warn melting of the West Antarctic Ice Sheet could cause global sea levels to rise up to 10 FEET*](https://advance.lexis.com/api/document?id=urn:contentItem:655D-MRJ1-DY4H-K469-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

37. [*Migration Impacts If Sea Level Rises 1.8 Meters*](https://advance.lexis.com/api/document?id=urn:contentItem:654R-M801-JCMN-Y0WX-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

38. [*Study: Keys to face fierce future flooding*](https://advance.lexis.com/api/document?id=urn:contentItem:652T-9W51-DXVP-V343-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

39. [*Key infra in 6 coastal cities may submerge by '50*](https://advance.lexis.com/api/document?id=urn:contentItem:6560-WXR1-F12F-F0KJ-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

40. [*Key infra in 6 coastal cities may submerge by '50*](https://advance.lexis.com/api/document?id=urn:contentItem:655P-R5P1-JDKC-R38J-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

41. [*By 2050, infra in 6 cities in danger*](https://advance.lexis.com/api/document?id=urn:contentItem:655S-XT51-JDKC-R41G-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

42. [*United Kingdom : Lower Otter Restoration Project saves rare plants from sea level rise*](https://advance.lexis.com/api/document?id=urn:contentItem:651T-J251-F11P-X53T-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

43. [*Key infra in 6 coastal cities may submerge by '50*](https://advance.lexis.com/api/document?id=urn:contentItem:655P-R8B1-F12F-F4JT-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

44. [*Tampa Bay business leaders: Billions needed for climate change The Tampa Bay Partnership releases a report that says protecting against sea level rise flooding is a wise investment for the region.*](https://advance.lexis.com/api/document?id=urn:contentItem:655C-MFS1-JCBJ-Y1SW-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

45. [*AR6 and Sea Level, Part 2: The complexity of measuring GMSL*](https://advance.lexis.com/api/document?id=urn:contentItem:6526-0X81-JCMN-Y2Y2-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

46. [*Ice shelf larger than New York City disintegrated in East Antarctica*](https://advance.lexis.com/api/document?id=urn:contentItem:653G-RBS1-DYY9-00MY-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

47. [*Bay to lose land in rising sea risk*](https://advance.lexis.com/api/document?id=urn:contentItem:651Y-KVH1-JD3N-52NR-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

48. [*AR6 and Sea Level, Part 3, A Statistically Valid Forecast*](https://advance.lexis.com/api/document?id=urn:contentItem:6528-PN01-JCMN-Y3BN-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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49. [*Thousands of properties are at risk from rising sea levels and tides. Here's how to protect yourself against coastal erosion and inundation*](https://advance.lexis.com/api/document?id=urn:contentItem:6558-9T71-JBN5-F1MX-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

50. [*PUB considering sea barriers to protect south-west coast Feasibility study will also look at raising industrial estates' ground level as an alternative solution*](https://advance.lexis.com/api/document?id=urn:contentItem:6511-H0F1-DYX4-001M-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

51. [*Protecting Parris Island from rising sea levels is urgent, leaders say*](https://advance.lexis.com/api/document?id=urn:contentItem:652G-0WR1-DYJM-M0D8-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

52. [*Laura Tobin predicts Welsh town will be submerged under water by 2054 amid climate crisis*](https://advance.lexis.com/api/document?id=urn:contentItem:654C-3D71-DY4H-K3V2-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

53. [*Laura Tobin predicts Welsh town will be submerged under water by 2054 amid climate crisis*](https://advance.lexis.com/api/document?id=urn:contentItem:654C-3D71-DY4H-K3X5-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

54. [*Fighting the tides: Maldives races to reclaim more land as sea levels rise*](https://advance.lexis.com/api/document?id=urn:contentItem:654H-C9R1-JCDN-135B-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

55. [*UNION MINISTER DR JITENDRA SINGH SAYS, RECENT SCIENTIFIC STUDIES HAVE PROJECTED A DECREASE IN ANNUAL RAINFALL FOR CHENNAI AT THE RATE OF 6.398 MM/YEAR DURING THE NEXT THREE DECADES (2020-2050)*](https://advance.lexis.com/api/document?id=urn:contentItem:6540-5411-JCBF-S25F-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

56. [*UNION MINISTER DR JITENDRA SINGH SAYS, RECENT SCIENTIFIC STUDIES HAVE PROJECTED A DECREASE IN ANNUAL RAINFALL FOR CHENNAI AT THE RATE OF 6.398 MM/YEAR DURING THE NEXT THREE DECADES (2020-2050)*](https://advance.lexis.com/api/document?id=urn:contentItem:6540-52G1-JCBF-S3YD-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

57. [*'It's happening now': how rising sea levels are causing a US migration crisis*](https://advance.lexis.com/api/document?id=urn:contentItem:655N-3RC1-JBNF-W3DY-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

58. [*Shipyard 'set to flood' due to impact of climate change*](https://advance.lexis.com/api/document?id=urn:contentItem:6540-4FB1-F0JC-M1BK-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

59. [*Cities Around the World That Will Soon Be Underwater*](https://advance.lexis.com/api/document?id=urn:contentItem:655T-J6J1-JCMN-Y41G-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

60. [*Library event focuses on local author’s warning about sea levels*](https://advance.lexis.com/api/document?id=urn:contentItem:656Y-7J91-DXVP-V3TX-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

61. [*Library event focuses on local author’s warning about sea levels*](https://advance.lexis.com/api/document?id=urn:contentItem:6574-W2S1-DXVP-V466-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

62. [*Survey: Majority of Louisiana residents say coastal land loss will harm the state*](https://advance.lexis.com/api/document?id=urn:contentItem:657M-G531-JBSN-3047-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

63. [*The Ocean Is Coming for Homes. That’s Not Priced In.*](https://advance.lexis.com/api/document?id=urn:contentItem:6551-N6S1-JBKS-P0KN-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

64. [*Coastal home buyers are ignoring rising flood risks, despite clear warnings and rising insurance premiums*](https://advance.lexis.com/api/document?id=urn:contentItem:652X-P2B1-JB75-90CF-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

65. [*Lyttelton area first to have climate plans*](https://advance.lexis.com/api/document?id=urn:contentItem:655N-VW51-JCBN-V0GD-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

66. [*Global flood losses hit $82bn last year*](https://advance.lexis.com/api/document?id=urn:contentItem:6552-WSM1-JCV0-21VT-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

67. [*Opinion: How the environmental movement might die. What that means for Cape Cod.*](https://advance.lexis.com/api/document?id=urn:contentItem:657Y-Y5R1-JCMC-W3B0-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

68. [*A North Carolinian is the U.S. watchman for rising seas. And he's worried.*](https://advance.lexis.com/api/document?id=urn:contentItem:6515-HCV1-JC3J-X3TH-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

**Narrowed by:**

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

69. [*Coastal home buyers are ignoring rising flood risks, despite clear warnings and rising insurance premiums*](https://advance.lexis.com/api/document?id=urn:contentItem:652W-KHS1-DY6B-21XH-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

70. [*- MIT - QA, Climate Grand Challenges finalists on using data and science to forecast climate-related risk*](https://advance.lexis.com/api/document?id=urn:contentItem:655V-WXY1-F0K1-N2D2-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

71. [*Union Minister Dr Jitendra Singh says, recent scientific studies have projected a decrease in annual rainfall for Chennai at the rate of 6.398 mm/year during the next three decades (2020-2050)*](https://advance.lexis.com/api/document?id=urn:contentItem:656R-40M1-DYDW-755M-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

**Narrowed by:**

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

72. [*Dr Jitendra Singh says that recent scientific studies have projected a decrease in annual rainfall for Chennai*](https://advance.lexis.com/api/document?id=urn:contentItem:654C-K491-DXMP-K4PH-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

**Narrowed by:**

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

73. [*Sentinel-6: New International Sea Level Satellite*](https://advance.lexis.com/api/document?id=urn:contentItem:6546-FCV1-JCMN-Y4F8-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

**Narrowed by:**

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

74. [*South China Sea level has risen by 150 mm since 1900: study*](https://advance.lexis.com/api/document?id=urn:contentItem:653G-2M81-DY91-H1BF-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

75. [*India : Union Minister Dr Jitendra Singh says, recent scientific studies have projected a decrease in annual rainfall for Chennai at the rate of 6.398 mm/year during the next three decades (2020-2050)*](https://advance.lexis.com/api/document?id=urn:contentItem:6549-FMT1-JBHT-D1B9-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

76. [*India : Union Minister Dr Jitendra Singh says, recent scientific studies have projected a decrease in annual rainfall for Chennai at the rate of 6.398 mm/year during the next three decades (2020-2050)*](https://advance.lexis.com/api/document?id=urn:contentItem:6546-4T81-JB5P-J0NK-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

77. [*Keys secures $14M in federal funding*](https://advance.lexis.com/api/document?id=urn:contentItem:6558-8T71-JBCN-4208-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

78. [*Candidate wants to cut waste, opposes new tax*](https://advance.lexis.com/api/document?id=urn:contentItem:6522-R2C1-DXVP-V12N-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

79. [*Lower Otter Restoration Project saves rare plants from sea level rise*](https://advance.lexis.com/api/document?id=urn:contentItem:651C-NXC1-JC7J-N3JC-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

**Narrowed by:**

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

80. [*Tide Gauge Network*](https://advance.lexis.com/api/document?id=urn:contentItem:652D-W8X1-DYDW-737G-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

81. [*Lower Otter Restoration Project saves rare plants from sea level rise*](https://advance.lexis.com/api/document?id=urn:contentItem:651J-FT81-F0YC-N0TP-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

82. [*- MIT - QA, Climate Grand Challenges finalists on using data and science to forecast climate-related risk*](https://advance.lexis.com/api/document?id=urn:contentItem:655V-WXY1-F0K1-N2M0-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

83. [*QANDA: CLIMATE GRAND CHALLENGES FINALISTS ON USING DATA AND SCIENCE TO FORECAST CLIMATE-RELATED RISK*](https://advance.lexis.com/api/document?id=urn:contentItem:655W-WJP1-DYTH-G2WT-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

84. [*Antarctic ice shelf the size of New York City finally crumbles after heatwave*](https://advance.lexis.com/api/document?id=urn:contentItem:653H-7FB1-DY47-50MC-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

85. [*Christianborg Castle, others will be eroded by the sea*](https://advance.lexis.com/api/document?id=urn:contentItem:654C-XDP1-F11P-X13T-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

86. [*South China Sea level has risen by 150 mm since 1900: Study*](https://advance.lexis.com/api/document?id=urn:contentItem:653G-PSH1-F11P-X06G-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

87. [*Coastal home buyers are ignoring rising flood risks, despite clear warnings and rising insurancepremiums*](https://advance.lexis.com/api/document?id=urn:contentItem:657B-KT31-JCMN-Y0W0-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

88. [*Don't Look Up!*](https://advance.lexis.com/api/document?id=urn:contentItem:656X-8P21-JCG7-83JH-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

89. [*Don't Look Up – OpEd*](https://advance.lexis.com/api/document?id=urn:contentItem:656G-9MH1-JDJN-6165-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

90. [*DON'T LOOK UP!*](https://advance.lexis.com/api/document?id=urn:contentItem:656R-S9J1-DYTH-G3D2-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

91. [*CLIMATE CHANGE IMPACT: IPCC PAINTS GRIM PICTURE FOR BANGLADESH*](https://advance.lexis.com/api/document?id=urn:contentItem:653P-WHG1-JCH9-G36N-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

92. [*Don't Look Up!*](https://advance.lexis.com/api/document?id=urn:contentItem:656P-R111-F03R-N2CF-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

93. [*Coastal home buyers are ignoring rising flood risks, despite clear warnings and rising insurancepremiums*](https://advance.lexis.com/api/document?id=urn:contentItem:6533-5YD1-F03R-N27X-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

94. [*Don't Look Up!*](https://advance.lexis.com/api/document?id=urn:contentItem:656S-3NB1-F03R-N1PB-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
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95. [*Don't Look Up!*](https://advance.lexis.com/api/document?id=urn:contentItem:656B-3ND1-JCMN-Y3H2-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

96. [*Miami's top official on climate change is resigning. She was the third in 3 years*](https://advance.lexis.com/api/document?id=urn:contentItem:6552-9GK1-DYJM-M118-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

97. [*United Kingdom : Lower Otter Restoration Project saves rare plants from sea level rise*](https://advance.lexis.com/api/document?id=urn:contentItem:651T-S951-JDJN-633T-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

98. [*Powerful 'rivers in the sky' could cause Antarctic Peninsula's biggest ice shelf to collapse*](https://advance.lexis.com/api/document?id=urn:contentItem:6575-7VB1-JBSS-S203-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

99. [*Lewes committee recommends resiliency fund Real estate disclosure also to go before mayor and city council*](https://advance.lexis.com/api/document?id=urn:contentItem:657J-P591-JBCN-446Y-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| **Content Type** | **Narrowed by** |
| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |

100. [*TIDE GAUGE NETWORK*](https://advance.lexis.com/api/document?id=urn:contentItem:651D-0PB1-JDKC-R3F7-00000-00&idtype=PID&context=1516831)

**Client/Matter:** -None-

**Search Terms:** sea-level rise

**Search Type:** Natural Language

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| News | Timeline: Mar 15, 2022 to Apr 15, 2022 |



[***AR6 and Sea Level Rise, Part 1***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651M-PWG1-F03R-N4VP-00000-00&context=1516831)

Newstex Blogs

Watts Up With That?

March 19, 2022 Saturday 6:06 PM EST

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**Length:** 2250 words

**Byline:** Andy May

**Body**

Mar 19, 2022( Watts Up With That?: [*http://wattsupwiththat.com*](http://wattsupwiththat.com) Delivered by Newstex)

By Andy May

This is the first of a three-part series on the IPCC's discussion of ***sea*** ***level*** ***rise*** in their latest report, AR6 (IPCC, 2021). The report claims that the rate of ***sea*** ***level*** ***rise*** is accelerating. It is fair to ask why they think this, what evidence do they offer?

We find the following in the AR6 Summary for Policymakers[1]:

'Global mean ***sea*** ***level*** increased by 0.20 [0.15 to 0.25] m between 1901 and 2018. The average rate of ***sea*** ***level*** ***rise*** was 1.3 [0.6 to 2.1] mm yr-1 between 1901 and 1971, increasing to 1.9 [0.8 to 2.9] mm yr-1 between 1971 and 2006, and further increasing to 3.7 [3.2 to 4.2] mm yr-1 between 2006 and 2018 (high confidence). Human influence was very likely the main driver of these increases since at least 1971.' [Bold added] AR6 Summary for Policymakers[2], page SPM-6 (IPCC, 2021)

And the following in AR6, Chapter 9:

'Global mean ***sea*** ***level*** (GMSL) rose faster in the 20th century than in any prior century over the last three millennia (high confidence), with a 0.20 [0.15-0.25] m ***rise*** over the period 1901 to 2018 (high confidence). GMSL ***rise*** has accelerated since the late 1960s, with an average rate of 2.3 [1.6-3.1] mm yr-1 over the period 1971-2018 increasing to 3.7 [3.2-4.2] mm yr-1 over the period 2006-2018 (high confidence). New observation-based estimates published since SROCC[3] [Special Report on the Ocean and Cryosphere in a Changing Climate, 2019] lead to an assessed ***sea*** ***level*** ***rise*** over the period 1901 to 2018 that is consistent with the sum of individual components. While ocean thermal expansion (38%) and mass loss from glaciers (41%) dominate the total change from 1901 to 2018, ice sheet mass loss has increased and accounts for about 35% of the ***sea*** ***level*** increase during the period 2006-2018 (high confidence).' On page 9-8 (Chapter 9, page 8) of the AR6 report[4]:

And, farther in Chapter 9:

'At the basin scale, ***sea*** ***levels*** rose fastest in the Western Pacific and slowest in the Eastern Pacific over the period 1993-2018 (medium confidence). The anthropogenic signal in regional ***sea*** ***level*** change will emerge in most regions by 2100 (medium confidence).' [bold added] AR6 Chapter 9, page 8.

It is a little distressing that in the Summary for Policy Makers (SPM) they conclude that human influence was 'very likely' the main driver of the acceleration in ***sea*** ***level*** and in Chapter 9 they admit they do not expect to observe an anthropogenic signal in regional ***sea*** ***level*** change before 2100.

Global Mean ***Sea*** ***Level*** (GMSL) might have increased more in the 20th century than at any time in the past 3,000 years, but how would anyone know? There were no tide gauges or satellites 3,000 years ago. Neither tide gauges nor satellites are accurate at the millimeter level, and certainly historical records and geological proxies from three thousand years ago are not. The geological proxies of past ***sea*** ***level*** are explained by Willis Eschenbach here[5]. Warning, if you have a sensitive stomach, don't look at Willis's plots!

Further, why should this mean anything? Glaciers advanced to their lowest Holocene elevations during the Little Ice Age from 1600 to 1850, swallowing entire villages in the process (Behringer, 2010, pp. 89-90). The Little Ice Age was the coldest period in the entire Holocene—roughly 11,700 years ago to the present day. As Little Ice Age glaciers melt, one would expect ***sea*** ***level*** to ***rise*** a little, but just how significant is this? More importantly can we be confident the rate of GMSL ***rise*** is accelerating?

We also find it strange that they conclude the rate of GMSL ***rise*** is increasing based on comparing linear least squares fits to selected portions of the ***sea*** ***level*** record. Figure 1 plots the entire NOAA GMSL record by quarter since April 1880. The x axis is the number of quarters (three-month periods), and mean ***sea*** ***level*** is given on the y axis through 2020. This record is built from the Church and White (Church & White, 2011) GMSL data to 2010 and University of Hawaii Fast Delivery data[6] after that.

[*https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-1\_featured.pngFigure*](https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-1_featured.pngFigure) 1. NOAA Mean ***Sea*** ***Level*** from 1880 to 2020 by quarter. Data collected by Philip Townsend. Most of this record was prepared by (Church & White, 2011). The record after 2010 is from the (University of Hawaii ***Sea*** ***Level*** Center, 2021). The period from 1971 to 2018, mentioned in the AR6 quotes above is shown in orange and a linear least squares fit to the period is displayed.

AR6 selects numerous specific intervals in the quotes above to justify their claim that the rate of ***sea*** ***level*** ***rise*** is accelerating. This claim is visually dubious since the data look a bit wavy, but linear. The period of apparent acceleration from 180 to 300 (1925-1952), looks suspiciously like 420 to 510 (1985-2007). The entire record, from April 1880 to the end of 2020 has a slope of 1.65 mm/year with an R2 of 0.97. We could cherry pick periods all day and not resolve anything significant regarding acceleration or the lack of it. The least squares statistics for the AR6 cherry-picked periods mentioned in the quotes above are given in Table 1 and compared to four I cherry-picked.

While AR6 claims acceleration is occurring with high confidence, the previous report states:

'The trend in GMSL observed since 1993, however, is not significantly larger than the estimate of 18-year trends in previous decades (e.g., 1920-1950).' AR5: (IPCC, 2013, p. 290)

One wonders why AR6 has a different view only seven years later.

[*https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Table-1.pngTable*](https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Table-1.pngTable) 1. Cherry-picked ***sea***-***level*** ***rise*** rates.

AR6 would have us believe that because a least squares linear fit to the ***rise*** in ***sea*** ***level*** is larger from 2006 to 2018 than from 1971 to 2018 it is accelerating. Yet from 2012 to 2020 the rate is nearly as low as from 1971 to 2018. The largest rate of ***rise*** in Table 1 is only 15 inches or 38 cm per century, hardly alarming when global tides, in the open ocean, average more than twice[7] that; and coastal tides are often ten times that value daily. Climate changes on a temporal scale of centuries, as we can see comparing the Little Ice Age to the Medieval Warm Period, so an instrumental record from 1880 to 2020 is unlikely to capture the full range of ***sea*** ***level*** rates. Estimates of ***sea*** ***level*** ***rise*** gathered from historical and geological records show that ***sea*** ***level*** has risen much faster in the past, as shown in Figure 2 created by Robert Rohde.

[*https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-2-2.jpgFigure*](https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-2-2.jpgFigure) 2. A ***sea*** ***level*** change graph for the Holocene and the Last Glacial Maximum created by Robert Rohde. The rate of ***sea*** ***level*** ***rise*** was much higher than today from 14,000 years ago until about 4,000 years ago. The variations since 4,000 years ago are too small to measure.

***Sea*** ***level*** is estimated using tide gauges mounted on coasts around the world. The very best of these gauges are only accurate to 5 mm[8] for a monthly average (NOAA, 2020). Satellite measurements of ***sea*** ***level*** are problematic unless meteorological conditions are perfect, and they are trying to measure the altitude of a moving surface. AR6 admits that satellite estimates of ***sea*** ***level*** ***rise*** 'acceleration' are much smaller than the heavily massaged tide gauge records. This is discussed on page AR6 page 9-96, where we see that satellites find acceleration from 1993 to 2015 to 2006-2015 is from a rate of 3.16 mm/year to 3.58 mm/year, this is an acceleration of less than half a mm/year2 in roughly a decade. Other satellite estimates are similar. Satellite estimates of ***sea*** ***level*** are not accurate to one-half of a millimeter (Frederikse, et al., 2020).

Is the difference between an estimated global average rate of 3.8 mm/year and 1.8 mm/year statistically significant, considering the data used? Particularly when these measurements are made over a few decades? It seems unlikely, but let's look at the data more closely.

The AR6 statements suggest that the rate of ***sea*** ***level*** ***rise*** is increasing due to human influence. This is presumably due to greenhouse gas (GHG) emissions causing surface warming, which then melts glaciers sitting on land. This raises two questions:

Is the increase in the rate of ***sea*** ***level*** ***rise*** statistically significant?

If so, could warming due to human GHG emissions have caused it?

From AR6:

'Heating of the climate system has caused global mean ***sea*** ***level*** ***rise*** through ice loss on land and thermal expansion from ocean warming. Thermal expansion explained 50% of ***sea*** ***level*** ***rise*** during 1971- 2018, while ice loss from glaciers contributed 22%, ice sheets 20%, and changes in land water storage 8%. The rate of ice sheet loss increased by a factor of four between 1992-1999 and 2010-2019. Together, ice sheet and glacier mass loss were the dominant contributors to global mean ***sea*** ***level*** ***rise*** during 2006-2018 (high confidence).' AR6 page: SPM-14

Thus, ocean warming since the Little Ice Age, provides about half of ***sea*** ***level*** ***rise***. Melting ice provides most of the rest.

From AR6:

'By 2100, GMSL is projected to ***rise*** by 0.28-0.55 m (likely range) under SSP1-1.9 and 0.63-1.02 m (likely range) under SSP5-8.5 relative to the 1995-2014 average (medium confidence). Under the higher CO2 emissions scenarios, there is deep uncertainty in ***sea*** ***level*** projections for 2100 and beyond associated with the ice-sheet responses to warming. In a low-likelihood, high-impact storyline and a high CO2 emissions scenario, ice-sheet processes characterized by deep uncertainty could drive GMSL ***rise*** up to about 5 m by 2150. Given the long-term commitment, uncertainty in the timing of reaching different GMSL ***rise*** levels is an important consideration for adaptation ' AR6 page TS-44

Some IPCC climate models predict up to 5 meters of ***sea*** ***level*** ***rise*** by 2150, when the current rate of ***sea*** ***level*** ***rise*** is less than 40 cm or 1.3 feet per century? Considering that the IPCC models have not predicted climate accurately after 30 years of trying (McKitrick & Christy, 2018), pardon my skepticism.

AR6:

'It is virtually certain that global mean ***sea*** ***level*** will continue to ***rise*** through 2100

Beyond 2100, GMSL will continue to ***rise*** for centuries due to continuing deep ocean heat uptake and mass loss of the Greenland and Antarctic Ice Sheets and will remain elevated for thousands of years (high confidence).' AR6 Chapter 9, page 9-9.

The first statement is likely true, we are still warming as we come out of the Little Ice Age and I would doubt a change in direction of glacier retreat before 2100, the second statement is pure speculation, projecting beyond 2100 is reckless.

In summary, the AR6 statements about acceleration of ***sea*** ***level*** ***rise*** are based on simple cherry-picked and crude linear least squares fits to ***sea*** ***level*** data for the past 140 years. They also incorporate data and trends of ocean warming and land-based glacier melting. The problem is the rate of ***rise*** of ***sea*** ***level*** is so small today and so linear that their attempts to predict large rates of ***sea*** ***level*** ***rise*** are statistically inept and almost comical. In the next post we examine the complexity of measuring GMSL, and later in this series we will provide a more statistically significant projection of ***sea*** ***level*** ***rise*** that is much less than the wild predictions from AR6.

The bibliography can be downloaded here[9].

Article Rating

[ 1]: [*https://www.ipcc.ch/report/ar6/wg1/#SPM*](https://www.ipcc.ch/report/ar6/wg1/#SPM) [ 2]: [*https://www.ipcc.ch/report/ar6/wg1/#SPM*](https://www.ipcc.ch/report/ar6/wg1/#SPM) [ 3]: [*https://www.ipcc.ch/srocc*](https://www.ipcc.ch/srocc)/ [ 4]: [*https://www.ipcc.ch/report/ar6/wg1/*](https://www.ipcc.ch/report/ar6/wg1/) [ 5]: [*https://wattsupwiththat.com/2022/03/18/proxy-rates-of-****sea****-****level****-****rise****/*](https://wattsupwiththat.com/2022/03/18/proxy-rates-of-sea-level-rise/) [ 6]: [*https://gloss-****sealevel****.org/fast-mode-data-delivery#:~:text=The%20UHSLC%20operates%20the%20GLOSS%20Fast-Delivery%20Center%2C%20which,implies%20posting%20of%20the%20data%20within%201-2%20months*](https://gloss-sealevel.org/fast-mode-data-delivery#:~:text=The%20UHSLC%20operates%20the%20GLOSS%20Fast-Delivery%20Center%2C%20which,implies%20posting%20of%20the%20data%20within%201-2%20months). [ 7]: [*https://www.timeanddate.com/astronomy/moon/tides.html#:~:text=Average%20and%20Extreme%20Tides%20The%20average%20tidal%20range,10%20times%20higher%20in%20the%20most%20extreme%20regions*](https://www.timeanddate.com/astronomy/moon/tides.html#:~:text=Average%20and%20Extreme%20Tides%20The%20average%20tidal%20range,10%20times%20higher%20in%20the%20most%20extreme%20regions). [ 8]: [*https://tidesandcurrents.noaa.gov/publications/CO-OPS\_Measurement\_Spec.pdf*](https://tidesandcurrents.noaa.gov/publications/CO-OPS_Measurement_Spec.pdf) [ 9]: [*https://andymaypetrophysicist.com/wp-content/uploads/2022/03/AR6-and-****sea****-****level****-Bibliography\_1.pdf*](https://andymaypetrophysicist.com/wp-content/uploads/2022/03/AR6-and-sea-level-Bibliography_1.pdf)

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[***34 Years of Flawed, Failed & Grossly Misrepresented Global Sea Level Rise Speculation***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:653W-SCJ1-JCMN-Y4VF-00000-00&context=1516831)

Newstex Blogs

Watts Up With That?

March 29, 2022 Tuesday 10:06 PM EST

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**Length:** 12245 words

**Byline:** Guest Blogger

**Body**

Mar 29, 2022( Watts Up With That?: [*http://wattsupwiththat.com*](http://wattsupwiththat.com) Delivered by Newstex)

Guest essay by Larry Hamlin

For decades climatealarmists in the UK, EU and U.S. have been making flawed andfailed exaggerated claims regarding acceleratingglobal level ***sea*** ***level*** ***rise*** beingcaused byincreasing man made CO2 emissions as one means of politically bullying the world's nations into mandating immensely costly, bureaucraticallyonerous and completely ineffective global CO2 reductions from these nations.

The flawed CO2 reduction schemes in the EU and UK have created significant declines in energy availability and reliability because of these nations excessive reliance on unreliable, nondispatchable, backup power reliant and costly renewable energy. These politically contrived emissions and energy incompetent policies have resulted in greatly increasing energy costs forEU and UK nations that negatively impacted their economies while significantly increasing their dependence on energy[1]from other nations.

This energy dependence includes greatly increased needs for natural gas, petroleum and coal supplies obtained through other nations and especially from Russia which (before sanctions) provided about 40% of the EU's natural gas energy as well as being the EUs main supplier of crude oil (27%) and hard coal (49%). This data and other information concerning the EU and UK self-inflicted climate alarmist driven energy and economic debacle is addressedhere[2],here[3]andhere[4].

The EUs efforts to build additional liquified natural gas terminals to wean itself off Russian gas is estimated to take atleast three years with existing available import shipping facilities already maxed out. Renewables would take even longer. Any new LNG cargoes will have higher costs than the existing Russianpipelines. EU policy makers are stuck with politically damaging options includingrationing energy and using more coal which means dumping climategoals. Whenpush comes to shove emission reductions will take second place toeconomic survival with this huge energy and emissions policy turnaround already underway and being led by Germany.

Loss ofwestern energy expertise in Russia resulting from sanctions could led to much higher emissions in Russia which is the largest emitter of methane in oil and gas production that leaks from its fossil-fuel infrastructure. China has become the major global manufacturing center producing emissions for the world making it far and away the largest emitter (emissions twice those of the U.S. withmore emissions growth to come) and because of its global manufacturing role doesn't even bother to play lip service to the alarmist driven propaganda hyping climate change goals. China along with economic growth desired by other developing nations will clearly push future global emissions upward as noted below.

Global emissions are climbing again and will clearly continue to climb ever upward in the coming years. Afterabout a 5% reduction[5]during the pandemic of 2020 global emissions have seen record highs in 2021 according to IEA with a 6% increase over 2020 levels with the CO2 atmospheric levels showing no trace of the 5% reduction in year 2020 as shown below. So much for the absurdly phony year 2021 scientifically false 'climate emergency' proclaimed by the Democrats trying to support their failed COP26 debacle in Glasgow at a time when all 5 acknowledged global temperature anomaliesmeasurement systems have been declining[6]for the last 6+ years.

During all this global energy and economic turmoil caused by harebrained net zero-renewable energy climate alarmist propaganda the latest report was released by NOAA and other government agencies attempting to justify claims of ever-increasing rates of global ***sea*** ***level*** ***rise*** caused by man- made CO2 emissions.

While the harsh political and economic reality of the excessive renewable energy net zero policy mandate consequences and stupidity are now clearly visible and impossible to hide the alarmist world of global mean ***sea*** ***level*** ***rise*** is floundering with the ability to accurately 'predict' future global ***sea*** ***level*** ***rise*** outcomes moving further into the future as demonstrated by the results of most recent year 2022 government ***sea*** ***level*** ***rise*** report published over the last 34 years starting with an historic Senate hearing in 1988.

The long and scientifically unsupported exaggerated history of flawed and failed ***rising*** ***sea*** ***level*** alarmist claimsbegan in earnest in the U.S. in 1988 political theatrics showcase hearing in the nation's Capital.

The Democratic Party escalated the politically driven climate alarmist dubious ***rising*** ***sea*** ***level*** claims in ahearing held on June 23, 1988by the Senate Committee on Energy and NaturalResources in the Senate Dirksen Office Building in Washington D.C. addressed in detailhere[7].

Dr. Michael Oppenheimer, Senior Scientist, Environmental Defense Fund wrongly testified that:

'Global mean temperature will likely ***rise*** at about 0.6 degrees F per decade and ***sea*** ***level*** at about 2.5 inches per decade.'

'These rates are about six times recent history.'

'Every decade of delay and implementation of greenhouse gas abatement policies ultimately adds perhaps a degree F of warming, and no policy can be fully implemented immediately in any event.'

NOAA global tide gauge data updated through year 2020 (more than three decades after the 1988 Senate hearings) estimates that theglobal absolute rate of ***sea*** ***level*** ***rise***[8]is about 0.7 inches per decade (between 1.7 to 1.8 mm/yr.) which is strikingly below Dr. Oppenheimer's claim of 2.5 inches per decade increase.

Furthermore Dr. Oppenheimer's claim that each decade of delay in implementing greenhouse gas abatement policies (global emissions grew by nearly 65% between 1988 and 2019[9]with this growth entirely dominated by the world's developing nations led by China and India) adds another 1 Degree F of warming would mean that the three plus decades of continued growth in greenhouse gas emissions that have occurred since the 1988 hearing would have considerably increased his estimates of 0.6 degrees F temperature anomaly increase per decade and 2.5 inches of ***sea*** ***level*** ***rise*** increase per decade - assuming his alarmist claims ever had any merit.

Of course, all these flawed and proved false increasing global ***sea*** ***level*** ***rise*** claims made in the Democrats hearing were headlined in the climate alarmist propaganda press (just as they continue to be 34 years later only with newly flawed and fabricated erroneous global mean ***sea*** ***level*** claims) as shown below in the headlines of the June 24,1988 New YorkTimes.

The firstUN IPCC AR1[10](FAR) climate report issued in 1990 provided yet another opportunity for climate alarmists to fabricate more flawed and failed exaggerated 'predicted'claims about global sea levelrise with the following study assessment.

'Simple models were used to calculate the ***rise*** in ***sea*** ***level*** to the year 2100, the results are illustrated below.'

'The ***sea*** ***level*** ***rise*** expected from 1990 to 2100 under the IPCC Business as-Usual emissions scenario is shown in Figure 12.'

The FAR report notes that using the Best Estimate 'predicted' case 'The 'predicted' ***rise*** is about 20cm (7.9 inches) in global mean ***sea*** ***level*** by 2030, and 65cm (25.6 inches) by the end of the next century.'

The FAR report High Estimate 'predicted' estimate for year 2100 was 110cm (43.3 inches) and the Low Estimate 'predicted' was 30cm (11.8 inches).

Using NOAA's absolute rate of global sea levelrise noted above of between 1.7 to 1.8 mm/yr. discussed above establishes that theincreasebetween 1990 and 2030 would be about 7cm (2.75 inches over 40 years or 6.87 inches per century) not the 20cm 'projected' in the FAR study with the NOAA estimated value being about 1/2 of what the Low Estimate 'projection' of the FAR study graph shows for year 2030.

Additionally using this NOAA absolute ***sea*** ***level*** ***rise*** value results in the global ***sea*** ***level*** ***rise*** increase between 1990 to year 2020 being about 5.2cm (2 inches in 30 years).

The graph below shows a comparison of the NOAA linear trend measuredtide gauge data for Los Angeles[11], California(used as an example of more than 100 U.S. NOAA coastal tide gauge measurement stations showing linear ***sea*** ***level*** ***rise*** data trends) over the period from 1923 through 2021 compared to the'predicted' accelerating ***sea*** ***level*** ***rise*** curves portrayed by the UN IPCC FAR study that falsely assert sea levelrise acceleration starts in 1990.

For the 31-year period between 1990 and 2021 (NOAA tide gauge data updated through year 2021) the Los Angeles tide gauge data shows a steady increase of about 3.2cm (1.27 inches) which is about 1/2 of the FAR Low Estimate value 'predicted' curve with no acceleration present as wrongly portrayed in the FAR study global ***sea*** ***level*** ***rise*** 'predicted' curves.

Hundreds of additional measured tide gauge data locations worldwide (using GLOSS/PSMSL world tide gauge station data) can be compared with the accelerating ***sea*** ***level*** ***rise*** curves as shown in the FAR 'predicted' study as shown below for the more than210 year long Brest France[12]tide gauge measured data reflecting no acceleration with a steady ***sea*** ***level*** ***rise*** trend over its long history of about 0.33 feet (10cm) per century.

TheFAR study over states the ***rise*** of global ***sealevel*** ***rise*** byabout a factor of 3(year 2030 7cm increase versus 20cm increase by FAR's Best Estimate 'predicted' ***sea*** ***level*** ***rise*** with ***sea*** ***level*** ***rise*** acceleration starting in 1990) higher than the NOAA determined absolute ***sea*** ***level*** ***rise*** rate of 1.7 to 1.8 mm/yr. - yet another flawed and failed UN IPCC ***sea*** ***level*** ***rise*** scenario 'predicted' outcome that the world's nations were being asked to accept via this 'settled science' based on flawed 'scenarios' that falsely attempted to justify mandates for highly questionable, ineffective and costly CO2 reduction mandates.

Moving on to theyear 2012 study by government climate alarmists[13]attempting to fabricate ***sea*** ***level*** riseincreasing claims the Global Sea LevelRise Scenarios for the U.S. National Climate Assessment report is shownbelow.

This report was carried out by theObama Administration reflecting his belief[14] thatwe would be able to look back upon his nomination and tell our children that 'this was the moment when the ***rise*** of the oceans began to slow and our planet began to heal.'

Besides the monumental hubris of this statement, it is apparent that President Obama was ignorant of the fact that the oceans have been ***rising*** for thousands of years since the end of the last ice age.

The rates of ocean ***sea*** ***level*** change have varied significantly over this time period with more recent studies showing greater detail of ocean ***sea*** ***level*** change information over about the last two hundred years. These changes in ocean ***sea*** ***level*** have occurred as a result of natural climate driven outcomes as clearlyshown in information[15](slide #36) from apresentationby Dr. Judith Curryregarding global climate science issues.

By the end of the Obama Administration in January 2017 the rate of ***sea*** ***level*** ***rise*** at both Honolulu and Woods Hole (6 miles from Martha's Vineyard Island) remained unchanged from January 2009 when he took office at 0.51 feet per century and 0.98 feet per century respectively (as shown below by NOAA tide gauge data updated through year 2021) thereby revealing that Obama's post Presidential decisions to spend tens of millions of dollars to build and buy huge coastal mansions atHonolulu[16]andMartha's Vineyard[17]coastal locations were unfettered by his and the Democratic Party politically contrived shenanigans about 'the ***rise*** of the oceans'.

Additionally,the rates of ***sea*** ***level*** ***rise*** at both of Obama's huge coastal mansion locations remainunchanged through year 2021 from those presentduringthe 8 long years of the ObamaAdministration demonstrating that not only was he not able to slow 'the ***rise*** of the oceans' but more importantly that Obama and the Democrats phony climate alarmist ***sea*** ***level*** ***rise*** claims were nothing but politically driven propaganda not science.

Like all government politically driven future ***sea*** ***level*** ***rise*** studies by climatealarmist's new versions of accelerating global mean ***sea*** ***level*** ***rise*** claims are fabricated using ***sea*** ***level*** ***rise*** 'scenario' models that show their completely speculative ***sea*** ***level*** ***rise*** trends accelerating in the future that the world will supposedly experience unless we act immediately to reduce CO2 emissions. This 2012 study ***sea*** ***level*** ***rise*** 'scenario' models are shown below with ***sea*** ***level*** ***rise*** acceleration starting about year 2000 (as shown below) a decade later than the FAR study 1990 acceleration start year.

The 2012 report proposes 4 speculative global ***sea*** ***level*** ***rise*** scenarios but states very confidently that'We have very high confidence ( >9 in 10 chance) that global mean ***sea*** ***level*** will ***rise*** at least 0.2 meters (8 inches) and no more than 2.0 meters (6.6 feet) by 2100.'The report offers a mid-range for its global ***sea*** ***level*** ***rise*** 'scenario' of about 3 feet.

The term'high confidence'represents 'expert opinion' by the authors of the report and is not derived fromcalculatedprobabilities for 'scenarios' which of coursehave no defined probabilities as discussed below.

Compared to the FAR study the'new' year 2100 magically arrived at highest global ***sea*** ***level*** ***rise*** number is now 6.6 feetversus just 3.6 feet in the FAR study emulating the usual IPCC 'it's worse than we thought' mantra utilized for each new UN published climate report. Addressed below is a discussion of the lack of both certainty and credibility behind the new 'worse than wethought' global ***sea*** ***level*** ***rise*** scenario 'projections' (note the term 'projection' is now used instead of the term 'prediction' as used in the FAR study clearly showing the degree of certainty in these ***sea*** ***level*** ***rise*** claims is declining) from this Obama Administration study.

The alleged purpose of this study was to 'help' local cities and communities 'plan' for future ***sea*** ***level*** ***rise*** that could impact their locations. The report contains the following huge methodology uncertainty stipulations and inadequacies regarding the validity and applicability of these global mean ***sea*** ***level*** ***rise*** scenarios that will supposedly impact coastal communities and cities in the future:

'Scenarios do not predict future changes but describe future potential conditionsin a manner that supportsdecision-making under conditions of uncertainty'.

'Probabilistic projections of future conditions are another form of scenarios not used in this reportbecause this method remains an area of active research. No widely accepted method iscurrently available for producingprobabilistic projections of ***sea*** ***level*** ***rise*** at actionable scales'.

'Thus,specific probabilities or likelihoods are not assigned to individual scenarios in this report, and none of these scenarios should be used in isolation'.

'None of these scenarios should be used in isolation, andexperts and coastal managers should factor in locally and regionally specific information on climatic, physical, ecological, and biological processesand on the culture and economy of coastal communities.'

'Scientific observations at the local and regional scale are essential to action, and long-term coastal management actions (e.g., coastal habitat restoration)are sensitive to near-term rates and amounts of SLR.' (This would include use of hundreds of long time period local tide gauge measurement data which is unmentioned in the study)

Exactly how local communities and cities are supposed to use these scenarios for local ***sea*** ***level*** ***rise*** 'decision-making under conditions of uncertainty' purposes given these extensive uncertainty limitations and inadequacies is unexplained.

Of course, when the climatealarmistnews media address these studies all uncertainty limitations and inadequacies concerning the studiesmonumental guesswork are carefully concealed.

Instead media emphasize the flawed application of 6+ foot highest global mean ***sea*** ***level*** ***rise*** 'projection' increases by 2100 to coastal locations (as noted numerous times in these global mean ***sea*** ***level*** ***rise*** government reports coastal ***sea*** ***level*** ***rise*** is subject to locally driven specific assessments that differentiate outcomes at these locations from GMSL outcomes) withalarmist headlines as shown[18], for example, in the L. A. Times article shown below.

These ***sea*** ***level*** ***rise*** climate alarmist news articles grossly exaggerate and misrepresent what these studies actually say by concealing huge study uncertainty and inadequacy limitations while hyping the speculative and ill-defined ***sea*** ***level*** ***rise*** scenario guesswork.

Thisoften repeated pattern of flawed, failed and grossly misrepresented ***sea*** ***level*** ***rise*** studies[19]is further addressed in the following material.

The 2012Global ***Sea*** ***Level*** ***rise*** study discussed above wasupdated in a 2017 report[20]shown below.

The 2017 report addressed the differences between this new study versus how the 2012 study was approached and conducted as discussed below from items noted in the 2017 report which discusses key ***sea*** ***level*** ***rise*** components, uncertainties and assumptions.

'Parris et al. (2012) recognized the need for an interagency effort to define a set of future possible GMSL ***rise*** scenarios for coastal planning, policy, and management to allow for recognition of trend changes and adaptive management strategies(USACE, 2013).

Because of the large uncertainties involved in predictions of the land-based ice melt contribution to GMSL ***rise*** and the significant consequences associated with impossible-to-rule-out extreme outcomes, Parris et al. (2012) recommended a scenario approach covering a broad range (0.2 m to 2.0 m GMSL ***rise*** by 2100) of existing ***sea*** ***level*** study results (trends, process modeling, semi-empirical approaches, etc.).'

'In order to bound the set of GMSL ***rise*** scenarios for year 2100, we assessed the most up-to-date scientific literature on scientifically supported upper-end GMSL projections, including recent observational and modeling literature related to the potential for rapid ice melt in Greenland and Antarctica.'

'To ensure consistency with these recent updates to the peer-reviewed scientific literature, we recommend a revised 'extreme' upper-bound scenario for GMSL ***rise*** of 2.5 m by the year 2100, which is 0.5 m higher than the upper bound scenario from Parris et al. (2012) employed by the Third NCA (NCA3).'(Third NationalClimateAssessment NCA 2014)

'This report articulates the linkages between scenario-based and probabilistic projections of future sea levelsfor coastal-risk planning, management of long-lived critical infrastructure, mission readiness,and other purposes.The probabilistic projections discussed inthis report recognize the inherent dependency (conditionality) of future GMSL ***rise*** on future greenhouse-gas emissions and associated ocean-atmosphere warming.' (The 2017 study incorporates the use of AR5 climate model RCPs into its analysis which was not done in the 2012 study)

'The RCPs provide a set of possible future greenhouse gas concentrations through the year 2300 and were used by the IPCC AR5. Each RCP represents possible underlying (though implicit) socioeconomic conditions and technological considerations, including a low-end member (RCP2.6) requiring strong mitigation (net- negative emissions in the last decades of the 21stcentury), a moderate mitigation member (RCP4.5) stabilizing emissions through 2050 and declining thereafter, and a high-end, fossil-fuel-intensive, 'business-as-usual' emission scenario (RCP8.5).'

'Under the methodological assumptions of Kopp et al. (2014), in 2100 the Low scenario has a 94% to 100% chance of being exceeded under RCP2.6 and RCP8.5, respectively, whereas the Extreme scenario has a 0.05% to a 0.1% chance of being exceeded.'

Table4supposedly represents a proposed framework for 'decision-making under conditions of uncertainty' where theRCP uncertainties are now expressed as probabilities in terms of exceeding aspecific but also uncertain ***sea*** ***level*** ***rise*** scenario.

Table 4 probabilities do not represent the likelihood of any specific ***sea*** ***level*** ***rise*** outcomes actual occurrence which cannot be established because of inadequacies of the RCPs and global ***sea*** ***level*** ***rise*** scenarios.

The climate alarmist news media conceal the 'decision-making under conditions of uncertainty' probability characterizations represented by Table 4 and erroneously emphasize the 'Extreme (2.5 m)' GMSL ***rise*** scenario (as discussed further below) intheir misleading articles that grosslymisrepresent what the Table 4 study actually says.

How these Table 4 'probability of exceeding' values was determined is addressed below.

After the theatrics of the 1988 Senate hearing on global warming the UN IPCC had conducted several climate analysis reports and concluded that there are significant limitations to climate models being able to provide accurate future climate predictions that cannot be overcome.

The UN IPCC Third Assessment Report (AR3) was issued in year 2001 more than a decade after the 1988 hearing. That report finallyacknowledged that it is not possible[21]to develop climate models that can accurately model global climate and provide future climate predictions.

Specifically, the report in Section 14.2.2.2 noted:

'In sum, a strategy must recognize what is possible. In climate research and modeling, we should recognize that we are dealing with a coupled non-linear chaotic system, and therefore that the long-term prediction of future climate states is not possible. The most we can expect to achieve is the prediction of the probability distribution of the system's future possible states by generation of ensembles model solutions.'

UN IPCC Assessment Reports to date provide climate model scenarios (referred to as RCPs) that are used to suggest various possible climate states in the future. The RCPs that were included in the AR5 report issued in 2013 were identified as RCP 2.6, RCP 4.5, RCP 6.0 and RCP 8.5 with assumed greenhouse gas emissions varied from low scenario (2.6) to high scenario (8.5) along with numerous other assumptions.

However, the validity of these climate scenarios is significantly qualified in the AR5 climate report with the following limitations:

'The scenarios should be considered plausible and illustrative, and do not have probabilities attached to them.' (12.3.1; Box1.1)

The RCP2.6, RCP4.5 and RCP8.5 used in the NOAA 2017 study have no probabilitiesassociated with theiremissions scenario outcomes nor are there associated defined probabilities for the resulting warming impacts that are estimated for ocean thermal expansion, mass lossfrom glaciers, ice caps, and ice sheets or for varying non-climatic ground LSL (local ***sea*** ***level***) uplift or subsidence. So how are these 'probabilities' in Table 4 established?

Going to the 2017 studies methodological assumptionssource for the probabilities Kopp et al. (2014)as shown in Table 4[22]above we find the followingcritical informationregarding what lies behind these numbers and the process that defined them ashighlighted in thesignificant items from this study discussed below.

'Here we present a global set of local ***sea***-***level*** (LSL) projectionsto inform decisions on timescales ranging from the coming decades through the 22nd century.'

'We provide complete probability distributions, informed by a combination of expert community assessment, expert elicitation, and process modeling.'

Theterm 'expert elicitation' means[23]the following:

'Inscience,engineering, andresearch,expert elicitationis the synthesis of opinions ofauthoritiesof a subject where there isuncertainty due to insufficientdataor when such data is unattainable because of physical constraints or lack of resources.'

So, the stated 'probabilities' are 'opinion' driven because ofuncertainty,insufficientand unattainable dataandnot the resultof calculated outcomes from well-defined scientifically established emission scenarios, global mean ***sea*** ***level*** ***rise*** scenarios and process models.

Continuing with the Kopp (2014) study we find further discussion of the analysis methodology limitations, uncertainties and inadequacies addressed as follows:

'Between the years 2000 and 2100, we project avery likely(90% probability) GSL ***rise*** of 0.5-1.2 m under representative concentration pathway (RCP) 8.5, 0.4-0.9 m under RCP 4.5, and 0.3-0.8 m under RCP 2.6.' (e.g., Table 4 is developed via 'expert community assessment', 'expert elicitation', 'process modeling' and RCP models that are 'plausible' and/or 'illustrative'.)

'Site-to-site differences in LSL projections are due tovarying non-climatic background uplift or subsidence, oceanographic effects, and spatially variable responses of the geoid and the lithosphere to shrinking land ice.'

'The Antarctic ice sheet (AIS) constitutes a growing share of variance in GSL and LSL projections. In the global average and at many locations, it is the dominant source of variance in late 21st century projections, though at some sites oceanographic processes contribute the largest share throughout the century.'

'The future rate of mean global ***sea***-***level*** (GSL) ***rise*** will be controlled primarily by the thermal expansion of ocean water and by mass loss from glaciers, ice caps, and ice sheets [Church et al.,2013[24]].'

'Local ***sea***-***level*** (LSL) change can differ significantly from GSL ***rise*** [Milne et al.,2009[25];Stammer et al.,2013[26]], so for adaptation planning and risk management, localized assessments are critical.'

'Projections of changes in GSL due to thermal expansion and in LSL due to regional steric and dynamic effects are based upon the CMIP5 GCMs.'(GCMs have no associated probabilities but are only considered as 'plausible' or'illustrative.')

'Consistent with AR5's judgment that the 5th-95th percentile of CMIP5 output represents alikely(67% probability) range for global mean thermal expansion' (More 'expert elicitation').

'As shown in the previous section, LSL ***rise*** is controlled by different factors—both climatic and non-climatic—at different locations and intervals over the next two centuries.'

'While all LSL projections are sensitive to assumptions about ice sheet behavior (process modeling), some are sensitive to assumptions about confidence in GCM output.'(GCMs have no assigned probabilities)

'There remains a need for improved ice sheet models to allow robust projections of the ice sheet component without heavy reliance upon expert elicitation.'(process modeling outcomes driven by 'expert elicitation')

'However, the development of such models is hindered by the limited consensus on the magnitude of positive and negative feedbacks on ice loss, such as those involving (a) temperature and snow albedo [Picard et al.,2012[27]], (b) forest fires and snow albedo [Keegan et al.,2014[28]], (c) snowfall and ice sheet discharge [Winkelmann et al.,2012[29]], (d) grounding line retreat [Joughin et al.,2014[30];Rignot et al.,2014[31];Schoof,2007[32]], (e) static-equilibrium ***sea***-***level*** and grounding line retreat [Gomez et al.,2010[33],2012[34],2013[35]], (f) meltwater, ocean temperature, sea ice, and snowfall [Bintanja et al.,2013[36]], and (g) ice-cliff collapse [Bassis and Walker,2012[37];Pollard and DeConto,2013[38]].(Process models are acknowledged as having numerous and significant inadequacies and uncertainties)

The wide range of projections and underlying uncertainties in continental-scale model projections pose challenges for interpreting the likelihood of their results [Bindschadler et al.,2013[39]].' (More process model uncertainty and inadequacies)

'Furthermore, structural errors in models of other ***sea*** ***level*** components remain probable.'(process modeling inadequacies impact ice sheet, ice caps & glaciers mass loss, ocean warming, vertical land movement, etc.)

'Under RCP 8.5, we project avery likelymean global ***sea***-***level*** ***rise*** of 0.5-1.2 m by 2100 and 1.0-3.7 m by 2200, which under the strong emissions mitigation of RCP 2.6 is lowered to 0.3-0.8 m by 2100 and 0.3-2.4 m by 2200. (See Table 4).' (More 'expert elicitation')

'Local ***sea***-***level*** ***rise*** projections differ from the global mean due to differing background rates of non-climatic ***sea***-***level*** change, spatially variable responses to different land ice reservoirs due to static-equilibrium effects, and spatially variable ocean steric and dynamic changes.'

Returning to the NOAA 2017 study we find these additional descriptions of how the study was done and what it intended to accomplish besides being used by the climate alarmist media to hype higher global mean ***sea*** ***level*** ***rise*** numbers.

'Significant uncertainties exist about the exact trajectory (and impacts) of future climate change, limiting the value of prediction-based frameworks for long-term, climate-related decision-making (e.g., see Hallegatte et al. 2012, Weaver et al., 2013).'

The above statement is extremely revealing because it clearly establishes that thescenarios contained in the Global Mean ***Sea*** ***Level*** ***Rise*** RCP curves shown above are inappropriate for use inmaking 'prediction-based' climate-related outcomes regarding global ***sea*** ***level*** ***rise***. Thus, the need to construct a 'decision-making under conditions of uncertainty' framework. This outcome is further re-enforced in the additional items from the 2017 study presented below.

'This approach is consistent with that recommended in Kopp et al. (2016b) and used by the Thames Estuary 2100 project (Ranger et al., 2013; Hinkel et al., 2015). Continuous monitoring of current ***sea*** ***level*** behaviors (trends and variability), along with improved scientific understanding of relevant climate-system processes and feedbacks, can then help identify the evolution of the system over time with respect to these mid-range and worst-case scenarios.'

'This technical report provides results and discussion related to two primary tasks: 1) developingan updated scenario range for possible 21stcentury GMSL ***rise*** and 2) producing a set of gridded RSL response along the United States coastline based on discrete scenarios drawn from this updated GMSL ***rise*** range. For the first task, we assessed recent observational and modeling literature on worst-case GMSL projections.'

'This deployment of scenarios and tools will help serve as a starting point for on-the-ground coastal preparedness planning and risk management processes needed to ensure that U.S. coastal communities (and their economies) remain vibrant and resilient to ongoing and future changes in ***sea*** ***level***.'

The language used in the NOAA 2017 study is clearlyintended to establish that the study is awork in progressin laying out an approach ('decision-making under conditions of uncertainty')for dealingwith the still largely poorly defined and complex climate issuesassociatedwith global mean ***sea*** ***level*** ***rise*** and local ***sea*** ***level*** ***rise*** as demonstrated by the numerous and significant scientific shortcomings of the both the climate scenarios (RCPs large and ill-defined uncertainty) and process modeling capabilities (inability to accurately define ocean warming, glaciers, ice caps and ice sheets mass loss or gain,non-climatic ***sea***-***level*** changebackground uplift or subsidence) discussed in detail in the 2017 study as noted above but ignored and concealed by the climate alarmist media.

The climatealarmist media grossly failed to address and instead concealed these critically important scientific evaluation contexts, limitations, qualifications and inadequacies and instead hyped climate alarmism driven outcomes with anexample shown in the article[40]below where specific ***sea*** ***level*** ***rise*** increases are exaggerated (e.g. 6.6 foot ***sea*** ***level*** ***rise*** becomes 8.2 foot ***sea*** ***level*** ***rise***) without any attempt to define the study context (to develop a framework for 'decision-making under conditions of uncertainty') along with the studies extensive and significant inadequacies and uncertainty that underly how these global mean ***sea*** ***level*** ***rise*** study numbers were developed and what they really mean.

Specifically, the above article (as representative of virtually all media presentations) hyped the following:

'A 2012NOAA reporton global ***sea***-***level*** ***rise*** included four possible climate scenarios, each involving different degrees of ocean warming and glacier melting around the world: one scenario with high ***sea***-***level*** ***rise***, one with low ***sea***-***level*** ***rise*** and two intermediate scenarios. The report suggested that the most extreme scenario could result in 6.6 feet of global mean ***sea***-***level*** ***rise*** by the year 2100. At a minimum, it suggested 0.7 feet of ***sea***-***level*** ***rise*** by that time.

The new report includes six possible climate scenarios, and it updates both the highest and lowest ***sea***-***level***-***rise*** estimates. It suggests that in the most extreme scenario, global mean ***sea*** ***levels*** could ***rise*** 8.2 feet by the year 2100. And in the lowest scenario, ***sea*** ***levels*** may ***rise*** by about one foot by the end of the century.

The authors decided on these updates by consulting a number of recent published studies on the subject. The increase in the upper extreme estimate from 6.6 feet to 8.2 feet was partly based on an improved understanding of the physical processes affecting the world's major ice sheets, Sweet noted.

He pointed to several recent studies modeling the response of the Antarctic ice sheet to climate change. Such studies have helped shed new light on the increasing instability of the ice sheets in areas like West Antarctica and the conditions that could lead them to collapse in the future. The updated research is 'suggestive that these higher [***sea***-***level*** ***rise***] outcomes are more probable than we once thought they were,' Sweet said.'

Ironically and as discussed in the analysis of the latest study (2022 GMSL report shown below) theAntarctic8.2-foot ***sea*** ***level*** ***rise*** scenario so hyped by media relative to the 2017 study was abandoned in the year 2022studybecause that scenario is now considered as being 'implausible' (expert elicitation and process modeling) although this significantchange was concealed by climatealarmist media stories addressing the GMSL ***rise*** 2022 study.

The 2017 article noted above along with many other climate alarmist articles that allegedly discussed the 2017 study were devoid of any discussion of the need for a work in progress starting point defined as'decision-making under conditionsof uncertainty' framework that is required because of the large inadequacies and uncertainties present intrying to define GMSLrise outcomes as addressed in detail above.

Instead, these media articles treat and present the 2017 studies ***sea*** ***level*** ***rise*** claims as though they represent accurate 'prediction based' climate related outcomes when that clearly is not the case as demonstrated by large uncertainty, inadequacies and limitations of the methodology as discussed above and further summarized below.

The article (and others like it) is devoid of any discussion of the lack of definable probabilities of either the CMIP5 climate models or global ***sea*** ***level*** risescenarios, failed to address the significant inadequacies and limitations of the process models for defining thermal expansion of ocean water, mass loss from glaciers, ice caps, and ice sheets and inadequacies ofregional and local uplift and/or subsidence data,failed to discuss the extensive use of subjective 'expertelicitation' and'expertcommunity assessment' because of large analysis methodology 'uncertainty' along with the caution that 'structural errors' are'probable' in process models, etc., etc.

The media climate alarmist articles are universal in grossly misrepresenting the huge inadequacies and uncertainty contained in future global ***sea*** ***level*** ***rise*** assessments bytheir failure to address these overwhelming analytical inadequacies that dictated the need to abandon 'predicted' based GMSL climate outcomes and instead create a future information oriented 'decision making under conditions of uncertainty' evolving ***sea*** ***level*** ***rise*** assessment framework.

The latest NOAA published report allegedly addressing global ***sea*** ***level*** ***rise*** titled 2022 ***Sea*** ***Level*** ***Rise*** Technical Report is shown below and availablehere[41].

This latest 2022 report continues with the prior 2017 reportsdevelopment of aframework for'decision-making under conditions of uncertainty' as discussed above in detail in this post andas addressed in theConclusion of section of the 2022 report[*https://aambpublicoceanservice.blob.core.windows.net/oceanserviceprod/hazards/sealevelrise/Section5-Conclusions.pdfas*](https://aambpublicoceanservice.blob.core.windows.net/oceanserviceprod/hazards/sealevelrise/Section5-Conclusions.pdfas) follows (recognizing that as was the case for the 2017 Global ***Sea*** ***Level*** ***Rise*** report and as is the case for this most recent 2022 GlobalSea Level ***Rise*** report neither the GMSL ***Rise*** Scenarios nor the IPCC AR6 updated RCPs have defined probabilities and are acknowledged as being in astate of uncertainly)

'It is the goal of the ***Sea*** ***Level*** ***Rise*** and Coastal Flood Hazard Scenarios and Tools Interagency Task Force to continue to provide projections and future scenarios to assist decision-makers for both planning and risk-bounding purposes.

This report builds upon the progress made in Sweet et al. (2017), updating the GMSL scenarios and the associated local and regional RSL projections to reflect recent advances in ***sea*** ***level*** science, as well as expanding the types of scenario information provided to better serve stakeholder needs for coastal risk management and adaptation planning.'

'In addition,it is important to note that the projections do not include natural year-to-year ***sea*** ***level*** variability that occurs along U.S. coastlines in response to climatic modes such as the El Niño-Southern Oscillation.

Nevertheless, if we assume that regional ***sea*** ***level*** will keep following its present trajectory(the term 'trajectory'in the NOAA 2022 report is used instead of 'projection' and represents an 'extrapolation' of existing observed trends versus model outcomes which are identified as 'projections' as discussed further below)for the coming three decades, most U.S. regions are mostly tracking between the Intermediate-Low and Intermediate-High scenarios.

Although the near-term observation-based extrapolations will continue to evolve over time with new observations and analyses, this updated information should help inform both near-term decisions and projects that may require decades' worth of planning prior to actual implementation.'

This statementagain reflects the'work inprogress' context of the 2022 study (as did the 2017 study)that it is intended to facilitate the ability to utilize future global mean ***sea*** ***level*** ***rise*** scientificassessments that can better define and establish significantly lower levels of uncertainty and inadequacies that presentlyexist which preclude the use of'prediction based' global mean ***sea*** ***level*** ***rise*** climate outcomes.

'In order to do so, additional and improved observations and more sophisticated modeling approaches that incorporate the relevant physical processes (e.g., waves; see Box 3.1) will be needed at the regional scale, with local granularity to assess the impacts of these coastal hazards.Such information is expected to ultimately feed into the next generation of interagency reports and assessments to enable informed climate adaptation planning.'

The2022 reports Introduction Section furtheremphasizes[42]the framing of the'decision-making under conditions of uncertainty'process that isintended for continued future updating and evaluation in addressing ***sea*** ***level*** ***rise*** as follows:

'it is important to emphasize the distinction between describing scientific progress, in terms of current understanding and key uncertainties, and translating such advances in the scientific knowledge base into actionable science. The latter requires sustained engagement by groups such as NOAA's Office of Coast Management and Sea Grant program with users, stakeholder groups, and associated boundary organizations regarding their specific planning and decision contexts.'

'we thus aim to provide our screening-level (suitable for first-order-assessment) products appropriate for framing and bounding important problems in coastal risk assessment and management, along with contextualization of the underlying science and illustrative case studies.'

'What this report does NOT provide is official guidance nor design specifications for a specific project.'

The 2022 report addressesfuture global mean ***sea*** ***level*** assessments in Section 2[43]as follows:

'One of the main structural changes from the Sweet et al. (2017) report to this one is a specific emphasis on the near-term time period, 2020-2050. There is also a detailed discussion of GMSL scenario divergence and tracking that becomes particularly important in the transition from the near term to the long term.'

'In this report, an assessment based solely on extrapolation of the observed rates and acceleration out to 2050 is used for trajectory tracking and a comparison to the GMSL and regional scenarios.These trajectories serve as an additional line of evidence for near-term ***sea*** ***level*** ***rise*** and provide a mostly independent (observational VLM information is shared in both) comparison to the model-based scenario.

To maintain a distinction between estimates arising from observations and those coming from model-derived GMSL scenarios, the observation-based assessments are referred to in this report as 'extrapolations' or 'trajectories' and not as 'projections.' These terms are also preceded by 'observation-based' whenever used.'

Thus, we have at least two different arenas of 'uncertainty' components in GMSL ***rise*** future scenarios. Shorter term GMSL ***rise*** uncertainty between 2020 and 2050 using 'extrapolations' and/or 'trajectories' based upon 'observed rates' and 'acceleration' out to 2050 and climate model-driven GMSL ***rise*** scenario 'projections' beyond year 2050.

'Sweet et al. (2017) filtered the ensemble of different future projections generated by Kopp et al. (2014) to identify those subsets consistent with 0.3 m, 0.5 m, 1.0 m, 1.5 m, 2.0 m, and 2.5 m of 21st-century GMSL ***rise***. These subsets constituted the six Sweet et al. (2017) GMSL scenarios.'

'This report retains the Sweet et al. (2017) scenarios (except the Extreme 2.5 m scenario, discussed below), with the principal difference being updated temporal trajectories and exceedance probabilities now based on global warming levels rather than emissions scenarios.'

'In addition to being updated based on the latest generation of GCMs and the IPCC AR6, this set of projections incorporates multiple methods of projecting future ice-sheet changes, which are the major sources of future ***sea*** ***level*** ***rise*** and pose the biggest source of uncertainty in projecting the timing and magnitude of future possible ***rise*** amounts.'

'An important change from the Sweet et al. (2017) report is the exclusion of the Extreme (2.5 m) scenario in this report.

Based on the most recent scientific understanding and as discussed in the IPCC AR6, the uncertain physical processes such as ice-sheet loss that could lead to much higher increases in ***sea*** ***level*** are now viewed as less plausible in the coming decades before potentially becoming a factor toward the end of the 21st century and beyond. A GMSL increase of 2.5 m by 2100 is thus viewed as less plausible, and the associated scenario has been removed from this report.'

The elimination of the year 2017 studies highest 2.5 m extreme ***sea*** ***level*** ***rise*** scenario in the 2022study is completely concealed by the climate alarmist mainstreammedia. Additionally, the decision to eliminate the 2.5-meter scenario reflects the 'work in progress' nature of the 'decision-making under conditions of uncertainty' framework that has been completely concealed by the climate alarmist media.

'After 2050, the assessments and comparisons made using the observation-based extrapolations of future ***sea*** ***level*** ***rise*** become less informative and should be made with caution.

This is because uncertainty in the current estimates of rates and accelerations leads to large projected ranges and because current estimates may not be reflective of shifts or process changes that may occur in the future with additional emissionsand global warming, resulting in increasing divergence between the future GMSL scenarios after 2050.'

The 2022 study 'uncertainty' issues are summarized as follows:

'Two types of uncertainty are important to consider in this context: uncertainty in physical processes and uncertainty in future emissions and ensuing warming.

Although there are possible alternative definitions and framings, as used in this report, process uncertainty (Box 2.1) is associated with how well we currently understand why ***sea*** ***level*** has changed in the past and how it will change in the future. Stated another way, how well do we understand and modelthe processes that will combine to impact ***sea*** ***level*** at a specific time and location in the future?

This uncertainty is also reflected in the likely range of future ***sea*** ***level*** ***rise*** for a given GMSL scenario.

The spread between the five GMSL ***rise*** scenarios is intended to reflect the range of potential future emissions pathways and associated warming levels that depends highly on global socioeconomic factors that have yet to unfold.

This unknown future pathway leads to what is referred to here as emissions uncertainty (Box 2.1).'

'At some point in the future, the separation between GMSL ***rise*** scenarios will overtake the process uncertainty associated with individual GMSL ***rise*** scenarios.

In other words, scenario dependence will emerge, and it will be possible to distinguish between the observation-based trajectories associated with two neighboring GMSL ***rise*** scenarios. In general, these time periods are important for connecting the near-term similarities between scenarios to the time period where scenarios diverge rapidly.

An effort is made here to understand when divergence of the GMSL risescenarios might occur and to link them to possible future warming and emissions pathways. This analysis then serves as the foundation for process-based monitoring that could be useful in determining the trajectory of ongoing ***sea*** ***level*** ***rise*** and, by extension, the possible future ***sea*** ***level*** ***rise*** out to 2150.'

Specifically identified underProcess Uncertainty is the following'For example, the sensitivity of theAntarctic ice sheets is not yet fully understood, (eventhough this process is the 'dominant source' of longerterm global mean sea levelrise as noted in both the 2017 and 2022 NOAA studies) leading to asubstantial uncertainty in how ***sea*** ***level*** reacts to forcing changes.

Additionally, the future conditions from processes, such as changes in ocean circulation and VLM, that impact RSL change more locally haveuncertainty'.

EmissionsUncertainty is noted as 'Various forcing scenarios describe possible GHG emission pathways, which range from quick emissions reductions to unmitigated future emissions.'

'The uncertainty in the future pathway is referred to as emissions uncertainty.'

Under Natural Variability it is noted that'Next to ***sea*** ***level*** changes caused by changes in GHG forcing, many physical processescause natural variation (e.g., ENSO). The scenarios and uncertainty ranges foreach scenario and for theobservation-based trajectories in this report do not include variations due to naturalvariability.'

The updated GMSL values in 2050, 2100, and 2150 relative to a 2000 baseline are shown for each of the five scenarios in Table 2.3.

'However, theseprojectionsinclude onlyphysical processes in which there is at leastmedium confidencein the current scientific understanding. As described in the IPCC AR6 (Box 9.4 in Fox-Kemper et al., 2021), thelargest potential contributions to long-term GMSL ***rise*** come from ice-sheet processes in which there is currently low confidence.'

'Because these outcomes arebased on processes poorly represented in climate ice-sheet models, the IPCC assessment of these processes incorporates information from a structured 'expert-judgement' study(Bamber et al., 2019) and a single Antarctic ice-sheet modeling study that explicitly incorporates ice-sheet hydrofracturing and ice-cliff collapse mechanisms (DeConto et al., 2021).'

In what has become the 'normal' distortion and deception tactics of climate alarmist's media the year 2022 studies extensive global ***sea*** ***level*** ***rise*** uncertainty, RCP inadequacies and uncertainties and ill-defined process modeling issues are concealed by the media.

Instead climate alarmist mediaexaggerateglobal ***sea*** ***level*** ***rise*** speculative 'extrapolations', 'trajectories' and 'projections' (as was the case for the 2012 and 2017 global ***sea*** ***level*** ***rise*** reports as discussed above)with headlined alarmism statements, among many other such flawed assertions, that the U.S.'willexperienceas much ***sea*** ***level*** ***rise*** in the next 30 years as it did in the last 100 years', 'seas lapping against America's coastlinesare ***rising*** ever faster andwill be10 to 12 inches higher by the year 2050, '***sea*** ***levels*** along the coastal United Stateswill riseby about a foot or more on average by 2050', 'parts of Louisiana and Texas projectedto see waters a foot and a half (0.45 meters) higher','by 2050, sea lapping against the U.S. shorewill be 10 to 12 inches (0.25 to 0.3 meters) higher', 'at least two feet of ***sea***-***level*** ***rise*** is expectedby the end of the century', etc., etc.

The 2020 global ***sea*** ***level*** ***rise*** study made none of these media 'prediction' asserted claims as demonstrated by the detailed ***sea*** ***level*** ***rise*** uncertainty and process modeling inadequacy information from the study as presented above.

As was the case for prior global ***sea*** ***level*** ***rise*** alarmist media reports the huge uncertainties and inadequacies of the climate model ***sealevel*** ***rise*** scenarios and process models are unaddressed, the'decision making under conditions of uncertainty' framework driven by the inability to establish credible 'prediction' basedoutcomes isconcealed, thecontinued use of subjective 'expertelicitation','expert community assessment' and inadequate 'process modeling' is concealed, the fact that the 2022 report continues the 'work in progress' context as did the 2017 report is concealed, etc., etc.

The ability to define credible future global mean ***sea*** ***level*** ***rise*** estimates awaits further extensive development of new scientific data and analysis that can be evaluated under the 'decision-making under conditions of uncertainty' framework in an undefined future timeframe.

In the Introduction Section of the 2022 GMSL ***rise*** study it is claimed that tide gauge data for both global and contiguous U.S. locations showscoastal ***sea*** ***level*** ***rise*** acceleration has been underway since abut 1970as noted below:

'Increases in GMSL provide an important indicator of the changing climate, but it is the ***sea*** ***level*** ***rise*** on local and regional scales—measured by the global network of tide gauges and satellites—that is most relevant for coastal communities around the world. Regional and local ***sea*** ***level*** ***rise*** has not been and will not be uniform in time or space. Rather, ***sea*** ***levels*** change locally for a variety of reasons, such as vertical land motion (VLM), which can exacerbate the effects of the ***rising*** ocean.

For context, whereas GMSL has risen by about 17 cm over the last 100 years (1920-2020), with noted acceleration since about 1970, relative ***sea*** ***level*** (RSL) averaged along the contiguous United States (CONUS) has risen about 28 cm over the same period with similar onset of acceleration (Figure 1.2b).'

1.2b) GMSL change (blue line) as shown in a) with the annual average relative ***sea*** ***level*** change measured by tide gauges around the contiguous United States (black line; with a linear regression estimate of 28 cm of ***sea*** ***level*** ***rise*** from 1920 to 2020). (Adaptation of Frederikse et al., 2020).

The 'acceleration' claim is derived from a study whichutilized both data and models[44]to allegedly arrive at the'acceleration' finding using a 'team of scientists to develop a state-of-the-art framework that pulls together the advances in each area of study -fromsea level modelsto satellite observations - to improve our understanding of the factors affecting ***sea*** ***level*** ***rise*** for the past 120 years.'

This ***sea*** ***level*** ***rise*** acceleration claim isaddressed at a WUWT article here[45]with the article noting the following:

'Thomas Frederikse and colleagues published a study of ***sea*** ***level*** data, considering both tide gauges and satellite data in 2020 (Frederikse, et al., 2020).'

'They found that there are many causes of global and regional ***sea*** ***level*** change that need to be considered. Land over much of the Northern Hemisphere is still rebounding from the melting of the massive glaciers they supported during the Last Glacial Maximum. This causes many northern tide gauges to record ***sea*** ***level*** falling as the land ***rises***. Further, dam construction during the twentieth century caused water to be withheld from the oceans and stored in reservoirs on land, especially between 1960 and 1980. They also tell us that previous assessments of ***sea*** ***level*** were unable to reconcile observations with the calculated contributions of ice-mass loss, dam construction, and thermal expansion of water.'

'The observations of ***sea*** ***level***, ocean temperature, ice-mass loss, water held in man-made reservoirs, and total river discharge to the oceans all have considerable uncertainty, which is why studies have not been able to close the gap between observations. Frederikse and colleagues make another attempt to close the gap.They note that over the past few years much more accurate estimates of all the critical observations have been made available and they collected these in a new estimate.'

'The results of his study (Frederikse at al) increase the previous estimates of GMSL (global mean ***sea*** ***level***) ***rise*** in the 1960s and 1970s, after excluding the effect of dam construction. His model also increases the uncertainty prior to 1940.

The match is quite poor in the 1920s and 1930s, and the steep ***rise*** in ***sea*** ***level*** from 1930 to 1950, nearly as rapid as in the 21stcentury, is also not matched well.'

'it is clear that the data shown in Figures 1 and 2 are not accurate enough to conclude that the overall rate of ***sea*** ***level*** ***rise*** is accelerating, in fact it is possible that we will see a deceleration of ***sea*** ***level*** ***rise*** in the near future.'

'In this part we show that the error in estimating ***sea*** ***level*** ***rise*** and its components is so large that showing acceleration definitively is probably not possible. In the next post we will discuss the problems with that approach and provide a more statistically sound projection of the rate of ***sea*** ***level*** ***rise***.'

The ***sea*** ***level*** ***rise*** 'acceleration' since 1970 claim isalso addressed at another WUWT article here[46]with the article noting the following

'More on ***Sea*** ***Levels***:In his discussion on the Scientific Method, Richard Feynman insisted that a scrupulous scientist must present all the data, including the data that is not favorable to his pet idea, his hypothesis.

A favorite trick of some is to put together two different datasets taken by two different sets of instruments or methods, showing different trends over different time intervals, but to eliminate the data that shows the datasets are not similar and have different trends.'

The'eliminated data'referred to above is the extensive Permanent Service for Mean ***Sea*** ***Level*** ***Rise*** (PSMSL) data base which is described byNOAA as follows[47]:

'Various tide gauge networks have contributed to GLOSS, each with a different focus and each changing over time as research priorities evolve. The main component is the GLOSS Core Network (GCN), a global set of ~300 tide gauges that serves as the backbone of the global in situ ***sea*** ***level*** network. GCN gauges were allocated to each island or group of islands at intervals not closer than 500 km, and along continental coasts at intervals generally not less than 1000 km. Preference was given to islands in order to maximize exposure to the open ocean.'

'Established in 1933, the Permanent Service for Mean ***Sea*** ***Level*** (PSMSL) is responsible for the collection, publication, analysis and interpretation of ***sea*** ***level*** data from the global network of tide gauges, including the GLOSS Core Network. It is based in Liverpool at the National Oceanography Centre (NOC). PSMSL generally relies on Member Nations to provide the final version of the monthly time series with all quality control assessments applied and documented.

Where possible, in order to construct time series of ***sea*** ***level*** measurements at each station, the monthly and annual means are reduced to a common datum. This reduction is performed by the PSMSL making use of the tide gauge datum history provided by the supplying authority. The PSMSL archive comprises of 'delayed-mode' monthly mean ***sea*** ***level*** values most suitable for studies of long-term ***sea***-***level*** change; most studies of 20th century global ***sea*** ***level*** ***rise*** are based on the PSMSL data set.'

Returning to the prior WUWT article above the use of PSMSL data is addressed as follows:

'We are seeing this again with NASA claims of ***sea*** ***level*** ***rise*** since 1900. Using data from the UK PSMSL (Permanent Service for Mean ***Sea*** ***Level***), Paul Homeward addresses the claims using data for two geologically stable locations. There are short term trends of increasing ***sea*** ***level*** ***rise*** and decreasing ***sea*** ***level*** ***rise***. For example, in the 1970s ***sea*** ***levels*** fell at Newlyn, UK, in the 1960s ***sea*** ***levels*** fell and then rose in the 1970s at North Shields, UK. Homewood writes:'

'This pattern of a slowdown or fall in ***sea*** ***levels*** in the 1960s and 70s is seen at many other sites around the world, as are rates of ***rise*** as high as now in the decades prior to that.'

'Both phenomena are, of course, consistent with warming in the Arctic in the 1920s and 30s, followed by the much colder interlude there, which ended in the 1990s. Global temperatures followed the same pattern too.'

'Although the overall rate of ***rise*** is around 2mm a year, because of periods when there was no ***rise*** at all there have been other periods when ***sea*** ***levels*** have been ***rising*** faster.'

'Annual ***sea*** ***level*** ***rise*** of around 3mm a year was typical prior to the cooldown and is similar to what is being reported now by satellites.'

'Whether we enter another period of AMO[Atlantic Multidecadal Oscillation]related cooling in coming decades remains to be seen. But what the data conclusively shows is that, as far as the UK is concerned, the recent rate of ***sea*** ***level*** ***rise*** is not unprecedented, nor is there any evidence of it accelerating.'

'Those who become excited over short-term ***sea***-***level*** trends need to review Richard Feynman on the scientific method. See links under Changing Seas.'

The Changing Seas heading for theWUWT article addresses a study using UK tide gauge PSMSL data[48]to evaluate accelerated ***sea*** ***level*** ***rise*** since 1970 as noted below at locations which exhibit geological stability and do not show acceleration since the 1970s.

The article breaks down the PSMSL data on a decadal basis to obtain a more insightful understanding of the ***sea*** ***level*** ***rise*** behavior over time as shown below.

'At Newlyn, there was a sharp ***rise*** in ***sea*** ***levels*** during the 1980s, but this presumably must be seen in context with the fall in the 1970s.

Similarly at North Shields, the fall in the 1960s and ***rise*** in the 1970s.

At both sites, ***sea*** ***level*** ***rise*** has actually slowed in the last decade. (The data available at North Shields, though not complete, shows a continued drop in ***sea*** ***level*** in 2018 and 2019).

And in both cases, the latest decadal ***rise*** is less than seen in some decades in the 20thC.

It is fair to add that the ***rise*** post 2000 is connected to the pause in ***sea*** ***level*** ***rise*** in the 1990s. The latter was of course the direct consequence of the Pinatubo explosion, which led to several years of global cooling.'

'This pattern of a slowdown or fall in ***sea*** ***levels*** in the 1960s and 70s is seen at many other sites around the world, as are rates of ***rise*** as high as now in the decades prior to that'.

The article concludes:

'Whether we enter another period of AMO related cooling in coming decades remains to be seen. But what the data conclusively shows is that, as far as the UK is concerned, the recent rate of ***sea*** ***level*** ***rise*** is not unprecedented, nor is there any evidence of it accelerating.'

NOAA U.S. long-term ***sea***-***level*** trend tide gauge stations (based on a minimum of 30 years of data) are identified relative to whether they areexperiencing significant vertical land motion noted as follows[49]:

'The map of relative ***sea*** ***level*** trends provides an overview of variations in the rates of local ***sea*** ***level*** change at long-term tide stations (based on a minimum of 30 years of data in order to account for long-term ***sea*** ***level*** variations and reduce errors in computing ***sea*** ***level*** trends based on monthly mean ***sea*** ***level***).

The variations in ***sea*** ***level*** trends seen here primarily reflect differences in rates and sources of vertical land motion.Areas experiencing little-to-no change in relative ***sea*** ***level*** are illustrated in green, including stations consistent with average global ***sea*** ***level*** ***rise*** rate of 1.7-1.8 mm/yr. These are stations not experiencing significant vertical land motion. Stations illustrated with positive ***sea*** ***level*** trends (yellow-to-red) are experiencing both global ***sea*** ***level*** ***rise***, and lowering or sinking of the local land, causing an apparently exaggerated rate of relative ***sea*** ***level*** ***rise***. Stations illustrated with negative trends (blue-to-purple) are experiencing global ***sea*** ***level*** ***rise*** and a greater vertical ***rise*** in the local land, causing an apparent decrease in relative ***sea*** ***level***.These rates of relative ***sea*** ***level*** ***rise*** reflect actual observations and must be accounted for in any coastal planning or engineering applications.'

NOAATechnical Report NOS CO-OPS 053[50]evaluated ***sea*** ***level*** variations of the U.S. from 1854-2006 in a 2009 analysis as shown below.

The Executive Summary of the report notes:

'Monthly mean ***sea*** ***level*** (MSL) data for 128 long-term National Water Level Observation Network (NWLON) stations of the Center for Operational Oceanographic Products and Services (CO-OPS) are analyzed in this report.All available data up to the end of 2006 are used to determine linear trends, average seasonal cycles, and interannual variability including estimated errors.The stations are located on the U.S. Atlantic and Pacific coasts, the Gulf of Mexico, Hawaii, Alaska, and on islands in the Atlantic and Pacific Oceans.

The linear trends obtained are relative MSL trends which are a combination of the absolute global rate of ***sea*** ***level*** ***rise*** (1.7 +/- 0.5 mm/yr in the 20thcentury) and the rate of any local vertical land motion. The variation in vertical land motion, ranging from rapid subsidence in Louisiana and eastern Texas to rapid uplift in Alaska, is primarily responsible for the regional differences in MSL trends and for the differing rates within regions. Separate pre- and post- seismic trends were calculated for some stations in Alaska and Guam with apparent seismic offsets in 1957, 1964, or 1993.'

'Each calculated linear trend has an associated 95% confidence interval that is primarily dependent on the year range of data for each station. A derived inverse power relationship indicates that 50-60 years of data are required to obtain a trend with a 95% confidence interval of +/- 0.5 mm/yr. This dependence on record length is caused by the interannual variability in the observations. A series of 50-year segments were used to obtain linear MSL trends for the stations with over 80 years of data.

None of the stations showed consistently increasing or decreasing 50-year MSL trends, although there was statistically significant multidecadal variability on the U.S. east coast with higher rates in the 1930s, 1940s and 1950s and lower rates in the 1960s and 1970s.'

The report's Conclusion notes:

'This report is a re-analysis of mean ***sea*** ***level*** variations in the United States using monthly MSL data from long-term NWLON stations with a data range of at least 30 years. The report follows the format of Zervas (2001) with seven additional years of data and presents results for 12 additional stations. A total of 128 stations were analyzed for linear trends, autoregressive coefficients, average seasonal cycles, and interannual variability along with their 95% confidence intervals. The stations are located on the U.S. east and west coasts, the Gulf of Mexico, Alaska, Hawaii, Bermuda, the Caribbean, and on islands in the Pacific Ocean (Figures 1-7, Appendix I).

The two oldest stations,The Battery and San Francisco, have records beginning in the 1850s. The maintenance of these long-term time series depends on the continued monitoring of tidal bench marks. The reference elevations of the station datums have been preserved despite the occasionally-required relocations of some of the stations.'

'Eight NWLON stations now have data spanning periods of over 100 years. These stations are The Battery, Philadelphia, Baltimore, Fernandina Beach, San Diego, San Francisco, Seattle, and Honolulu. Figure 35 graphically summarizes these CO-OPS data sets and demonstrates the value of continuous, long-term ***sea*** ***level*** measurements. Together, these series represent the effect of globally-***rising*** ***sea*** ***levels*** on most of the U.S. coastline. Although there is a small amount of subsidence at The Battery, Philadelphia, and Baltimore (about 1 mm/yr), the other five stations have negligible vertical land motion and therefore have been recording the absolute global 20thcentury ***sea*** ***level*** ***rise*** of 1.7 mm/yr (Douglas, 1991).

As shown in Figure 35, the importance of the demonstrated global ***sea*** ***level*** ***rise*** derived from the long-term ***sea*** ***level*** observations is analogous to the importance of the atmospheric CO2observations to the global climate system.'

'Figure 35. Comparison of the atmospheric carbon dioxiderecord at Mauna Loa, Hawaii since 1958(from[*http://www.esrl.noaa.gov/gmd/ccgg/trends/co2\_data\_mlo.html*](http://www.esrl.noaa.gov/gmd/ccgg/trends/co2_data_mlo.html)[51]) and monthly mean ***sea*** ***levels*** at eight NWLON stations with record lengths of over 100 years.'

NOAA has updated its U.S. ***sea*** ***level*** risedata[52]andtrends[53]to year 2021.

Provided below are the eight NWLON tide gauge stationtrends shown above that span more than 100 years of measured data with theadditional 15years of new data since the 1854-2006 NOAA study updated through year 2021 showing continued absence of'acceleration' since 1970. These trends do not reflect that they are being driven by global atmospheric CO2 levels as measured at Mauna Loa Observatory since 1958 as shown above.

The tide gauge measured dataoutcomes addressed in this NOAA 1854 to 2006 study and other WUWT posts noted above clearly indicate that the 2022 Global Mean ***Sea*** ***Level*** ***Rise*** study claims of tide gauge datameasurements showing ***sea*** ***level*** ***rise*** accelerationoccurring since 1970 are exaggerated and unsupported at numerous global locations with these acceleration claims more likely being an artifact of the studies analysis methodology (use of models) and notrepresentative of real world tide gauge measurement trends.

The 2022 Global ***Sea*** ***Level*** ***Rise*** study 'extrapolations' and 'trajectories' used for assessing ***sea*** ***level*** ***rise*** during the 30-year period between 2020 and 2050 rely upon speculative and methodologically inadequate and uncertain claims of accelerating tide gauge measurements that are not supported by other well established global tide gauge data analysis.These inadequacies result in flawed claims of higher rates of global ***sea*** ***level*** ***rise*** during this 2020 to 2050 period asserted in the latest year 2022 GMSL study.

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[***As sea levels rise, so do groundwater levels. Beaufort Co. studying impact with $300K grant***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655D-Y4J1-JC3J-X1J7-00000-00&context=1516831)

The Island Packet

April 6, 2022 Wednesday

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**Section:** local

**Length:** 683 words

**Byline:**  Sarah Haselhorst

The Island Packet

**Body**

When people think of ***sea*** ***level*** ***rise***, they can reckon with what's in front of them, like visible flooding and ***rising*** tides, but they don't often think about what's beneath their feet: Groundwater.

The very water below the Earth's surface that's used for irrigation and drinking purposes could be subjected to negative impacts from ***rising*** ***sea*** ***levels***, which can cause problems with drainage and underground infrastructure.

It's what Alicia Wilson, a groundwater hydrologist at the University of South Carolina's School of the Earth, Ocean and Environment, said is overlooked in discussions of ***sea***-***level*** ***rise***.

They're issues already cropping up along South Carolina's coastline, Wilson said. The S.C. Sea Grant Consortium, a multidisciplinary team of scientists, and Beaufort County are diving deeper into the issue.

But there's a lot of unknowns, said Robert Merchant, Beaufort County Planning and Zoning director.

With a nearly $300,000 grant from the National Oceanic and Atmospheric Administration's Climate Program Office, scientists will analyze how ***sea***-***level*** ***rise*** impacts underground infrastructure and groundwater to define the unknowns and aim to lessen potential impacts. The two-year grant is called "Beaufort County Adapts: ***Sea*** ***Level*** Impacts Beneath Our Feet."

How ***sea*** ***level*** ***rise*** is pushing up groundwater in South Florida and making flooding more commonHow is ***sea*** ***level*** ***rise*** pushing up groundwater in South Florida and making flooding more common? Research associate professor at the Institute of Environment at Florida International University Randall Parkinson explains the issue.

Merchant said launching the study is like "knowing your enemy." If researchers can understand the impacts of ***sea*** ***level*** ***rise*** on groundwater, they can plan better mitigation strategies.

Starting soon, the team will site and monitor about 15 shallow groundwater wells in areas of Alljoy, Mossy Oaks, Shell Point and St. Helena. Locations that, due to their low elevation, already are experiencing issues, Beaufort County's long range planner Juliana Smith said.

Scientists will collect water-height measurements every three months and then model the projected impacts of ***sea*** ***level*** ***rise*** on groundwater conditions and infrastructure. They'll watch for tide cycles, rainfall, storm events and drought. Social scientists will work alongside the research team, talking with communities.

"It's easy for us to all read the articles and the data about predictions for ***sea*** ***level*** ***rise*** that are coming out from your federal agencies and your national institutions, but we really want to understand what does that mean here," Smith said.

What's below the surface?

There's a multitude of possible issues when ***sea*** ***level*** ***rise*** interacts with groundwater. Drainage is at the top of Smith's list.

"It would fill in ponds that would otherwise be reserved for holding on to storm water or for runoff and rain," she said.

Then there's what's below the surface. Septic tanks and electrical lines.

"If your water doesn't run through (your property) the way it used to, because groundwater is sitting there all the time, then you can't have a functioning septic tank," Smith said.

Septic tank failure can be problematic if sewage leaks into rivers or creeks nearby.

What's less known is the impact on underground electrical lines. She isn't certain how the lines would fair, but postulated that more frequent water exposure could have an effect.

On the back-burner of concern, but not to be ruled out, is ***sea*** ***level*** ***rise*** spiking salt content of groundwater. When ***sea*** ***level*** ***rises***, so does the salt water underneath groundwater. When it gets to a certain height, salt water can infiltrate into wells.

The grant's mission will also interact with an ongoing project that gauges tide levels locally to find out what's happening to local waters when flooding strikes.

"We take this issue very seriously," Merchant said. "Our comprehensive plan really projects being proactive about the issue of flooding and ***sea*** ***level*** ***rise***, and trying to do everything we can at the local level to understand the issue to then be in a better situation to come up with solutions."

**Load-Date:** April 6, 2022

**End of Document**



[***County towns preparing for sea level rise; NOAA report says sea level may rise over 12 inches by 2050***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:653S-GM01-DXVP-V52P-00000-00&context=1516831)

The Carteret County News-Times (Morehead City, North Carolina)

March 28, 2022

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**Section:** NEWS TIMES

**Length:** 889 words

**Byline:** MIKE SHUTAK NEWSTIMES

**Body**

BEAUFORT Federal agencies anticipate ***sea*** ***levels*** may ***rise*** over a foot on the North Carolina coast, and several Carteret County municipal governments are taking this into account in their projects and ordinances.

The National Oceanic and Atmospheric Administration, in partnership with six other federal agencies, released a report titled "Global and Regional ***Sea*** ***Level*** ***Rise*** Scenarios for the United States."

This report updates projects and extreme water level probabilities along the U.S. coastlines. Among these is the southeast U.S. coastline, which includes North Carolina. According to a Associated Press release, NOAA National Ocean Service oceanographer and the report's lead author Dr. William Sweet said climate change may result in the same amount of ***sea*** ***level*** ***rise*** in the U.S. in the next 30 years as occurred during the previous century.

The press release goes on to read that according to the report, the southeast U.S. may get 12-14 inches of ***sea*** ***level*** ***rise*** by 2050. Among the anticipated effects are up to four moderate sunny-day floods a year. The report itself, meanwhile, says its regional average ***sea*** ***level*** ***rise*** estimates are measured from the average ***sea*** ***levels*** in 2000.

Coastal town officials in Carteret County are not taking this report or the subject matter lightly. Beaufort Public Information Officer Rachel Johnson said in a Friday, March 25 email to the News-Times that Beaufort officials are "taking steps to help plan for the future and to mitigate the current situation."

"The town's CAMA (Coastal Area Management Act) land use plan that's in the process of being updated incorporates inundation from ***sea*** ***level*** ***rise*** into the plan," Ms. Johnson said. "The plan includes policies specifically addressing ***sea*** ***level*** ***rise***."

Beaufort Planner Sam Burdick said in the email the LUP has a resilience component that includes potential effects of ***sea*** ***level*** ***rise*** and policies to mitigate and adapt to coastal and climate hazards.

"The town also received a grant to build on this plan with a more in-depth assessment of coastal and climate hazards, including ***sea*** ***level*** ***rise***," Ms. Burdick said. Town officials have developed a project portfolio which includes projects "aimed at enhancing community and coastal resilience."

"Having the projections from the new NOAA report has helped us validate our decision to use a '3 feet by 2080' intermediate ***sea*** ***level*** ***rise*** scenario for our resilience strategy for the N.C. Resilient Coastal Communities Program," Ms. Burdick said, referring to a state program which provides assistance to coastal communities for projects and plans to survive and recover from extreme weather and other hazards.

Other measures Beaufort officials have taken include allocating $90,000 in 2021 in American Recovery Act funds for a stormwater flooding mitigation project on Front Street and creating a Harbor Management Advisory Committee to create long-term goals for the town's waterfront.

Other town officials in Carteret County are also taking ***sea*** ***level*** ***rise*** into consideration with their planning. On the eastern end of Bogue Banks, Atlantic Beach Mayor Trace Cooper said in a Friday, March 25 email to the News-Times as the mayor of a coastal community, he's "very concerned about ***sea*** ***level*** ***rise***."

"We don't need NOAA to tell us it's a threat," Mayor Cooper said. "Our citizens can see it themselves with increasing sunny-day floods."

The mayor went on to say town officials are factoring in ***sea*** ***level*** ***rise*** into all their major projects, including the ongoing public beach access boardwalk redesign project and infrastructure improvements under consideration along Atlantic Beach Causeway.

"We design things with an eye towards resiliency in the face of storms and ***sea*** ***level*** ***rise***," Mayor Cooper said. "As a town-wide initiative, we've been working on a new freeboard ordinance that I expect we'll enact, once we have some clarity on updated (state) flood insurance rate maps."

Freeboard refers to a height above a given flood zone's base flood elevation above which town officials may require developers to build.

On the western end of Bogue Banks, meanwhile, Emerald Isle Mayor Jason Holland said in a Thursday, March 24 email to the News-Times he thinks NOAA's report may be a "useful to moving forward when planning the town's future."

"As a barrier island town, we're aware the projected ***sea*** ***level*** ***rise*** will have a continued impact on stormwater issues throughout Carteret County," he said. "The town is always striving to address stormwater issues, including a current grant application to assist with stormwater mitigation issues."

Back on the mainland, Morehead City Mayor Jerry Jones said in a Friday, March 25 email to the News-Times that Morehead City is already experiencing higher and more frequent tidal flooding, which he expects will increase.

"We're in the process of establishing a new comprehensive plan, which will include future land use development regulations along with coastal and stormwater flood management," Mayor Jones said.

Existing Morehead City coastal construction regulations include a freeboard, according to Mayor Jones.

"Our coastal future does present some unique challenges," he said, "but challenges can be mitigated with proper planning and development."

Contact Mike Shutak at 252-723-7353, email [*mike@thenewstimes.com*](mailto:mike@thenewstimes.com); or follow on Twitter at @mikesccnt.

**Load-Date:** March 29, 2022

**End of Document**



[***Proxy Rates of Sea Level Rise***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651D-TTY1-JCMN-Y0JC-00000-00&context=1516831)

Newstex Blogs

Watts Up With That?

March 18, 2022 Friday 6:06 PM EST

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**Length:** 817 words

**Byline:** Willis Eschenbach

**Body**

Mar 18, 2022( Watts Up With That?: [*http://wattsupwiththat.com*](http://wattsupwiththat.com) Delivered by Newstex)

Guest Post by Willis Eschenbach

My Twitter friend Wei Zhang @WeiZhangAtmos[1] pointed me to an open-access study in Nature magazine entitled 'Timing of emergence of modern rates of ***sea***-***level*** ***rise*** by 1863[2]'. It claims that ***sea*** ***levels*** were basically stable for centuries, all the way up until the 1860s when the modern rates of ***rise*** started occurring. They are basing this claim on a variety of different kinds of proxy ***sea*** ***level*** data—foraminifera, coral microatolls, plants, diatoms, peat, shells, vermetids, herbaceous peat, mangrove peat, ∆13C, sediment, testates, archeological, and bioconstructed reefs.

Intrigued, I took a look. Here's their Supplementary Figure 5[3].

Figure 1. Figure 5 from the Supplement, with original caption

Hmmm overall, that wasn't impressive in the slightest. Different areas are claimed to have wildly differing rates of change, sometimes going up and down radically in a couple of hundred years. Why would New Jersey be so different from North Carolina? Why do Iceland and Denmark show no change in ***sea*** ***level*** until very recently, when relative ***sea*** ***level*** is supposed to have dropped? These questions and more

I noted an interesting point in the caption to Supplementary Figure 5 above. It said that the 'global and linear' components had been removed. Hmmm again how was that done?

Reading the paper I found the magic behind the curtain. The finished records in Fig. 5 above are the result of the raw data being 'incorporated into a spatiotemporal empirical hierarchical model' and hey, if you don't believe in the millimeter-level accuracy of a random spatiotemporal empirical hierarchical model, you must be anti-science.

Now, those who know me are aware that I'm a great fan of raw data. And kudos to the authors, they included a link to download[4] an Excel spreadsheet containing the data. It contains proxy data from 103 different sites around the world. So I took that proxy data and I graphed it all up.

Figure 2. The proxy data used in the ***sea*** ***level*** study.

YIKES! All I can say is, it's a darn good thing that they have their spatiotemporal empirical hierarchical macerator because if they'd shown the unmacerated data, they'd have to provide 500ml of eyebleach with every issue of the magazine

With that data as a starting point, as you might expect, their claims are all over the map. Regarding the North Atlantic, for example, they say that the emergence of modern rates of ***sea***-***level*** ***rise*** occurred 'earliest in the mid-Atlantic [US] region (1872-1894 CE) and later in Canada and Europe (1930-1964 CE)'.

Seriously? After centuries during which their claim is that there was very little ***sea***-***level*** ***rise*** (Fig 1.), they say that one side of the Atlantic started ***rising*** about a half-century before the other side of the Atlantic, leaving the entire Atlantic tilted wait, what?

And climate scientists wonder why the general public is so skeptical of their findings?

Sigh

My very best wishes to all, stay safe and sane in these parlous times

w.

My Custom: I ask you to quote the exact words you're discussing. Misunderstandings are a bane of the intarwebs, and vague claims based on what someone thinks someone else meant are a major source of said confoundibulations.

Article Rating

[ 1]: [*https://twitter.com*](https://twitter.com) /WeiZhangAtmos [ 2]: [*https://www.nature.com/articles/s41467-022-28564-6*](https://www.nature.com/articles/s41467-022-28564-6) [ 3]: [*https://static-content.springer.com/esm/art%3A10.1038%2Fs41467-022-28564-6/MediaObjects/41467\_2022\_28564\_MOESM1\_ESM.pdf*](https://static-content.springer.com/esm/art%3A10.1038%2Fs41467-022-28564-6/MediaObjects/41467_2022_28564_MOESM1_ESM.pdf) [ 4]: [*https://static-content.springer.com/esm/art%3A10.1038%2Fs41467-022-28564-6/MediaObjects/41467\_2022\_28564\_MOESM3\_ESM.xlsx*](https://static-content.springer.com/esm/art%3A10.1038%2Fs41467-022-28564-6/MediaObjects/41467_2022_28564_MOESM3_ESM.xlsx)

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[***Germany : Tropical peatland, sea level rise and climate change***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:652M-BBR1-F11P-X23W-00000-00&context=1516831)

TendersInfo

March 23, 2022 Wednesday

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**Length:** 609 words

**Body**

Tropical peatlands are one of the most efficient carbon sinks. The flipside is that they can become massive emitters of carbon if they are damaged, for instance by land use change, degradation or fire. This can lead to faster climate warming. In research led by the University of Gttingen, researchers show how peatland in the coastal areas in Sumatra and Borneo in Indonesia developed over thousands of years and how climate and ***sea*** ***level*** influenced their dynamics throughout. The results were published in Global Change Biology.

To discover more about the environment over the past 17,000 years, researchers analysed two peat cores, each over eight meters long. They carried out analyses for traces of pollen, spores and charcoal, as well as conducting carbon dating and biogeochemical investigations. Their study found that there were much higher concentrations of charcoal between 9,000 to 4,000 years ago (the mid-Holocene), when ***sea*** ***level*** was even higher than it is now. This is a sign that there were much larger forest fires at that time. Later, around 3,000 years ago, irregular periodic variations in winds and sea surface temperatures (known as El Nino-Southern Oscillation or ENSO) would have caused prolonged drought, making the forests dry and thus susceptible to fires ignited by lightning. However, even at this time, the fires were fewer than in the earlier mid-Holocene, which presented a puzzle. A clue was that during the earlier period in the mid-Holocene period, researchers found a high proportion of mangrove pollen.

The pollen grains indicate the presence of mangrove forests which grow along the coast in salty water. Their presence is a good indicator of ***rising*** ***sea*** ***level*** and an increase of salt in the otherwise freshwater peatland ecosystem. Salt is harmful to freshwater (inland) vegetation, which is likely to have resulted in more dry and dead tree leaves and branches. Salt can also reduce forest canopy cover and air humidity, which is the one important factor that can prevent fire spreading in peatland ecosystems. Furthermore, mangrove woods are high-quality fuels that can burn for a long time and reach high temperatures. The increase in dry or dead trees and the availability of high-quality firewood alongside decreased canopy cover and humidity, could all contribute to the larger fires from that time. We were surprised to find that ***rising*** ***sea*** ***levels*** could potentially exacerbate fires in coastal areas in Indonesia, says lead author Dr Anggi Hapsari, University of Gttingen. Our findings underline how the interaction between ***rising*** ***sea*** ***levels*** and dry climate may contribute to massive forest fires even in relatively fire-proof ecosystems, such as pristine peatlands. This reveals the potential hidden impact of ***sea*** ***level*** ***rise*** exacerbating climate warming.

However, in contrast to the past, the primary cause of peatland fires now is human activity, adds Hapsari. If peoples behaviour continues in terms of, for instance, extensive destruction of peat swamp forests, peatland drainage, and intentional burning, when met with current rapidly ***rising*** ***sea*** ***level*** and stronger future ENSO, this could lead to catastrophic and widespread forest fires and uncontrollable carbon release, she continues.

"Our unexpected finding adds an as yet unknown threat to the survival of these valuable ecosystems," explains coauthor Dr Tim Jennerjahn, Leibniz Centre for Tropical Marine Research in Bremen. He concludes, "It demonstrates how the reconstruction of past environmental change can help improve present-day management of coastal ecosystems. It is clear that fire risk assessment in tropical peatlands deserves more attention."

**Load-Date:** March 24, 2022

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[***Burlingame plans for projected sea level rise***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6534-K191-JBCN-43S7-00000-00&context=1516831)

The San Mateo Daily Journal (California)

March 26, 2022

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**Section:** LOCAL

**Length:** 755 words

**Byline:** Corey Browning

**Body**

Plans to construct a comprehensive network of seawalls and levees to protect the Peninsula from projected ***sea*** ***level*** ***rise*** are moving forward, with the early phases of design work for a portion along the Bayshore in Millbrae and Burlingame slated to begin this year.

Sizable portions of both cities could be inundated in coming decades as melting polar ice is expected to raise global ***sea*** ***levels*** by multiple feet over the next century. In response, a countywide effort calls for infrastructure to be built with a height 6 feet above the current elevation of a "100-year flood" an event with a 1% chance of occurring in any given year. In Burlingame, that means walls will be built up to 16 feet or more.

"We're the most vulnerable county in the state in terms of population, number of homes, property value," said Len Materman, who heads OneShoreline, the agency tasked with overseeing the county's ***sea*** ***level*** ***rise*** infrastructure.

Water levels have a 66% chance ***rising*** by more than a foot in the next 30 years, and 2.5 feet by 2100, according to the state ***sea*** ***level*** ***rise*** guidance document, which notes the numbers could be much greater depending on environmental conditions.

A Civil Grand Jury report last year estimated nearly $40 billion in property in the county was at risk due to long-term erosion and flooding. In Burlingame, the majority of land east of Highway 101, the highway itself, and a sizable strip west of the highway are projected to be inundated within the next 100 years if no action is taken.

OneShoreline hopes to have selected a consultant to complete design work for the Millbrae-Burlingame infrastructure by the end of this month, and over the next four years identify total costs and close any funding gaps, in addition to completing necessary environmental impact studies.

Matermen said that in addition to offering protection from ***rising*** waters, the project would seek to improve the "aesthetics and the connectivity" of the Bay shoreline.

"We're not just all about walling off people from water. We're also about creating assets and we view the Bay shoreline as very much a key asset of Burlingame and other communities," he said.

So far the agency has secured $4 million in funding from the state budget, which Matermen said will cover part of the design work. Additional money is planned to come from a mixture of government and private sources. Burlingame is planning multiple large developments near the Bayshore that will likely be required to chip in.

"All of this is expensive work and the private sector's part of it, but there's also a role for us and the city's and San Francisco airport in getting us to that point," he said. "I want to be clear there will be future conversations about completing the funding even just to get to the construction."

Estimates to complete all needed infrastructure for the county, which includes also a wall around Redwood Shores, along the water in East Palo Alto, and near various creek and watersheds and on portions of the western coast, could be upwards of a billion dollars. Some projects are being led by local jurisdictions, others by OneShoreline. Walls around SFO and Foster City are being constructed independently.

"We're fortunate in this county that we have such a collaborative group of cities and a county that is so overarching and supportive," said Councilmember Donna Colson, who also sits on the OneShoreline Board of Directors. "I'm concerned about Burlingame, but I'm also concerned about our very-low-income neighborhoods that are very vulnerable and won't be able to finance this."

Matermen said the agency is nearing completion of its first project, a $8.6 million underground culvert to divert stormwater away from a group of mobile-home parks near the Bayfront Canal that were subject to frequent flooding.

He said a long-term funding source to help finance future projects is being sought, likely in the form of a countywide parcel tax.

Councilmember Michael Brownrigg said that while the city "plans for the worse" by constructing the wall, it was also important to continue the work of reducing carbon emission driving the planet's warming.

"I think what all the data shows is that we have to fend against, sadly, a much higher projected ***sea*** ***level*** ***rise*** much sooner than experts were saying even a decade ago," he said. "This is a left hand and right hand thing, we need to reduce carbon in the environment, we know that. The problem is the world and our nation isn't moving fast enough."

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**Load-Date:** March 26, 2022

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[***Wide Bay's rising sea levels to impact hundreds by 2100***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6521-92S1-DY66-5449-00000-00&context=1516831)

The Gympie Times Online

March 20, 2022 Sunday 10:51 PM AEDT

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**Length:** 435 words

**Byline:** Scott Kovacevic

**Body**

Tin Can Bay, Craignish and Moore Park Beach are among the Wide Bay suburbs and towns facing expanded water views if a predicted ***sea*** ***level*** ***rise*** comes to fruition.

Digital modelling by Coast Risk Australia has painted a confronting picture about the potential impacts of climate change and ***rising*** ***sea*** ***levels*** over the next 80 years.

The modelling uses predicted ***sea*** ***level*** ***rise*** scenarios based on the Intergovernmental Panel on Climate Change Fifth Assessment Report.

These range from a high scenario of 0.84m by 2100, and a much less likely scenario in which levels ***rise*** 2m by 2100, and 5m by 2150.

If a 0.84m ***rise*** becomes reality Tin Can Bay will lose the tip of Norman Point while water views along the Esplanade will become much clearer.

Popular tourist spot Inskip Point will lose a significant chunk of land under such a scenario, too.

At Hervey Bay Eli Waters will become much wetter, as will Craignish and Toogoom.

The biggest impact under a 0.84m ***rise*** will be felt north of Bundaberg.

Burnett Heads, Barubbra Island, and Moore Park Beach will all be significantly impacted by a 0.84m ***rise***.

Heritage listed Fraser Island faces a significant threat from ***rising*** ***sea*** ***levels*** too, with the modelling showing half the island will be inundated.

The damage would be much worse under a 2m ***rise***, which Coastal Risk says was a "low confidence" of eventuating but "cannot be ruled out due to deep uncertainty in ice sheet processes".

Under that scenario the entirety of Norman Point stretching from Oyster Parade to the Yacht Club would become an underwater world.

Hervey Bay would face a significantly larger problem, with a chunk of Urangan and Torquay inundated.

Houses along dozens of streets including Ann St, Dayman St, Whitlam St and Cunningham St would be submerged, with the water line spreading along the Esplanade past Scarness.

Further west, the coastline between Burrum Heads and Point Vernon would be moved inland several metres.

Bundaberg would face losing a large volume of farmland north of Fairymead while Burnett Heads would shrink considerably.

Gympie Regional Council sustainability director Adrian Burns said the organisation took a key step towards mitigating any impact from ***rising*** ***sea*** ***levels*** through its Hazard Adaptation Strategy, which takes into consideration the possibility of a 0.8m ***rise*** by 2100.

It was not the only council working towards ensuring any damage from ***rising*** ***sea*** ***levels*** was minimised.

"Council is working in conjunction with other local coastal councils that are facing similar challenges to consolidate actions and share mitigation strategies and successful project outcomes," Mr Burns said.

**Notes**

Document links may not lead to an active page. Page maintenance is at the discretion of the publisher.

**Load-Date:** March 21, 2022

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[***New link between greenhouse gases and sea level rise***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655M-FN21-JCG7-80J0-00000-00&context=1516831)

CE Noticias Financieras English

April 6, 2022 Wednesday

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**Length:** 525 words

**Body**

MADRID, 6 (EUROPA PRESS)

A new study provides the first evidence that increased greenhouse gases produce long-term warming in the Amundsen Sea in West Antarctica.

Scientists from the British Antarctic Survey (BAS) point out that, although others have proposed this relationship, no one had been able to demonstrate it.

The loss of ice from the West Antarctic Ice Sheet into the Amundsen Sea is one of the most rapid and worrisome contributions to global ***sea*** ***level*** ***rise***. If the West Antarctic ice sheet were to melt, global ***sea*** ***level*** could ***rise*** by as much as three meters.

Patterns of ice loss suggest that the ocean may have warmed in the Amundsen Sea over the past hundred years, but scientific observations of the region did not begin until 1994.

**86% of Mexicans live in debt and burdened by lack of moneyKarime Macías, one step away from extradition by order of Great Britain; can still contestThis is what is known of Hugo's murder in Naucalpan, Edomex**

In the study, published in the journal 'Geophysical Research Letters', oceanographers used advanced computer models to simulate the ocean's response to a series of possible changes in the atmosphere between 1920 and 2013.

The simulations show that the Amundsen Sea generally warmed over the century. This warming corresponds with simulated trends in wind patterns in the region, which increase temperatures by driving warm water currents into and under the ice.

Increasing greenhouse gases are known to make these wind patterns more likely, so the wind trend is believed to be caused in part by human activity.

This study supports theories that ocean temperatures in the Amundsen Sea have been increasing since before records began. It also provides the missing link between ocean warming and wind trends, which are known to be driven in part by greenhouse gases.

Ocean temperatures around the West Antarctic Ice Sheet are likely to continue to ***rise*** if greenhouse gas emissions increase, with consequences for ice melt and global ***sea*** ***level***. However, these results suggest that this trend could be slowed if emissions are sufficiently reduced and wind patterns in the region are stabilized.

Dr. Kaitlin Naughten, ocean ice modeler at BAS and lead author of this study, says her simulations show how the Amundsen Sea responds to long-term trends in the atmosphere, specifically to westerly winds from the southern hemisphere.

"This raises concerns for the future because we know that these winds are affected by greenhouse gases," he continues in a statement. However, it should also give us hope, because it shows that ***sea*** ***level*** ***rise*** is not out of our control."

For his part, Professor Paul Holland, BAS ocean and ice scientist and co-author of the study, stresses that "changes in westerly winds in the southern hemisphere are a well-established climatic response to the effect of greenhouse gases. However, the Amundsen Sea is also subject to strong natural climate variability."

"Simulations suggest that both natural and anthropogenic changes are responsible for the ocean-driven ice loss from the West Antarctic Ice Sheet," he concludes.

**Load-Date:** April 7, 2022

**End of Document**



[***-MIT - Improving predictions of sea level rise for the next century***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6545-FN01-F0K1-N06V-00000-00&context=1516831)

M2 PressWIRE

March 31, 2022 Thursday

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**Length:** 1272 words

**Body**

March 31, 2022

Release date- 30032022 - When we think of climate change, one of the most dramatic images that comes to mind is the loss of glacial ice. As the Earth warms, these enormous rivers of ice become a casualty of the ***rising*** temperatures. But, as ice sheets retreat, they also become an important contributor to one the more dangerous outcomes of climate change: ***sea***-***level*** ***rise***. At MIT, an interdisciplinary team of scientists is determined to improve ***sea*** ***level*** ***rise*** predictions for the next century, in part by taking a closer look at the physics of ice sheets.

Last month, two research proposals on the topic, led by Brent Minchew, the Cecil and Ida Green Career Development Professor in the Department of Earth, Atmospheric and Planetary Sciences (EAPS), were announced as finalists in the MIT Climate Grand Challenges initiative. Launched in July 2020, Climate Grand Challenges fielded almost 100 project proposals from collaborators across the Institute who heeded the bold charge: to develop research and innovations that will deliver game-changing advances in the world's efforts to address the climate challenge.

As finalists, Minchew and his collaborators from the departments of Urban Studies and Planning, Economics, Civil and Environmental Engineering, the Haystack Observatory, and external partners, received $ 100,000 to develop their research plans. A subset of the 27 proposals tapped as finalists will be announced next month, making up a portfolio of multiyear 'flagship' projects receiving additional funding and support.

One goal of both Minchew proposals is to more fully understand the most fundamental processes that govern rapid changes in glacial ice, and to use that understanding to build next-generation models that are more predictive of ice sheet behavior as they respond to, and influence, climate change.

'We need to develop more accurate and computationally efficient models that provide testable projections of ***sea***-***level*** ***rise*** over the coming decades. To do so quickly, we want to make better and more frequent observations and learn the physics of ice sheets from these data,' says Minchew. 'For example, how much stress do you have to apply to ice before it breaks?'

Currently, Minchew's Glacier Dynamics and Remote Sensing group uses satellites to observe the ice sheets on Greenland and Antarctica primarily with interferometric synthetic aperture radar (InSAR). But the data are often collected over long intervals of time, which only gives them 'before and after' snapshots of big events. By taking more frequent measurements on shorter time scales, such as hours or days, they can get a more detailed picture of what is happening in the ice.

'Many of the key unknowns in our projections of what ice sheets are going to look like in the future, and how they're going to evolve, involve the dynamics of glaciers, or our understanding of how the flow speed and the resistances to flow are related,' says Minchew.

At the heart of the two proposals is the creation of SACOS, the Stratospheric Airborne Climate Observatory System. The group envisions developing solar-powered drones that can fly in the stratosphere for months at a time, taking more frequent measurements using a new lightweight, low-power radar and other high-resolution instrumentation. They also propose air-dropping sensors directly onto the ice, equipped with seismometers and GPS trackers to measure high-frequency vibrations in the ice and pinpoint the motions of its flow.

How glaciers contribute to ***sea*** ***level*** ***rise***

Current climate models predict an increase in ***sea*** ***levels*** over the next century, but by just how much is still unclear. Estimates are anywhere from 20 centimeters to two meters, which is a large difference when it comes to enacting policy or mitigation. Minchew points out that response measures will be different, depending on which end of the scale it falls toward. If it's closer to 20 centimeters, coastal barriers can be built to protect low-level areas. But with higher surges, such measures become too expensive and inefficient to be viable, as entire portions of cities and millions of people would have to be relocated.

'If we're looking at a future where we could get more than a meter of ***sea*** ***level*** ***rise*** by the end of the century, then we need to know about that sooner rather than later so that we can start to plan and to do our best to prepare for that scenario,' he says.

There are two ways glaciers and ice sheets contribute to ***rising*** ***sea*** ***levels***: direct melting of the ice and accelerated transport of ice to the oceans. In Antarctica, warming waters melt the margins of the ice sheets, which tends to reduce the resistive stresses and allow ice to flow more quickly to the ocean. This thinning can also cause the ice shelves to be more prone to fracture, facilitating the calving of icebergs - events which sometimes cause even further acceleration of ice flow.

Using data collected by SACOS, Minchew and his group can better understand what material properties in the ice allow for fracturing and calving of icebergs, and build a more complete picture of how ice sheets respond to climate forces.

'What I want is to reduce and quantify the uncertainties in projections of ***sea*** ***level*** ***rise*** out to the year 2100,' he says.

From that more complete picture, the team - which also includes economists, engineers, and urban planning specialists - can work on developing predictive models and methods to help communities and governments estimate the costs associated with ***sea*** ***level*** ***rise***, develop sound infrastructure strategies, and spur engineering innovation.

Understanding glacier dynamics

More frequent radar measurements and the collection of higher-resolution seismic and GPS data will allow Minchew and the team to develop a better understanding of the broad category of glacier dynamics - including calving, an important process in setting the rate of ***sea*** ***level*** ***rise*** which is currently not well understood.

'Some of what we're doing is quite similar to what seismologists do,' he says. 'They measure seismic waves following an earthquake, or a volcanic eruption, or things of this nature and use those observations to better understand the mechanisms that govern these phenomena.'

Air-droppable sensors will help them collect information about ice sheet movement, but this method comes with drawbacks - like installation and maintenance, which is difficult to do out on a massive ice sheet that is moving and melting. Also, the instruments can each only take measurements at a single location. Minchew equates it to a bobber in water: All it can tell you is how the bobber moves as the waves disturb it.

But by also taking continuous radar measurements from the air, Minchew's team can collect observations both in space and in time. Instead of just watching the bobber in the water, they can effectively make a movie of the waves propagating out, as well as visualize processes like iceberg calving happening in multiple dimensions.

Once the bobbers are in place and the movies recorded, the next step is developing machine learning algorithms to help analyze all the new data being collected. While this data-driven kind of discovery has been a hot topic in other fields, this is the first time it has been applied to glacier research.

'We've developed this new methodology to ingest this huge amount of data,' he says, 'and from that create an entirely new way of analyzing the system to answer these fundamental and critically important questions.'

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**Load-Date:** March 31, 2022

**End of Document**



[***Reconstructing Sea-Level Rises In The Red Sea***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:652F-1HV1-F11P-X0G5-00000-00&context=1516831)

Eurasia Review

March 22, 2022 Tuesday

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**Length:** 462 words

**Byline:** Eurasia Review

**Body**

A study of the relative contributions of surface winds and atmospheric pressure on ***sea***-***level*** ***rises*** in the Red Sea has shown that wind variations over the southern part of the sea are the main drivers of basin-wide ***sea***-***level*** extremes, uniformly driving ***sea*** ***levels*** up and down depending on wind direction.

Changes in ***sea*** ***levels*** often occur in response to meteorological forces such as wind and atmospheric pressure. These meteorological surges, or storm surges, lead to coastal flooding and erosion and are considered one of the greatest threats to coastal environments and communities.

Therefore, understanding storm surges and their driving forces is critical for coastal planning and management activities.

Numerous studies on storm surges have been done in some oceans and seas around the world, for example, in the coastal areas of the Bay of Bengal and along the coast of the North Sea, yet few have been conducted on the Red Sea.

This led Ibrahim Hoteit, Sabique Langodan and colleagues from KAUST's Red Sea Modeling and Prediction Group to study the meteorological origin of ***sea***-***level*** extremes in the Red Sea basin.

"Understanding ***sea***-***level*** extremes requires high temporal (hourly or less) data from tidal gauges distributed along the coastline and over long periods, ideally decades," explained Langodan. "Unfortunately, long-term tidal observations are very scarce for the Red Sea."

To overcome this, the researchers resorted to advanced computer simulations of storm surges to generate high-spatial-resolution (approximately 500 meters) long-term datasets of ***sea***-***level*** variations in the Red Sea. They first validated the datasets with hourly ***sea***-***level*** observations for three years (2013-2015) from six tidal gauges along the Saudi coast of the Red Sea.

They then used the ADvanced CIRCulation (ADCIRC) storm surge model, which solves the vertically integrated shallow-water equations for water-surface elevations and currents to hindcast ***sea***-***level*** ***rise*** from meteorological forces in the Red Sea over 37 years, spanning 1980-2016.

"This approach allowed the contribution from surface winds and atmospheric pressures to be modeled separately and provided spatial maps of the maximum ***sea***-***levels*** resulting from the pressure-only, wind-only and combined wind-pressure forcing simulations," explains Langodan.

Hoteit says the work has important implications for managing and developing the Red Sea coastline, including the proposed megacity projects and the rapid expansion of tourism along the coast. It will also support strategies to mitigate their impact on the unique marine environment and coral reefs of the Red Sea.

"We are now investigating the predicted changes in these extremes due to the projected climate change impacts, in terms of intensity and frequency," he said.

**Load-Date:** March 23, 2022

**End of Document**



[***bolsa chica ecological reserve; Sea level rise seen as threat to wetlands***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6557-FS61-JBCN-43K0-00000-00&context=1516831)

Orange County Register (California)

April 5, 2022 Tuesday

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**Section:** NEWS; Pg. 1

**Length:** 1362 words

**Byline:** Martin Wisckol ; mwisckol@scng.com

**Body**

***Sea*** ***level*** ***rise*** could wipe out precious habitat at Huntington Beach ’s Bolsa Chica wetlands and eventually flood neighborhoods just east of the ecological reserve, according to a new study three years in the making.

But ongoing estuary maintenance and continued improvements, including new levees and elevating some existing wetlands, would preserve and improve

existing wildlife ecosystems. Such work also would bolster the buffer that the wetlands provide for adjacent homes against ***rising*** seas, the study found.

Because portions of the 1,400-acre wetlands have subsided as a result of decades of oil drilling, there is growing urgency to take action and the opportunity to provide a model for the state’s other remaining wetlands.

Adaptation efforts at Bolsa Chica “have broad ramifications in that the site provides early insight into issues other coastal wetland systems will face in coming decades,” according to the 462-page study, paid for with $282,000 of Proposition 1 water bond money.

Southern California has lost 62% of its wetlands since the 19th century, with the Orange-Los Angeles county region losing more than 90%, mostly to development and urbanization.

That’s resulted in the loss of habitat crucial to many species that are now threatened, endangered and of special concern, 23 of which reside or make migratory stops at Bolsa Chica. In addition to providing wildlife habitat and a buffer to homes, wetlands also absorb carbon dioxide from the atmosphere.

But wildlife is the main reason $151 million was spent on the Bolsa Chica restoration completed in 2006. The project created a new ocean inlet at the south end of the wetlands that has proved a boon to both the variety and total population of wildlife in the reserve.

Much of that habitat will be lost without ongoing improvements, the report said. And while the focus of the report’s recommendations is on wildlife, humans living nearby also would benefit from the reduced risk of flooding.

“Bolsa Chica acts as a giant sponge,” said Kim Kolpin, executive director of the Bolsa Chica Land Trust. “How good a job we do will determine its resiliency. A healthy wetlands means a healthy barrier from ***sea*** ***level*** ***rise***.”

The land trust wrote the grant application that resulted in the Proposition 1 funding and commissioned the study in coordination with government agencies involved with the wetlands. The Bolsa Chica Steering Committee, composed of two state and three federal agencies, will determine the next steps in maintenance and improvements.

“It’s in everyone’s best interest to have Bolsa Chica thriving, so it can best absorb the impact of climate change and ***sea*** ***level*** ***rise***,” Kolpin said.

Cinderella story

Without human intervention, coastal wetlands can be dynamic and unpredictable. The location of river mouths and ocean inlets as well as lagoons and tidal basins can shift from season to season, depending on how the storms affect associated rivers and oceanfronts.

But such year-to-year changes often don’t bode well for man’s plans for ports, roads and buildings. As a result, urbanization has meant filling in or otherwise constricting many of the state’s wetlands.

Probably the first significant human impact on the Bolsa Chica wetlands came with the establishment of the Bolsa Chica Gun Club in 1899, which included a two-story building and damming of a portion of the wetlands to facilitate duck hunting.

Subsequent decades saw the construction of Pacific Coast Highway and a coastal trolley line, as well as extensive oil drilling and construction of a stormwater channel, each of which reduced the dynamic shifting of the wetlands and impinged on wildlife.

In the 1970s, developers proposed turning the wetlands into a marina surrounded by 5,000 homes. That marked a turning point, as environmentalists and residents rallied against the development in order to preserve the natural wetlands.

In 2000, a state Coastal Commission determination led to just 379 homes being built in an elevated corner of the broader wetlands area.

“Throughout most of recorded world history, wetlands were regarded as wastelands and problem areas to be drained and filled,” said the 2018 report “Wetlands on the Edge,” commissioned by a coalition of federal and state environmental agencies.

“[But] a shift in the understanding and appreciation for these habitats has occurred, and wetlands are now valued worldwide for the many benefits they provide.”

Bolsa Chica, a state-owned ecological reserve, is a prime example. The 2006 ocean inlet construction and associated improvements then the largest wetlands project on the West Coast are testament to how such estuaries have become an asset to improve upon.

Bolsa Chica now hosts more than 300 feathered resident and migratory species, many of which lay their eggs in the wetlands. All told, there are an estimated 900 species in the wetlands, including turtles, rays and octopi.

Kolpin said the wetlands is the healthiest it’s been since the 1940s, when oil drilling peaked. However, she added that the coming effects of ***sea*** ***level*** ***rise*** are already being seen, as king tides have encroached on the wetlands’ two nesting islands.

Those sandy islands vital for the endangered least tern and wetlands areas popular with other shorebirds are among Bolsa Chica habitat in most immediate jeopardy from ***sea*** ***level*** ***rise***.

The islands are just part of ongoing challenges. The wetlands have become a man-made reconstruction of wildlife, lacking some historical natural features that allowed it to be self sustaining and now requiring continued maintenance.

“The wetlands at Bolsa Chica never looked the way they do today,” Kolpin said. “The pieces never fit the way they do now.”

The biggest current maintenance issue is dredging of the ocean inlet, necessary to maintain the intertidal flow. The trust fund set up for that $1 million annual expense has been exhausted, requiring new budget approvals each cycle and no guarantee the money will be available from year to year.

The new study looked at alternatives to dredging and found none that were feasible.

Hope for the future

What is known as Bolsa Chica’s full tidal basin the intertidal lagoon created by the inlet has exceeded expectations in terms of preserving wildlife habitat. But other aspects of the wetlands, particularly the muted tidal basin that fronts the homes to the east, have been less successful.

The new study, completed by the environmental engineering firm Anchor QEA, examines current and future challenges and viable solutions for the reserve.

In addition to ongoing dredging, pumping water out of the muted tidal basin will need to be continued because tidal action flushes water into the basin, but without human help, once there, that water remains stagnant.

Levees and ground elevation are part of the hydrological recommendations to both improve habitat in the muted tidal basin and adapt to ***sea*** ***level*** ***rise***.

The proposals also address the groundwater table beneath the nearby homes which, without changes to the wetlands’ hydrology, is expected to come closer to the surface as ***sea*** ***level*** ***rise*** obstructs its westward migration.

That’s in addition to the ocean’s elevated levels washing directly over the wetlands and into that neighborhood.

“By the turn of the century, the entire [wetlands] site and surrounding residential neighborhood will likely become inundated without some type of intervention,” the study concluded.

Study recommendations are broken into short-, mid- and long-term strategies. Not addressed is funding, although Kolpin expressed optimism and pointed to Gov. Gavin Newsom’s “30×30” executive order as one reason for hope.

The order calls for the state to conserve 30% of its land and coastal waters by 2030, with wetlands restoration a highlighted priority.

“It’s a large state with a lot of challenges to natural resources,” she said. “Wildfires and drought are huge. You’re going to have a lot of money poured into that, but habitats are important too.”

Kolpin, who’s been fighting for the preservation and restoration of the wetlands for more than 20 years, is hardly new to such challenges.

“Bolsa Chica,” she said, “has never been cheap or easy.”

**Load-Date:** April 5, 2022

**End of Document**



[***Trump claims sea level rise means more homes by the ocean. Let's take a look at Mar-a-Lago***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6516-J441-DY4H-K4M3-00000-00&context=1516831)

The Independent (United Kingdom)

March 17, 2022 Thursday 5:06 PM GMT

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**Section:** NEWS,CLIMATE; Version:3

**Length:** 1107 words

**Byline:** Louise Boyle

**Highlight:** Low-lying southern Florida, where Mar-a-Lago is located, is already impacted by ***rising*** tides and storm surge, writes Louise Boyle

**Body**

If the repertoire at his recent public outings are anything to go by, [*Donald Trump*](https://www.independent.co.uk/topic/donald-trump) appears to be workshopping new climate denial material, perhaps in light of his rumored 2024 run for the [*White House*](https://www.independent.co.uk/topic/white-house).

The former president rolled out his bit on [***sea******level******rise***](https://www.independent.co.uk/topic/sea-level-rise) again at a rally in Florence, [*South Carolina*](https://www.independent.co.uk/topic/south-carolina) this past weekend.

"The world is going to be destroyed because the oceans are going to ***rise*** 1/100 of an inch within the next 300 years," he claimed, in a mocking tone. "It's going to kill everybody."

[*Trump news -live updates*](https://www.independent.co.uk/news/world/americas/us-politics/trump-news-today-putin-ukraine-republicans-b2038641.html)

He continued: "It's going to create more oceanfront property. That's what it's going to do."

Mr Trump made similar comments at the [*Conservative Political Action Conference*](https://www.independent.co.uk/climate-change/news/trump-climate-cpac-seafront-properties-b2024619.html) in Orlando last month.

But while he plays the line for roars of adulation from supporters, Mr Trump's fellow Floridians know the subject is no laughing matter.

Florida tops the list for ***sea*** ***level***-***rise*** risk in the US. Globally, the seas have risen six to eight inches (15-20 cm) over the last century, a rate that has accelerated in the past two decades.

More than 90 per cent of excess heat in the atmosphere - caused by greenhouse gas emissions from burning oil, gas and coal - is absorbed by the ocean. Heat causes water to expand and raises ***sea*** ***levels***, with melting glaciers and ice sheets compounding the problem.

Average ***sea*** ***level*** along the US coastline is expected to ***rise*** by 10 -12 inches (25-30cm) in the next 30 years, according to a [*2022 update*](https://oceanservice.noaa.gov/hazards/sealevelrise/sealevelrise-tech-report.html) from the National and Oceanic Atmospheric Administration (NOAA).

Coastal flooding will worsen, NOAA says. Higher ***sea*** ***levels*** mean higher tides and storm surges, pushing water further inland. By 2050, "moderate" flooding - the kind which causes damage - will happen more than 10 times as often as it does today, on average.

This means serious problems for low-lying southern Florida, where Mr Trump lives at the [*Mar-a-Lago*](https://www.independent.co.uk/topic/mar-lago) estate. The Republican bought the 123-room mansion in 1985 after [*driving down its price*](https://www.vanityfair.com/style/2016/12/how-donald-trump-beat-palm-beach-society-and-won-the-fight-for-mar-a-lago) and has spent millions on renovations in the [*intervening decades.*](http://go.redirectingat.com/?id=44681X1458326&url=https%3A%2F%2Fwww.theglobeandmail.com%2Fnews%2Fworld%2Fus-politics%2Fdonald-trump-in-palm-beach%2Farticle33453459%2F&sref=https://www.independent.co.uk/climate-change/news/trump-mar-a-lago-ocean-sea-level-rise-b2035738.html)

Located on a barrier island of Palm Beach, the private club, and its neighbouring multi million-dollar properties, are surrounded by water, with the Atlantic Ocean to the east and Florida's Intracoastal Waterway to the west.

Nearly two-thirds of properties in Palm Beach are designated as "[*special flood hazard area*](https://discover.pbcgov.org/pzb/MapGallery/floodzones.pdf) " by the Federal Emergency Management Agency, the US government's disaster-response branch.

***Sea*** ***level*** ***rise*** will have myriad impacts on the Sunshine State. Firstly, three-quarters of the population live in coastal areas. This means more people and homes in harm's way of flooding and storm surges which can accompany the increasingly powerful hurricanes being[*fuelled by warm water.*](https://www.independent.co.uk/climate-change/news/hurricane-ida-louisiana-storm-katrina-b1912069.html)

Millions of people, particularly in Miami-Dade and Broward counties just south of Palm Beach, live on land within four feet of the local high tide line. ***Sea*** ***level*** ***rise*** more than doubles risk of a [*storm surge*](https://www.independent.co.uk/topic/storm-surge) at this level in South Florida by 2030, the nonprofit [*Climate Central*](https://sealevel.climatecentral.org/news/floria-and-the-rising-sea) reports.

Even outside of hurricane season, Florida communities are experiencing flooded storm drains, roads and infrastructure during high tide.

The state sits on porous bedrock so even small amounts of ***sea*** ***level*** ***rise*** can have salty water seeping into the foundations of buildings and freshwater supplies.

During Hurricane Sandy in 2012, rushing water [*destroyed and damaged sea wall defences of homes near Mar-a-Lago*](https://www.wptv.com/about-us/mobile/hurricaneplus-video/hurricane-sandy-damage-on-palm-beach-more-extensive-than-originally-thought). Palm Beach County was left with a major restoration job along the eroded shoreline.

In 2017, Mar-a-Lago staff and guests were among a mass evacuation ahead of Category-5 Hurricane Irma making landfall. Five people died in Palm Beach County and the cyclone caused an estimated $50bn in damage to the state, the costliest hurricane in Florida history.

Over the next 30 years, 2,386 properties in Palm Beach have a one-in-five chance of being severely affected by flooding, reports [*FloodFactor,*](https://floodfactor.com/city/palm-beach-florida/1254025_fsid) representing 82 per cent of buildings in the city.

Mar-a-Lago is unlikely to escape. Even with conservative projections of ***sea*** ***level*** ***rise***, water could be sloshing over Mar-a-Lago's manicured lawns from the intracoastal waterway in the next 30 years, according to [*Climate Central's*](https://coastal.climatecentral.org/map/17/-80.0396/26.6761/?theme=sea_level_rise&map_type=year&basemap=hybrid&contiguous=true&elevation_model=best_available&forecast_year=2050&pathway=gmsl1p0m&percentile=p50&refresh=true&return_level=return_level_1&rl_model=tebaldi_2012&slr_model=noaa_2022) coastal risk screening tool based on the latest NOAA data.

Flooding is also expected to impact neighbouring properties and roads on the barrier island, and threaten a bridge which provides access to mainland Florida.

A 2016 analysis, published by the[*Guardian,*](https://www.theguardian.com/us-news/2016/jul/06/donald-trump-climate-change-florida-resort) found that by 2045, "storm surge from even a category two storm would bring waters crashing over the main swimming pool and up to the main building" of Mar-a-Lago.

And it's not Mr Trump's only at-risk property in Florida. There's also the Trump International Beach Resort and his Doral golf course, both located further south in the Miami area.

The Independent has contacted representatives for Mr Trump and Mar-a-Lago for comment.

The long-term severity of ***sea*** ***level*** ***rise*** will depend on how seriously countries tackle still-***rising*** carbon emissions, scientists say.

However according to the most recent accounting from the authoritative [*Intergovernmental Panel on Climate Change,*](https://www.independent.co.uk/climate-change/news/sea-level-rise-ipcc-report-2021-b1899177.html) some damage is already "baked in".

It is "virtually certain" that global ***sea*** ***levels*** will continue to ***rise*** this century but beyond 2050, projections become increasingly sensitive to "emission choices we are making today", [*according to the report's authors.*](https://www.independent.co.uk/climate-change/news/sea-level-rise-ipcc-report-2021-b1899177.html)

Scientists have a less clear picture of what will happen if global heating continues to ***rise***, particularly when it comes to catastrophic events like the collapse of the polar ice sheets.

NOAA has also issued [*"extreme"* ***sea******level*** *projections, a so-called "Doomsday" scenario.*](https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf) While unlikely, it would see a 10-to 12-foot ***rise*** in US ***sea*** ***levels*** by the end of the century, leaving large parts of southern Florida including Miami (but also major coastal cities like New York and Boston) underwater.

Florida is investing billions in near-term preparations. Republican Governor Ron DeSantis, a potential Trump rival for 2024, announced a "Resilient Florida" program last year, which will provide $1bn in grants to help local authorities adapt to climate risks.

This means a rollout of strategies like raising roads, bridges and buildings and installing high-tech pumping systems. In some instances, communities are beginning to [*retreat from* ***rising*** *seas entirely*](https://www.georgetownclimate.org/files/MRT/GCC_20_Punta-3web.pdf).

[*Jim Cason,*](https://sealevelrise.org/states/florida/) the former Republican mayor of the south Florida city of Coral Gables, called ***sea*** ***level*** ***rise*** an "existential issue".

"In 30 years Florida will see many more days of flooding, stronger storms, more extreme weather, and stagnant or declining coastal property values," [*he said*](https://sealevelrise.org/states/florida/).

**Load-Date:** March 18, 2022

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[***Author Jeff Goodell Visits Eckerd College for Presentation on Sea Level Rise***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655W-2H81-DYG2-R3GJ-00000-00&context=1516831)

Targeted News Service

April 8, 2022 Friday 9:00 AM EST

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**Length:** 492 words

**Byline:** Targeted News Service

**Dateline:** ST. PETERSBURG, Florida

**Body**

(TNSRes) -- Eckerd College issued the following news:

Jeff Goodell, author of The Water Will Come: ***Rising*** Seas, Sinking Cities, and the Remaking of the Civilized World, came to Eckerd College on March 31 to give a presentation on ***sea*** ***level*** ***rise*** and the disastrous effects it will have on our society as a whole.

Goodell is an award-winning investigative journalist, writer and contributing editor for Rolling Stone magazine. He has written several books about environmentalism and global warming and is considered a leading expert in his field.

Goodell began his lecture with some sobering facts about the effects of climate change, pointing out that Eckerd is "ground zero" in the fight against ***sea*** ***level*** ***rise***. Citing new research from the National Oceanic and Atmospheric Administration (NOAA), he explained that even in a best-case scenario, our oceans will gain about a foot of water in the next 30 years. In a worst-case scenario, they will gain 13 feet by 2150. "The water will come," Goodell said. "The question is how high and how fast."

Throughout his presentation, Goodell spoke about his experience writing The Water Will Come, detailing the four-year research project that went into the final book. On a trip to Miami, he saw firsthand the effects of ***sea*** ***level*** ***rise*** after extreme flooding during spring tide in 2013. This experience sparked a global investigation into ***sea*** ***level*** ***rise***, inspiring him to travel to places around the world most impacted by flooding.

After listening to Goodell's presentation, Cameron "Cam" Larmer--a senior marine science student from Sarasota, Florida--called climate change "the problem of the century" and talked about how the issue of climate change connected to his studies. "Any issue that I've been interested in with ocean conservation, it all kind of comes back to climate change," Cam says.

Goodell emphasized this association during his presentation but insisted that students and young people across all fields can contribute to positive change.

At the end of his talk, several students raised questions for the author, not only about the experience of writing his book and actions they might take to help prevent disastrous ***sea*** ***level*** ***rise***. Goodell insisted that forward thinking and creativity would be essential to reimagining our world in the face of ***rising*** seas. "There's a lot of thinking about how to make this a landscape that is friendly for people and for life, in general. This is the kind of creative thinking that I think is so exciting," he told the students.

Kasey Laguna, a junior geosciences student from Phillipsburg, New Jersey, found Goodell's presentation "empowering" and says that Goodell has inspired future work in climate change activism. "I thought he said a lot of things that people are kind of afraid to say," Kasey says. "And I liked his idea of living with the water ... I'd never heard anyone talk about that before."

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**Load-Date:** April 8, 2022

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[***Sea-level rise creating 'ghost forests' in North Carolina***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6516-V9M1-JBCN-455Y-00000-00&context=1516831)

CBS - 9 WNCT (Greenville, North Carolina)

March 17, 2022 Thursday

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**Section:** NEWS

**Length:** 540 words

**Byline:** Rachel Duensing

**Body**

RALEIGH, N.C. (WNCN) -- Imagine a forest the size of Raleigh and Durham. Now imagine a forest that size dying every single year.

It's an unfortunate reality that's happening right now across the North American Coastal Plain, including part of our backyard here in North Carolina.

Our North Carolina beaches are a popular vacation spot or weekend getaway where we soak up the sun and relax to the sound of waves. But just a few miles inland, our coastal wetlands are facing a crisis. Vulnerable ecosystems are changing, and trees are dying, leaving nothing but ghosts.

"A ghost forest I think is a very fitting name because the ghost part, you think about a ghost it's a relic of what used to be," explains Dr. Elliott White Jr.

Dr. White led a team of researchers across the North American Coastal Plain to study and document the loss of our coastal forested wetlands, and what they found is sobering.

Their research showed that the North American Coastal Plane was losing 684 square kilometers, or 264 square miles of coastal forested wetlands every year. That's the size of Raleigh and Durham combined.

Duke Professor Dr. Emily Bernhardt was part of this research group and says what started out as a restoration study became something more.

"They're quite striking, and to us, they became an indicator of a much larger problem," she explains. "How prominent are these, what's causing them, where's it happening, and how fast?"

In previous centuries, these forests were drained and cut down for agriculture, but that now only accounts for 3% of the total loss. So they looked at the bigger picture.

"It's happening all over the place, anywhere water tables are ***rising***, or marine salts are getting upslope and salinizing the soil," says Dr. Bernhardt.

So why should we care? The reality is the trees dying can't thrive in water that is becoming saltier and saltier, so as ***sea***-***levels*** ***rise*** and stronger hurricanes produce more storm surges, it's harder for these trees to survive.

"We can't reverse climate change overnight. We can sign a law and stop deforestation overnight, but you can't reverse climate change overnight. So these systems in some ways are on a ticking clock in terms of what we can do to save them," Dr. White explains.

If we do nothing, what's left of these coastal forests will be gone within the century.

Native cultures have a spiritual connection with these areas, they provide habitats for numerous species of wildlife, and they're even nature's natural water filters!

"If you eat seafood or you like to swim in clear waters on the coast, these wetlands play a really important role in protecting our water quality," Dr. Bernhardt says.

We can't save the forests overnight, and they may never fully return to their former glory, but Dr. White and his team of researchers are working to create opportunities and awareness so these forests can be around for generations to come.

"Even though I said these systems are hard to restore, plant some trees," Dr. White says. "Some of them will come back, so buying land and trying to create more of this system a little farther inland so that they can grow healthy and survive."

To understand both the natural and climate change drivers of ***sea***-***level*** ***rise***, you can read more here.

**Load-Date:** March 17, 2022

**End of Document**



[***Sea-level rise creating 'ghost forests' in North Carolina***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:650Y-JVM1-JBCN-40KY-00000-00&context=1516831)

NBC - 17 WNCN (Raleigh-Durham, North Carolina)

March 15, 2022 Tuesday

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To understand both the natural and climate change drivers of ***sea***-***level*** ***rise***, you can read more here.

**Load-Date:** March 16, 2022

**End of Document**



[***IMPROVING PREDICTIONS OF SEA LEVEL RISE FOR THE NEXT CENTURY***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6546-45J1-DYTH-G0DD-00000-00&context=1516831)

States News Service

March 30, 2022 Wednesday

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**Length:** 1281 words

**Byline:** States News Service

**Dateline:** CAMBRIDGE, Mass.

**Body**

The following information was released by the Massachusetts Institute of Technology (MIT):

Brent Minchew leads two proposals to better understand glacial physics and predict ***sea***-***level*** ***rise*** as part of MIT's Climate Grand Challenges competition.

Paige Colley | EAPS

When we think of climate change, one of the most dramatic images that comes to mind is the loss of glacial ice. As the Earth warms, these enormous rivers of ice become a casualty of the ***rising*** temperatures. But, as ice sheets retreat, they also become an important contributor to one the more dangerous outcomes of climate change: ***sea***-***level*** ***rise***. At MIT, an interdisciplinary team of scientists is determined to improve ***sea*** ***level*** ***rise*** predictions for the next century, in part by taking a closer look at the physics of ice sheets.

Last month, two research proposals on the topic, led by Brent Minchew, the Cecil and Ida Green Career Development Professor in the Department of Earth, Atmospheric and Planetary Sciences (EAPS), were announced as finalists in the MIT Climate Grand Challenges initiative. Launched in July 2020, Climate Grand Challenges fielded almost 100 project proposals from collaborators across the Institute who heeded the bold charge: to develop research and innovations that will deliver game-changing advances in the world's efforts to address the climate challenge.

As finalists, Minchew and his collaborators from the departments of Urban Studies and Planning, Economics, Civil and Environmental Engineering, the Haystack Observatory, and external partners, received $100,000 to develop their research plans. A subset of the 27 proposals tapped as finalists will be announced next month, making up a portfolio of multiyear "flagship" projects receiving additional funding and support.

One goal of both Minchew proposals is to more fully understand the most fundamental processes that govern rapid changes in glacial ice, and to use that understanding to build next-generation models that are more predictive of ice sheet behavior as they respond to, and influence, climate change.

"We need to develop more accurate and computationally efficient models that provide testable projections of ***sea***-***level*** ***rise*** over the coming decades. To do so quickly, we want to make better and more frequent observations and learn the physics of ice sheets from these data," says Minchew. "For example, how much stress do you have to apply to ice before it breaks?"

Currently, Minchew's Glacier Dynamics and Remote Sensing group uses satellites to observe the ice sheets on Greenland and Antarctica primarily with interferometric synthetic aperture radar (InSAR). But the data are often collected over long intervals of time, which only gives them "before and after" snapshots of big events. By taking more frequent measurements on shorter time scales, such as hours or days, they can get a more detailed picture of what is happening in the ice.

"Many of the key unknowns in our projections of what ice sheets are going to look like in the future, and how they're going to evolve, involve the dynamics of glaciers, or our understanding of how the flow speed and the resistances to flow are related," says Minchew.

At the heart of the two proposals is the creation of SACOS, the Stratospheric Airborne Climate Observatory System. The group envisions developing solar-powered drones that can fly in the stratosphere for months at a time, taking more frequent measurements using a new lightweight, low-power radar and other high-resolution instrumentation. They also propose air-dropping sensors directly onto the ice, equipped with seismometers and GPS trackers to measure high-frequency vibrations in the ice and pinpoint the motions of its flow.

How glaciers contribute to ***sea*** ***level*** ***rise***

Current climate models predict an increase in ***sea*** ***levels*** over the next century, but by just how much is still unclear. Estimates are anywhere from 20 centimeters to two meters, which is a large difference when it comes to enacting policy or mitigation. Minchew points out that response measures will be different, depending on which end of the scale it falls toward. If it's closer to 20 centimeters, coastal barriers can be built to protect low-level areas. But with higher surges, such measures become too expensive and inefficient to be viable, as entire portions of cities and millions of people would have to be relocated.

"If we're looking at a future where we could get more than a meter of ***sea*** ***level*** ***rise*** by the end of the century, then we need to know about that sooner rather than later so that we can start to plan and to do our best to prepare for that scenario," he says.

There are two ways glaciers and ice sheets contribute to ***rising*** ***sea*** ***levels***: direct melting of the ice and accelerated transport of ice to the oceans. In Antarctica, warming waters melt the margins of the ice sheets, which tends to reduce the resistive stresses and allow ice to flow more quickly to the ocean. This thinning can also cause the ice shelves to be more prone to fracture, facilitating the calving of icebergs events which sometimes cause even further acceleration of ice flow.

Using data collected by SACOS, Minchew and his group can better understand what material properties in the ice allow for fracturing and calving of icebergs, and build a more complete picture of how ice sheets respond to climate forces.

"What I want is to reduce and quantify the uncertainties in projections of ***sea*** ***level*** ***rise*** out to the year 2100," he says.

From that more complete picture, the team which also includes economists, engineers, and urban planning specialists can work on developing predictive models and methods to help communities and governments estimate the costs associated with ***sea*** ***level*** ***rise***, develop sound infrastructure strategies, and spur engineering innovation.

Understanding glacier dynamics

More frequent radar measurements and the collection of higher-resolution seismic and GPS data will allow Minchew and the team to develop a better understanding of the broad category of glacier dynamics including calving, an important process in setting the rate of ***sea*** ***level*** ***rise*** which is currently not well understood.

"Some of what we're doing is quite similar to what seismologists do," he says. "They measure seismic waves following an earthquake, or a volcanic eruption, or things of this nature and use those observations to better understand the mechanisms that govern these phenomena."

Air-droppable sensors will help them collect information about ice sheet movement, but this method comes with drawbacks like installation and maintenance, which is difficult to do out on a massive ice sheet that is moving and melting. Also, the instruments can each only take measurements at a single location. Minchew equates it to a bobber in water: All it can tell you is how the bobber moves as the waves disturb it.

But by also taking continuous radar measurements from the air, Minchew's team can collect observations both in space and in time. Instead of just watching the bobber in the water, they can effectively make a movie of the waves propagating out, as well as visualize processes like iceberg calving happening in multiple dimensions.

Once the bobbers are in place and the movies recorded, the next step is developing machine learning algorithms to help analyze all the new data being collected. While this data-driven kind of discovery has been a hot topic in other fields, this is the first time it has been applied to glacier research.

"We've developed this new methodology to ingest this huge amount of data," he says, "and from that create an entirely new way of analyzing the system to answer these fundamental and critically important questions."

**Load-Date:** March 31, 2022

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[***Germany : Tropical peatland, sea level rise and climate change***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:652M-DHS1-F11P-X0S3-00000-00&context=1516831)

Mena Report

March 23, 2022 Wednesday

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**Length:** 609 words

**Body**

Tropical peatlands are one of the most efficient carbon sinks. The flipside is that they can become massive emitters of carbon if they are damaged, for instance by land use change, degradation or fire. This can lead to faster climate warming. In research led by the University of Gttingen, researchers show how peatland in the coastal areas in Sumatra and Borneo in Indonesia developed over thousands of years and how climate and ***sea*** ***level*** influenced their dynamics throughout. The results were published in Global Change Biology.

To discover more about the environment over the past 17,000 years, researchers analysed two peat cores, each over eight meters long. They carried out analyses for traces of pollen, spores and charcoal, as well as conducting carbon dating and biogeochemical investigations. Their study found that there were much higher concentrations of charcoal between 9,000 to 4,000 years ago (the mid-Holocene), when ***sea*** ***level*** was even higher than it is now. This is a sign that there were much larger forest fires at that time. Later, around 3,000 years ago, irregular periodic variations in winds and sea surface temperatures (known as El Nino-Southern Oscillation or ENSO) would have caused prolonged drought, making the forests dry and thus susceptible to fires ignited by lightning. However, even at this time, the fires were fewer than in the earlier mid-Holocene, which presented a puzzle. A clue was that during the earlier period in the mid-Holocene period, researchers found a high proportion of mangrove pollen.

The pollen grains indicate the presence of mangrove forests which grow along the coast in salty water. Their presence is a good indicator of ***rising*** ***sea*** ***level*** and an increase of salt in the otherwise freshwater peatland ecosystem. Salt is harmful to freshwater (inland) vegetation, which is likely to have resulted in more dry and dead tree leaves and branches. Salt can also reduce forest canopy cover and air humidity, which is the one important factor that can prevent fire spreading in peatland ecosystems. Furthermore, mangrove woods are high-quality fuels that can burn for a long time and reach high temperatures. The increase in dry or dead trees and the availability of high-quality firewood alongside decreased canopy cover and humidity, could all contribute to the larger fires from that time. We were surprised to find that ***rising*** ***sea*** ***levels*** could potentially exacerbate fires in coastal areas in Indonesia, says lead author Dr Anggi Hapsari, University of Gttingen. Our findings underline how the interaction between ***rising*** ***sea*** ***levels*** and dry climate may contribute to massive forest fires even in relatively fire-proof ecosystems, such as pristine peatlands. This reveals the potential hidden impact of ***sea*** ***level*** ***rise*** exacerbating climate warming.

However, in contrast to the past, the primary cause of peatland fires now is human activity, adds Hapsari. If peoples behaviour continues in terms of, for instance, extensive destruction of peat swamp forests, peatland drainage, and intentional burning, when met with current rapidly ***rising*** ***sea*** ***level*** and stronger future ENSO, this could lead to catastrophic and widespread forest fires and uncontrollable carbon release, she continues.

"Our unexpected finding adds an as yet unknown threat to the survival of these valuable ecosystems," explains coauthor Dr Tim Jennerjahn, Leibniz Centre for Tropical Marine Research in Bremen. He concludes, "It demonstrates how the reconstruction of past environmental change can help improve present-day management of coastal ecosystems. It is clear that fire risk assessment in tropical peatlands deserves more attention."

**Load-Date:** March 24, 2022

**End of Document**



[***Tampa Bay should plan smart, resilient infrastructure now for a prosperous tomorrow | Column; Regional leaders must plan to replace aging water and wastewater infrastructure, improve transportation infrastructure, and address building codes that predate sea level rise and growing weather threats.***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6557-MDY1-JCBJ-Y15B-00000-00&context=1516831)

Tampa Bay Times

April 1, 2022 Friday

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**Section:** NEWS; Opinion

**Length:** 535 words

**Byline:** Sean Sullivan

**Body**

Tampa Bay and its seven surrounding counties form one of the most vulnerable regions of the United States to the growing threats of ***sea*** ***level*** ***rise*** and intensifying storms. NOAA's recently released [*2022* ***Sea******Level******Rise*** *Technical Report*](https://oceanservice.noaa.gov/hazards/sealevelrise/sealevelrise-tech-report.html) predicts that the Tampa Bay region is facing an approximate 11-inch increase in ***sea*** ***levels*** over the next 30 years, the same level of increase that we've experienced over the past 100 years.

It's time to take action. Regional leaders must plan to replace aging water and wastewater infrastructure, improve transportation infrastructure, and address building codes that predate ***sea*** ***level*** ***rise*** and growing weather threats. This will take intensive planning and wide-ranging community involvement.

The Tampa Bay Regional Planning Council is facilitating and fostering the conversations necessary to set us on this path. On April 5-6, the Tampa Bay Regional Planning Council and the [*Tampa Bay Regional Resiliency Coalition*](https://www.tbrpc.org/coalition/) will host the second [*Tampa Bay Regional Resiliency Leadership Summit.*](https://www.tbrpc.org/summit2022/)

At the summit, resiliency experts and government officials will discuss a range of topics - from how cities and counties can turn ideas into reality, to how flooding impacts real estate and property insurance. The coalition members and partner organizations will also discuss the Coalition's new regional resiliency action plan, which is designed to address the impacts from flooding and ***sea*** ***level*** ***rise***. This action plan will define priorities for regional collaboration to address flooding and ***sea*** ***level*** ***rise*** threats to housing and critical infrastructure.

Resiliency is an important part of the Tampa Bay Regional Planning Council's daily work. As one example, our [*Resilient Ready Tampa Bay*](https://www.tbrpc.org/resilient-ready/) project leaders work with legal and technical professionals to develop guidance and policies on such topics as materials used in seawall construction, recommended height of seawalls and best practices for protecting our shorelines.

We're also bringing together experts in housing and recovery planning to assess potential risks that local communities face from extreme weather and ***sea*** ***level*** ***rise*** as part of the regional planning council's [*Tampa Bay REACH Initiative*](https://www.tbrpc.org/reach/). Together, we're redefining strategies and policies to encourage affordable, resilient housing development and redevelopment.

Common sense, pragmatic plans and results-oriented actions can protect our economic prosperity, our community tax bases, and the well-being of our citizens. In one of the many sessions at the upcoming summit, mayors Jane Castor (Tampa), Ken Welch (St. Petersburg), Frank Hibbard (Clearwater) and Woody Brown (Largo) will share their priorities, progress and future plans for making their cities more resilient, sustainable, and equitable.

For resiliency plans to work, we need involvement at all levels of our community. I invite readers to participate in the council's [*Resilient Communities and Homes Survey*](https://live.metroquestsurvey.com/?u=9f3k#!/?p=web&pm=dynamic&s=1&popup=WTD), which will help guide discussions at the leadership summit and will provide input into the coalition's action plan.

Let's continue our effort together, as we work to make the Tampa Bay region more prosperous and resilient.

*Sean Sullivan is executive director of the Tampa Bay Regional Planning Council.*

**Graphic**

[*See image link*](http://www.tampabay.com/resizer/k554YcwNfHBfPIg__peVvCDc03c=/cloudfront-us-east-1.images.arcpublishing.com/tbt/XQUICGXZUREQ7BZE5MVBZJX6JE.JPG)

Apollo Beach is one of many communities in Tampa Bay vulnerable to future flooding as seas ***rise***.

[*See image link*](http://www.tampabay.com/resizer/7bvmR94mb-Habl4O8H5NmPQR1dY=/cloudfront-us-east-1.images.arcpublishing.com/tbt/GC2V6JEWPNBLPMX2KQLNRJSTDE.jpg)

Sean Sullivan

**Load-Date:** April 5, 2022

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[***-MIT - Improving predictions of sea level rise for the next century***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6545-FMY1-F0K1-N55C-00000-00&context=1516831)

ENP Newswire

March 31, 2022 Thursday

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**Length:** 1266 words

**Body**

When we think of climate change, one of the most dramatic images that comes to mind is the loss of glacial ice. As the Earth warms, these enormous rivers of ice become a casualty of the ***rising*** temperatures. But, as ice sheets retreat, they also become an important contributor to one the more dangerous outcomes of climate change: ***sea***-***level*** ***rise***. At MIT, an interdisciplinary team of scientists is determined to improve ***sea*** ***level*** ***rise*** predictions for the next century, in part by taking a closer look at the physics of ice sheets.

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

**Load-Date:** March 31, 2022

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[***Farmers race rising sea level***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6527-CT81-DXVP-V51Y-00000-00&context=1516831)

Sarasota Herald Tribune (Florida)

22 March 2022

SAR-HeraldTrib Edition

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**Section:** NEWS; Pg. A11

**Length:** 579 words

**Body**

A new report that projects ***sea*** ***levels*** will ***rise*** 10 to 12 inches – and much more in some parts of Florida – by 2050 should sound an alarm in our state.

The National Oceanic and Atmospheric Administration, which authored the report, predicts moderate flooding from tide, wind and storm-driven extreme water levels will happen 10 times more often than it does now.

Such talk leads many to think about the threat ***rising*** seas pose to waterfront homes, businesses and recreation spots. Much less attention is focused on agricultural areas and the impact of saltwater intrusion on crops, and that is unfortunate.

Florida produces more than 300 commodities, from tomatoes to citrus to strawberries, which generated roughly $7.4 billion in cash receipts in 2020. The state has 9.7 million acres of farmland and, along with other southeastern states, is expected to play an increasing role as a food producer as climate change impacts where, when and how crops can be grown.

But we must act now to reduce saltwater intrusion, which affects soil, surface and groundwater and plant viability, given that many farmlands in Florida are near the coastline. For example, in parts of the South Dade Agricultural area – which as of 2017 had nearly 71,000 acres being farmed – some elevations are less than 3 feet above ***sea*** ***level***. Other examples of agricultural land at risk include areas in Palm Beach, Martin, St. Lucie, Lee, Manatee and Sarasota counties.

Even a slight increase in saltwater intrusion into Florida's aquifers could have major repercussions on the availability of fresh water for drinking and agricultural purposes.

Florida's ***rising*** stature as a food producer necessitates taking this issue seriously and adopting both short-term mitigation measures and long-term adaptations, such as investing in and breeding salt-tolerant crops and working with agricultural engineers, water managers and climate scientists to reduce saltwater intrusion.

Short-term management practices could be implemented at farm and field levels. One approach is improving irrigation efficiency to reduce water usage rates and volumes needed to grow crops. Better irrigation efficiency is also critical to reduce groundwater pumping and salt buildup in the soil. Alternative water sources for irrigation, such as reclaimed water, could be used to offset freshwater demand.

Almost all crops grown in South Florida are sensitive to high salinity and flooding, such as snap beans, strawberries, blueberries, squash, tomatoes, avocados and papaya. Saline-stressed plants have reduced nutrient uptake and don't flower and fruit well, which also means they are more prone to disease and pests.

There are a very few plants with limited tolerance to salinity: coconuts, sapodilla and tamarind. And there are some that can withstand periodic flooding, such as coconut, guava, jujube and mango. But we have to breed salt and flood-resistant cultivars of major commodities.

We are in a race against time to better understand the mechanisms and negative impacts of ***sea*** ***level*** ***rise*** and saltwater intrusion on freshwater resources, soil health, crops and our ability to play a role as a major food producer.

Yuncong Li is a professor of soil and water sciences, Haimanote Bayabil is an assistant professor of water resources and Jonathan Crane is a professor of horticulture at the University of Florida Tropical Research & Education Center.

Your Turn

Yuncong Li, Haimanote Bayabil

and Jonathan Crane

Guest columnists

**Load-Date:** March 22, 2022

**End of Document**



[***ACCELERATED RISE OF SOUTH CHINA SEA LEVEL BLAMED ON GLOBAL WARMING***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6558-0061-DYTH-G33T-00000-00&context=1516831)

States News Service

April 4, 2022 Monday

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**Length:** 593 words

**Byline:** States News Service

**Dateline:** WASHINGTON, DC

**Body**

The following information was released by Radio Free Asia:

Experts warn of millions of climate refugees and the disruption of economic growth in the region.

By RFA Staff

2022.04.04

The water level in the South China Sea has risen by 152mm since 1900, Chinese researchers have found, and the rate has accelerated in accordance with global warming.

A study published in the April issue of the Palaeogeography, Palaeoclimatology, Palaeoecology magazine said that the ***sea*** ***level*** in the South China Sea fell slightly from 1850-1900 period, but has continuously risen by 1.31mm per year on average for a total increase of 152mm ( 7 mm) from 1900-2015.

Researchers from the South China Sea Institute of Oceanology under the Chinese Academy of Sciences (CAS) reconstructed the history of the South China Sea's ***sea***-***level*** shift using Porites coral, a widespread coral with a high growth rate, clear annual growth layer and sensitive response to the change of seawater environment.

The coral's oxygen stable isotopes are an ideal proxy to indicate ***sea***-***level***, they said.

The researchers analyzed the correlation between the oxygen stable isotopes of Porites coral, sea-surface salinity, and temperature, as well as the rainfall in the South China Sea; and then quantitatively reconstructed the annual ***sea***-***level*** record.

The study found that the ***sea***-***level*** ***rise*** in the South China Sea may be the result of a combination of solar activity and greenhouse gases; and human-caused global warming may have been the dominant factor behind the current rapid ***rise*** of ***sea*** ***level***.

"Clearly the findings of this study show the global community will have to do more to slow climate change, but we already knew climate change would cause the ***sea*** ***level*** to ***rise***, threatening the coastlines of a number of countries including minimally Indonesia, the Philippines and Vietnam," said Murray Hiebert, a senior associate of the Southeast Asia Program at the Center for Strategic and International Studies (CSIS) in Washington, D.C.

"This will cause havoc for agriculture, fisheries, and tourism, which will create millions of climate refugees and disrupt economic growth in the region," Hiebert said.

***Sea***-***level*** ***rise*** is caused primarily by two factors related to global warming: the added water from melting ice sheets and glaciers and the expansion of seawater as it warms, scientists say.

The 2012 US National Climate Assessment provided global ***sea***-***level*** ***rise*** scenarios that ranged from 0.2 to 2.0 meters by 2100.

Losing momentum

"To slow climate change, it will be necessary to sharply reduce carbon emissions," said Murray Hiebert.

"Many countries in the region had goals to try to achieve this, but these plans have been turned upside-down in the wake of Russia's invasion of Ukraine."

"Now with the sharp drop in oil and gas exports from Russia and the ***rising*** prices on the international market, countries around the South China Sea will depend more on cheaper coal and pump more carbon into the atmosphere," the analyst said, warning that the years 2022 and 2023 "will mark a major blow to arresting climate change."

"This will be period in which we will lose much of the momentum that followed the COP26 summit late last year," he said.

Much of the focus on the South China Sea over the past decade has been on the territorial disputes between China and its Southeast Asian neighbors, as well as the geopolitical tussle between China and the United States over freedom of navigation in the contested waters.

It's time for competing nations to cooperate to avoid a looming environment catastrophe, experts said.

**Load-Date:** April 5, 2022

**End of Document**



[***ENVIRONMENT; Bolsa Chica wetlands face dire threat from sea-level rise***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655D-RB61-DXVP-V1TD-00000-00&context=1516831)

The Daily Democrat (Woodland, California)

April 6, 2022 Wednesday

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**Section:** FEATURES; Pg. 6

**Length:** 1363 words

**Byline:** Martin Wisckol ; Orange County Register

**Body**

***Sea***-***level*** ***rise*** could wipe out precious habitat at Huntington Beach’s Bolsa Chica wetlands and eventually flood neighborhoods just east of the ecological reserve, according to a new study three years in the making.

But ongoing estuary maintenance and continued improvements including new levees and elevating some existing wetlands would preserve and improve existing wildlife ecosystems. Such work also would bolster the buffer that the wetlands provide for adjacent homes against ***rising*** seas, the study found.

Because portions of the 1,400-acre wetlands have subsided as a result of decades of oil drilling, there is growing urgency to take action and the opportunity to provide a model for the state’s other remaining wetlands.

Adaptation efforts at Bolsa Chica “have broad ramifications in that the site provides early insight into issues other coastal wetland systems will face in coming decades,” according to the 462-page study, paid for with $282,000 of Proposition 1 water bond money.

Southern California has lost 62% of its wetlands since the 19th century, with the Orange-Los Angeles county region losing more than 90% mostly to development and urbanization.

That’s resulted in the loss of habitat crucial to many species that are now threatened, endangered and of special concern 23 of which reside or make migratory stops at Bolsa Chica. In addition to providing wildlife habitat and a buffer to homes, wetlands also absorb carbon dioxide from the atmosphere.

But wildlife is the main reason $151 million was spent on the Bolsa Chica restoration completed in 2006. The project created a new ocean inlet at the south end of the wetlands that has proved a boon to both the variety and total population of wildlife in the reserve.

Much of that habitat will be lost without ongoing improvements, the report said. And while the focus of the report’s recommendations is on wildlife, humans living nearby also would benefit from the reduced risk of flooding.

“Bolsa Chica acts as a giant sponge,” said Kim Kolpin, executive director of the Bolsa Chica Land Trust. “How good a job we do will determine its resiliency. A healthy wetlands means a healthy barrier from ***sea***-***level*** ***rise***.”

The land trust wrote the grant application that resulted in the Prop. 1 funding, and commissioned the study in coordination with government agencies involved with the wetlands. The Bolsa Chica Steering Committee, composed of two state and three federal agencies, will determine the next steps in maintenance and improvements.

“It’s in everyone’s best interest to have Bolsa Chica thriving, so it can best absorb the impact of climate change and ***sea***-***level*** ***rise***,” Kolpin said.

Cinderella story

Without human intervention, coastal wetlands can be dynamic and unpredictable. The location of river mouths and ocean inlets as well as lagoons and tidal basins can shift from season to season, depending on how the storms affect associated rivers and ocean fronts.

But such year-to-year changes often don’t bode well for man’s plans for ports, roads and buildings. As a result, urbanization has meant filling in or otherwise constricting many of the state’s wetlands.

Probably the first significant human impact on the Bolsa Chica wetlands came with the establishment of the Bolsa Chica Gun Club in 1899, which included a two-story building and damming of a portion of the wetlands to facilitate duck hunting.

Subsequent decades saw the construction of Pacific Coast Highway and a coastal trolley line, as well as extensive oil drilling and construction of a stormwater channel, each of which reduced the dynamic shifting of the wetlands and impinged wildlife.

In the 1970s, developers proposed turning the wetlands into a marina surrounded by 5,000 homes. That marked a turning point, as environmentalists and residents rallied against the development in order to preserve the natural wetlands.

In 2000, a state Coastal Commission determination led to just 379 homes being built in an elevated corner of the broader wetlands area.

“Throughout most of recorded world history, wetlands were regarded as wastelands and problem areas to be drained and filled,” said the 2018 report “Wetlands on the Edge,” commissioned by a coalition of federal and state environmental agencies.

“(But) a shift in the understanding and appreciation for these habitats has occurred, and wetlands are now valued worldwide for the many benefits they provide.”

Bolsa Chica, a state-owned ecological reserve, is a prime example. The 2006 ocean inlet construction and associated improvements then the largest wetlands project on the West Coast are testament to how such estuaries have become an asset to improve upon.

Bolsa Chica now hosts more than 300 feathered resident and migratory species, many of which lay their eggs in the wetlands. All told, there are an estimated 900 different species in the wetlands, including turtles, rays and octopi.

Kolpin said the wetlands is the healthiest it’s been since the 1940s, when oil drilling peaked. However, she added that the coming effects of ***sea***-***level*** ***rise*** are already being seen, as king tides have encroached on the wetlands’ two nesting islands.

Those sandy islands vital for the endangered least tern and wetlands areas popular with other shorebirds are among Bolsa Chica habitat in most immediate jeopardy from ***sea***-***level*** ***rise***.

The islands are just part of ongoing challenges. The wetlands has become a manmade reconstruction of wildlife, lacking some historical natural features that allowed it to be self sustaining and now requiring continued maintenance.

“The wetlands at Bolsa Chica never looked the way they do today,” Kolpin said. “The pieces never fit the way they do now.”

The biggest current maintenance issue is dredging of the ocean inlet, necessary to maintain the intertidal flow. The trust fund set up for that $1 million annual expense has been exhausted, requiring new budget approvals each cycle and no guarantee the money will be available from year to year.

The new study looked at alternatives to dredging and found none that were feasible.

Hope for future

What is known as Bolsa Chica’s full tidal basin the intertidal lagoon created by the inlet has exceeded expectations in terms of preserving wildlife habitat. But other aspects of the wetlands, particularly the muted tidal basin that fronts the homes to the east, have been less successful.

The new study, completed by the environmental engineering firm Anchor QEA, examines current and future challenges and viable solutions for the reserve.

In addition to ongoing dredging, pumping water out of the muted tidal basin will need to be continued because tidal action flushes water into the basin but without human help and, once there, that water remains stagnant.

Levees and ground elevation are part of the hydrological recommendations to both improve habitat in the muted tidal basin and adapt to ***sea***-***level*** ***rise***.

The proposals also address the groundwater table beneath the nearby homes which, without changes to the wetlands’ hydrology, is expected to come closer to the surface as ***sea***-***level*** ***rise*** obstructs its westward migration.

That’s in addition to the ocean’s elevated levels washing directly over the wetlands and into that neighborhood.

“By the turn of the century, the entire (wetlands) site and surrounding residential neighborhood will likely become inundated without some type of intervention,” the study concluded.

Study recommendations are broken into short-, mid- and long-term strategies. Not addressed is funding, although Kolpin expressed optimism and pointed to the Gov. Gavin Newsom’s “30×30” executive order as one reason for hope.

The order calls for the state to conserve 30% of its land and coastal waters by 2030, with wetlands restoration a highlighted priority.

“It’s a large state with a lot of challenges to natural resources,” she said. “Wildfires and drought are huge. You’re going to have a lot of money poured into that, but habitats are important too.”

Kolpin, who’s been fighting for the preservation and restoration of the wetlands for more than 20 years, is hardly new to such challenges.

“Bolsa Chica,” she said, “has never been cheap or easy.”

**Load-Date:** April 6, 2022

**End of Document**



[***LOWER OTTER RESTORATION PROJECT SAVES RARE PLANTS FROM SEA LEVEL RISE***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651D-GWV1-JCBF-S50M-00000-00&context=1516831)

States News Service

March 18, 2022 Friday

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**Length:** 398 words

**Byline:** States News Service

**Dateline:** LONDON

**Body**

The following information was released by the UK Government:

Some of Devon's rarest plants are to be moved to new sites in the county as work continues on the Lower Otter Restoration Project (LORP).

From:

Environment Agency

Published

18 March 2022

In Devon, divided sedge only grows in the Lower Otter but must be moved due to ***rising*** ***sea*** ***levels***

The Lower Otter is currently the only known place in Devon where the divided sedge (Carex divisa) is found and is one of only a few sites in the South West where it grows it is deemed nationally scarce.

The survival of these plants is threatened by ***rising*** ***sea*** ***levels*** and the deterioration of embankments at the Lower Otter. Volunteers will be helping to move the yellow-tipped grass-like plant to new sites nearby on 22 March 2022.

Also being moved are some populations of galingale (Cyperus longus), which is also scarce nationally, though less so in Devon than the divided sedge. Unlike the divided sedge, the galingale will be able to continue to survive in some areas of the lower Otter valley.

Three sites with similar ecological characteristics have been chosen to replant these rare species and their progress will be monitored over the next 12 months. One of the chosen sites is grazing marsh associated with the Axe estuary, where divided sedge had been known to grow but was last recorded as present in 1934.

Moving the rare plants follows on from 400 southern marsh orchids that grew on the Lower Otter being relocated elsewhere last year.

Dr Sam Bridgewater, Head of Wildlife and Conservation for landowners, Clinton Devon Estates, said:

The divided sedge is an unassuming little plant which you could be forgiven for overlooking, but it's the rarest living thing that the LORP scheme will provide help to.

We hope it will thrive in the new sites it is to be moved to.

New hedgerow planting, using biodegradable protection tubes

This week also saw planting of hedgerows to the north of Little Bank begin. Native species, including hawthorn, blackthorn and dog rose, have been planted in among gaps to existing hedgerows. The LORP project will see a net gain of 1.5km of hedgerow when completed.

The Environment Agency-led LORP project is one of two schemes under the ERDF's Interreg France Channel England funded Promoting Adaptation to Changing Coasts project. The second site of the total 26m project is in the Sa-ne Valley in Quiberville, Normandy.

**Load-Date:** March 18, 2022

**End of Document**



[***Key infra in Mumbai, other coastal cities may submerge by 2050***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655P-7JD1-JDKC-R42Y-00000-00&context=1516831)

Hindustan Times

April 8, 2022 Friday

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**Length:** 742 words

**Dateline:** New Delhi

**Body**

New Delhi, April 8 -- A new analysis on the impact of ***sea*** ***level*** ***rise*** on coastal Indian cities has revealed that some critical properties and road networks in Mumbai, Kochi, Mangalore, Chennai, Vishakhapatnam, and Thiruvananthapuram will be submerged by 2050.

The analysis by RMSI, a global risk management firm has found that Haji Ali dargah, Jawahar Lal Nehru Port Trust, Western Express Highway, Bandra-Worli Sea-link,and Queen's Necklace on Marine drive, all in Mumbai , are at risk of submergence.

RMSI considered findings from the Intergovernmental Panel on Climate Change's sixth assessment report 'Climate Change 2021: The Physical Science Basis' released in August last year; various publications based on the IPCC report , the latest climate change data, and its own models to find out possible impact on the Indian coastline.

Six coastal cities of India , Mumbai, Chennai, Kochi, Vizag, Mangalore, and Thiruvananthapuram were considered for this analysis. RMSI's experts created a high-resolution Digital Terrain Model (topography) for the coastline of the identified cities. They then used a coastal flood model to map the cities' inundation levels based on various ***sea***-***level*** ***rise*** forecasts.

IPCC has projected that the ***sea*** ***level*** around India will ***rise*** significantly by 2050. 'Assessment of climate change over the Indian region' a report of the Ministry of Earth Sciences (MoES) also said that ***sea***-***level*** ***rise*** in the North Indian Ocean (NIO) occurred at a rate of 1.06-1.75 mm per year during 1874-2004 and has accelerated to 3.3 mm per year in the last two and a half decades (1993-2017), which is comparable to the current rate of global mean ***sea***-***level*** ***rise***.

The moderate emissions (RCP 4.5) scenario of IPCC projects that steric ***sea*** ***level*** (variation in the ocean volume due to density changes) of the north Indian Ocean will ***rise*** by approximately 300 mm (a foot) relative to the average values from 1986 to 2005, the MoES report said. The corresponding projection for the global mean ***rise*** is approximately 180 mm.

In Mumbai, around 998 buildings and 24km of road length will be affected by potential ***sea***-***level*** ***rise*** by 2050, and approximately 2,490 buildings and a road length of 126 km will be affected by potential ***sea***-***level*** ***rise*** during high tide, the analysis found. In Chennai, with the potential ***sea***-***level*** ***rise*** by 2050, road length of 5 km and 55 buildings are at the risk, of which the majority are residential buildings situated in low-lying areas. In Kochi, around 464 buildings are likely to be impacted by 2050 with the number ***rising*** to around 1,502 buildings during high tide. In Thiruvananthapuram, due to ***sea*** ***level*** ***rise*** by 2050 and ***sea*** ***level*** ***rise*** with high tide, 349 and 387 buildings, respectively, are likely to be impacted. In Visakhapatnam, around 206 buildings and 9 km of road network are likely to be inundated due to potential coastline changes by 2050.

"How much water will go inland is a function of what kind of continental shelf we have. The impact of ***sea*** ***level*** ***rise*** will be different in different parts. No client asked us to do these modelling studies. Because the IPCC report suggested Indian coastal cities could be in danger, we felt we should quantify these findings. We intend to reach out to affected state governments and we will definitely share the findings with the World Bank and National Disaster Management Authority," said Pushpendra Johari, senior VP , Sustainability, RMSI Pvt Ltd.

Johari added that with early knowledge of how coastal cities are going to be impacted, some interventions can be made , including land reclamation; increasing the height of roads and strengthening buildings against corrosion or relocating them.

"We considered RCP 4.5 which is an intermediate scenario. ***Sea*** ***level*** is expected to rose at least 2050 and then stabilise," he said.

The amount of greenhouse gases like CO2 emitted by the world needs to peak by 2025 followed by a 43% reduction in the 10 years after in order to limit global warming to 1.5 degree C by the year 2100, the Intergovernmental Panel on Climate Change (IPCC) said on Monday, calling for immediate action with a warning that policies implemented till the end of 2020 will add more emissions and lead to a ***rise*** of 3.2 degree C by the end of the century.

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**Load-Date:** April 7, 2022

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[***SOLUTIONS 3/18: The Seas are Rising***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651K-6221-DXVP-V0T4-00000-00&context=1516831)

Hillsborough Beacon (New Jersey)

March 18, 2022

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**Section:** BORDENTOWN OPINION

**Length:** 501 words

**Byline:** Huck Fairman

**Body**

Central New Jersey's Sierra Club recently presented a Zoom talk on the accelerating rate of ***sea*** ***level*** ***rise***, presented by Dr. Jennifer Walker of Rutgers University's Department of Earth and Planetary Sciences.

With the rate of ***sea*** ***level*** ***rise*** increasing, New Jersey is particularly vulnerable to its impacts. There are a number of reasons for this. First, as most know, the entire planet is warming, largely due to emissions trapping heat. But the oceans absorb much of this trapped heat, which causes their volume to expand. The resulting ***sea*** ***level*** ***rise*** is the fastest in 2000 years.

And in the latest Intergovernmental Panel on Climate Change report, the data on emissions warns that the heating will continue long after emissions are slowly reduced.

A second factor contributing to the ***sea*** ***level*** ***rise*** is the melting glaciers and ice sheets, notably in the Arctic and Antarctic, but in mountain ranges as well. With this melting likely to increase, the oceans' volumes will increase, raising ***sea*** ***levels***.

A third, and local cause, is the fact that in New Jersey, and along the Mid-Atlantic coast, the land is sinking. It is doing so as it slowly adjusts to the changes following the disappearance of the large ancient ice sheet over the land. The melt from that ice sheet, the water, is slowly moving or simply evaporating as the thermal levels ***rise***, together allowing the land to sink. And from these several factors, the ***sea*** ***level*** ***rise*** along the New Jersey coast is increasing faster than the global average.

Another factor is that global warming is slowing ocean currents, such as the Gulf Stream.

This results in longer periods of heat and cold along their paths. The United Kingdom may experience this as increased cold periods, while New Jersey shore residents may experience longer warm periods, and increased ***sea*** ***level*** ***rise***.

The impacts from these several factors include flooding and destructive storm surges. And from the ***rising*** heat, and resulting energy, the strength and frequency of strong storms is predicted to increase.

With the development and population increases along the Jersey Shore, the impacts of both ***sea*** ***level*** ***rise*** and predicted storms will be increasingly expensive. In some communities, mitigation efforts, in the form of enhancing dunes and marshes along the bays, provide demonstrable protection, for a time. They appear to be the most effective responses, but in time even they may be overwhelmed by the ***rising*** seas and storms.

In the nearer term, those communities with sufficient assets can build back or replace beach sand and dunes, but that ability varies between communities. In time, the destruction or damage in some communities will eventually impact adjoining communities. The costs of repairing the damage from Superstorm Sandy in 2012 should give us an idea of the costs ahead.

As both the global heating and ***sea*** ***level*** ***rise*** seem certain to continue, the only reasonable response in more vulnerable areas may be simply retreat, where residents move inland or elsewhere.

**Load-Date:** March 19, 2022

**End of Document**



[***SOLUTIONS 3/18: The Seas are Rising***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651K-6221-DXVP-V20R-00000-00&context=1516831)

Windsor-Hights Herald (New Jersey)

March 18, 2022

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**Load-Date:** March 19, 2022

**End of Document**



[***Mumbai to Chennai: These coastal cities that may drown by 2050***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655T-K7R1-JDKC-R0KW-00000-00&context=1516831)

MINT

April 8, 2022 Friday

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**Length:** 398 words

**Dateline:** New Delhi

**Body**

New Delhi, April 8 -- Several Indian cities that lie near the sea may get submerged in the next 28 years due to the ***rise*** in water level, a study has revealed. According to the analysis by RMSI, some critical properties and road networks in Mumbai, Kochi, Mangalore, Chennai, Vishakapatnam, and Thiruvananthapuram will be drowned by 2050 because of the ***rise*** in ***sea*** ***level***.

In a report in Hindustan Times, the RMSI, a global risk management firm has found that Haji Ali Dargah Jawahar Lal Nehru Port Trust, Western Express Highway, Bandra-Worli Sea-link, and Queen's Necklace on Marine drive are key infrastructures in Mumbai that are at risk of submergence.

As per the daily, RMSI's experts created a high-resolution Digital Terrain Model (topography) for the coastline of the identified cities. They then used a coastal flood model to map the cities' inundation levels based on various ***sea***-***level*** ***rise*** forecasts.

As per the analysis, around 998 buildings and 24 km of road length will be affected by potential ***sea***-***level*** ***rise*** by 2050 in Mumbai, and around 2,490 buildings and a road length of 126 km will be affected by a potential ***sea***-***level*** ***rise*** during the high tide in the city.

In Chennai, a road length of 5 km and 55 buildings are at the risk; in Kochi, around 464 buildings are likely to be impacted by 2050 with the number ***rising*** to around 1,502 buildings during high tide. In Thiruvananthapuram, due to ***sea***-***level*** ***rise*** by 2050 and ***sea***-***level*** ***rise*** with high tide, 349 and 387 buildings, respectively, are likely to be impacted. In Visakhapatnam, around 206 buildings and 9 km of the road network are likely to be inundated due to potential coastline changes by 2050, the daily added.

Pushpendra Johari, senior VP, Sustainability, RMSI Pvt Ltd. said the drowning of cities can be prevented with some interventions, such as land reclamation; increasing the height of roads, and strengthening buildings against corrosion or relocating them.

The amount of greenhouse gases like CO2 emitted by the world needs to peak by 2025 followed by a 43% reduction in the 10 years after to limit global warming to 1.5 degree C by the year 2100, the Intergovernmental Panel on Climate Change (IPCC) said on Monday.

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**Load-Date:** April 8, 2022

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[***SOLUTIONS 3/18: The Seas are Rising***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651K-6221-DXVP-V0YC-00000-00&context=1516831)

The Lawrence Ledger (Lawrenceville, New Jersey)

March 18, 2022

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**Section:** BORDENTOWN OPINION

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**Load-Date:** March 19, 2022

**End of Document**



[***Study: Keys face fierce future flooding***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651V-RRY1-DXVP-V2PJ-00000-00&context=1516831)

The Key West Citizen (Florida)

March 19, 2022 Saturday

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**Section:** NEWS; Pg. A1

**Length:** 1050 words

**Byline:** ELLIOT WELD, KEY WEST CITIZEN

**Body**

A new study sponsored by NOAA is projecting U.S. coastlines to see an average of 1 foot of ***sea***-***level*** ***rise*** by the year 2050. The Florida Keys are one of the most susceptible areas in the United States to ***rising*** seas, and the effects of climate change are certain to magnify under these projections.

The study was authored in part by Dr. William Sweet, a NOAA ocean scientist who has presented ***sea***-***level*** ***rise*** predictions to the Monroe County Board of County Commissioners in the past. Other authors came from NOAA, NASA, Florida International University and the U.S. Department of Defense, among others. It projects a narrower set of pathways for ***sea*** ***level*** ***rise*** than previously reported, regardless of emissions paths.

“By 2050, the expected relative ***sea***-***level*** (RSL) will cause tide and storm surge heights to increase and will lead to a shift in U.S. coastal flood regimes, with major and moderate high tide flood events occurring as frequently as moderate and minor high tide flood events occur today,” the study reads.

It goes on to say that beyond 2050, greater ***sea***-***level*** ***rise*** predictions will be influenced by higher global temperatures, and are dependent on future emissions pathways, as the world’s developed nations seek to shift their economies away from greenhouse gas-emitting forms of energy.

Dr. Ben Kirtman, a professor at the University of Miami’s Rosenstiel School of Marine and Atmospheric Science, was not a part of the NOAA study but is a frequent scholar of ***sea***-***level*** ***rise*** and its effects on South Florida. He said most ***sea***-***level*** ***rise*** projections are on the conservative side.

“South Florida in particular is starting to show signs of acceleration that are probably not well accounted for in that report. Particularly in changes in the Gulf Stream,” Kirtman said.

Kirtman said the NOAA report was an update to a 2017 ***sea***-***level*** projection report, also authored by Sweet, et al. The 2017 report used various emissions scenarios to predict ***sea***-***level*** ***rise***, whereas the more recent one used global temperatures to predict them, leading to a slight variation in the results. This created some confusion, Kirtman said, since ***sea***-***level*** ***rise*** rates were projected to be a bit lower in some areas in the more recent report.

As far as what the report could mean for Key West and the Florida Keys, Kirtman thinks because of the acceleration observed in South Florida, the Keys could be looking at more than 1 foot by 2050 possibly 1½ to 2 feet of ***sea***-***level*** ***rise***.

“That would be my guess. Initially, maybe in 2010 to 2013, we were seeing ***sea***-***level*** ***rise*** rates in Florida that were basically in line with the global mean, but it’s accelerating,” he said.

The Keys are already seeing increased flooding in the streets, particularly in the Key Largo neighborhoods of Twin Lakes and Stillwright Point, the latter of which saw three months of flooded streets in 2019, an all-time high.

Kirtman said that chronic flooding problem is the biggest concern for impact on human activity. For the recent NOAA projections, Kirtman said the Keys might be expecting “somewhere in the order of 100 days where you’re going to have several inches of water for several hours a day.”

The questions for him are: “When does that become unmanageable? When does that become too much?”

Kirtman said the best strategies for mitigation are “holistic” and involve installing natural features rather than sea walls or pumps, which are expensive and take large amounts of energy.

“We will have to think about the type of living arrangements we make,” Kirtman said. “Are we going to focus on housing on high ground, where some parts of the built environment will return to its natural state and we’ll protect others? I worry we’re not making fully thought-out decisions.”

Most leaders in the Keys but not all now tout their ***sea***-***level*** ***rise*** strategy as a key part of their campaign.

Mo n roe Co u n t y Commissioner Holly Raschien, who represents the Upper Keys, has been a proponent of ***sea***-***level*** ***rise*** and climate change mitigation. She recently said at a campaign event that she wanted Monroe County to be the model for ***sea***-***level*** ***rise*** strategy in Florida.

“We can’t gamble on best-case scenarios amid great uncertainty,” Raschein told The Key West Citizen. “Everyone local taxpayers, visitors, the state and federal government needs to pitch in to make the Keys the model of resiliency.”

Raschein said the state government had created a resiliency bill called the Always Ready Act, which creates a statewide resiliency officer and offers funding for projects.

“We won’t become resilient enough if we get caught up in the blame game. We need to work together,” Raschein added.

The county, and its municipalities, are now part of a plan created by the Army Corps of Engineers to raise large portions of the roads in the Keys, with a price tag in the billions. The county, cities and village of Islamorada will have to cover the cost of 35% of it.

Kirtman said one issue is the U.S. is not providing the needed resources to small-town leaders to make the necessary decisions to protect their communities.

“I don’t think we’re providing the people that need to make these decisions sufficiently robust tools to make them,” he said. “I sort of feel like Key West needs to make some really tough decisions. Do they have the tools in order to ask the real ‘what if’ questions?”

Kirtman said a system where municipal leaders can play out real hypotheticals, and get assessments from scholars on different ideas, would be beneficial.

Key West Mayor Teri Johnston agrees that small-town leaders don’t have the resources they need.

The financial stakes of spending billions on climate mitigation are daunting to a small city’s budget. On Tuesday, March 15, the city heard a presentation on special taxing districts from Terry Lewis, a tax attorney from the law firm Lewis Longman Walker. Johnston said the city is considering setting up special taxing districts to fund Duval Street redevelopment and resilience projects.

“The cost of raising roads and things of that nature is massive,” Johnston said. “So if it benefits a certain area, we should have a non-advalorem tax.”

Johnston said the city was “piggy-backing” on the county’s ***sea***-***level*** ***rise*** mitigation, and is probably five years behind the county on that issue.

[*eweld@keysnews.com*](mailto:eweld@keysnews.com)

**Load-Date:** March 20, 2022

**End of Document**



[***SOLUTIONS 3/18: The Seas are Rising***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651J-P1B1-DXVP-V1KV-00000-00&context=1516831)

Cranbury Press (New Jersey)

March 18, 2022

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**Section:** BORDENTOWN OPINION

**Length:** 501 words

**Byline:** Huck Fairman

**Body**

Central New Jersey's Sierra Club recently presented a Zoom talk on the accelerating rate of ***sea*** ***level*** ***rise***, presented by Dr. Jennifer Walker of Rutgers University's Department of Earth and Planetary Sciences.

With the rate of ***sea*** ***level*** ***rise*** increasing, New Jersey is particularly vulnerable to its impacts. There are a number of reasons for this. First, as most know, the entire planet is warming, largely due to emissions trapping heat. But the oceans absorb much of this trapped heat, which causes their volume to expand. The resulting ***sea*** ***level*** ***rise*** is the fastest in 2000 years.

And in the latest Intergovernmental Panel on Climate Change report, the data on emissions warns that the heating will continue long after emissions are slowly reduced.

A second factor contributing to the ***sea*** ***level*** ***rise*** is the melting glaciers and ice sheets, notably in the Arctic and Antarctic, but in mountain ranges as well. With this melting likely to increase, the oceans' volumes will increase, raising ***sea*** ***levels***.

A third, and local cause, is the fact that in New Jersey, and along the Mid-Atlantic coast, the land is sinking. It is doing so as it slowly adjusts to the changes following the disappearance of the large ancient ice sheet over the land. The melt from that ice sheet, the water, is slowly moving or simply evaporating as the thermal levels ***rise***, together allowing the land to sink. And from these several factors, the ***sea*** ***level*** ***rise*** along the New Jersey coast is increasing faster than the global average.

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With the development and population increases along the Jersey Shore, the impacts of both ***sea*** ***level*** ***rise*** and predicted storms will be increasingly expensive. In some communities, mitigation efforts, in the form of enhancing dunes and marshes along the bays, provide demonstrable protection, for a time. They appear to be the most effective responses, but in time even they may be overwhelmed by the ***rising*** seas and storms.

In the nearer term, those communities with sufficient assets can build back or replace beach sand and dunes, but that ability varies between communities. In time, the destruction or damage in some communities will eventually impact adjoining communities. The costs of repairing the damage from Superstorm Sandy in 2012 should give us an idea of the costs ahead.

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[***SOLUTIONS 3/18: The Seas are Rising***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651K-6221-DXVP-V1P9-00000-00&context=1516831)

The Register-News (Burlington County, New Jersey)

March 18, 2022

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[***SOLUTIONS 3/18: The Seas are Rising***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651K-6221-DXVP-V1J7-00000-00&context=1516831)

The Princeton Packet (New Jersey)

March 18, 2022

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[***United Kingdom: Lower Otter Restoration Project saves rare plants from sea level rise***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651D-YMT1-DXMS-8238-00000-00&context=1516831)

Thai News Service

March 21, 2022 Monday

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**Section:** GENERAL NEWS

**Length:** 338 words

**Body**

The Lower Otter is currently the only known place in Devon where the divided sedge (Carex divisa) is found and is one of only a few sites in the South West where it grows - it is deemed nationally scarce.

The survival of these plants is threatened by ***rising*** ***sea*** ***levels*** and the deterioration of embankments at the Lower Otter. Volunteers will be helping to move the yellow-tipped grass-like plant to new sites nearby on 22 March 2022.

Also being moved are some populations of galingale (Cyperus longus), which is also scarce nationally, though less so in Devon than the divided sedge. Unlike the divided sedge, the galingale will be able to continue to survive in some areas of the lower Otter valley.

Three sites with similar ecological characteristics have been chosen to replant these rare species and their progress will be monitored over the next 12 months. One of the chosen sites is grazing marsh associated with the Axe estuary, where divided sedge had been known to grow but was last recorded as present in 1934.

Moving the rare plants follows on from 400 southern marsh orchids that grew on the Lower Otter being relocated elsewhere last year.

Dr Sam Bridgewater, Head of Wildlife and Conservation for landowners, Clinton Devon Estates, said:

The divided sedge is an unassuming little plant which you could be forgiven for overlooking, but it's the rarest living thing that the LORP scheme will provide help to.

We hope it will thrive in the new sites it is to be moved to.

This week also saw planting of hedgerows to the north of Little Bank begin. Native species, including hawthorn, blackthorn and dog rose, have been planted in among gaps to existing hedgerows. The LORP project will see a net gain of 1.5km of hedgerow when completed.

The Environment Agency-led LORP project is one of two schemes under the ERDF's Interreg France Channel England funded Promoting Adaptation to Changing Coasts project. The second site of the total 26m project is in the Sa\xE2ne Valley in Quiberville, Normandy.

Source: United Kingdom Government

**Load-Date:** March 18, 2022

**End of Document**



[***United Kingdom: Lower Otter Restoration Project saves rare plants from sea level rise***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651H-V301-JBHT-D2D0-00000-00&context=1516831)

Asia News Monitor

March 21, 2022 Monday

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**Section:** GENERAL NEWS

**Length:** 339 words

**Dateline:** Bangkok

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**FULL TEXT**

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Source: United Kingdom Government

**Load-Date:** March 18, 2022

**End of Document**



[***Antarctic sea ice reaches second lowest level in 44 YEARS as scientists warn melting of the West Antarctic Ice Sheet could cause global sea levels to rise up to 10 FEET***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655D-MRJ1-DY4H-K469-00000-00&context=1516831)

MailOnline

April 6, 2022 Wednesday 8:50 AM GMT

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**Section:** SCIENCE; Version:2

**Length:** 867 words

**Byline:** Sam Tonkin For Mailonline

**Body**

* Antarctic sea ice has reached its second lowest level in almost half a century

1. Sea ice covering Antarctic in March was 26 per cent below 1991-2020 average
2. Separate study uncovered link between greenhouse gases and ocean warming
3. It is the first evidence gases have a long-term warming effect on Antarctic seas
4. If West Antarctic Ice Sheet were to melt, global ***sea*** ***levels*** could ***rise*** by up to 10ft

Antarctic sea ice has reached its second lowest level in almost half a century, new satellite data reveals, as scientists warn that the melting of the West Antarctic Ice Sheet could cause global ***sea*** ***levels*** to ***rise*** by up to 10 feet.

Analysis revealed that, in March, the amount of sea ice covering the Antarctic was 26 per cent below the 1991-2020 average, particularly in the Ross, Amundsen, and northern Weddell Seas, and the lowest in 44 years.

Data from the Copernicus Climate Change Service (C3S) also revealed that last month was the fifth warmest March on record, with the global average temperature about 0.72ºF (0.4ºC) higher than the 1991-2020 average for March.

It comes as British Antarctic Survey (BAS) scientists have found the first conclusive evidence that ***rising*** greenhouse gases are having a long-term warming effect on the Amundsen Sea in West Antarctica.

They said that while others have proposed this link, no one had been able to demonstrate it until now.

The scientists warned that the melting of the West Antarctic Ice Sheet could cause global ***sea*** ***levels*** to ***rise*** by up to 10 feet (3 metres).

GLACIERS AND ICE SHEETS MELTING WOULD HAVE A 'DRAMATIC IMPACT' ON GLOBAL ***SEA*** ***LEVELS***

Global ***sea*** ***levels*** could ***rise*** as much as 10ft (3 metres) if the Thwaites Glacier in West Antarctica collapses.

***Sea*** ***level*** ***rises*** threaten cities from Shanghai to London, to low-lying swathes of Florida or Bangladesh, and to entire nations such as the Maldives.

In the UK, for instance, a ***rise*** of 6.7ft (2 metres) or more may cause areas such as Hull, Peterborough, Portsmouth and parts of east London and the Thames Estuary at risk of becoming submerged.

The collapse of the glacier, which could begin with decades, could also submerge major cities such as New York and Sydney.

Parts of New Orleans, Houston and Miami in the south on the US would also be particularly hard hit.

Ice loss from the West Antarctic Ice Sheet in the Amundsen Sea is one of the fastest growing and most concerning contributions to global ***sea*** ***level*** ***rise***.

The patterns of ice loss suggest that the ocean may have been warming in the Amundsen Sea over the past 100 years, but scientific observations of the region only began in 1994.

In the BAS study, oceanographers used advanced computer modelling to simulate the response of the ocean to a range of possible changes in the atmosphere between 1920-2013.

The analysis shows the Amundsen Sea generally became warmer over the century.

This warming corresponds with simulated trends in wind patterns in the region, which increase temperatures by driving warm water currents towards and beneath the ice.

***Rising*** greenhouse gases are known to make these wind patterns more likely, and so the trend in winds is thought to be caused in part by human activity.

This study supports theories that ocean temperatures in the Amundsen Sea have been ***rising*** since before records began.

It also provides the 'missing link' between ocean warming and wind trends, which are known to be partly driven by greenhouse gasses.

Ocean temperatures around the West Antarctic Ice Sheet will probably continue to ***rise*** if greenhouse gas emissions increase, with consequences for ice melt and global ***sea*** ***levels***.

These findings suggest, however, that this trend could be curbed if emissions are sufficiently reduced and wind patterns in the region are stabilised.

Dr Kaitlin Naughten, ocean-ice modeller at BAS and lead author of this study, said: 'Our simulations show how the Amundsen Sea responds to long-term trends in the atmosphere, specifically the Southern Hemisphere westerly winds.

'This raises concerns for the future because we know these winds are affected by greenhouse gases.

'However, it should also give us hope, because it shows that ***sea*** ***level*** ***rise*** is not out of our control.'

Professor Paul Holland, ocean and ice scientist at BAS and a co-author of the study, said: 'Changes in the Southern Hemisphere westerly winds are a well-established climate response to the effect of greenhouse-gasses.

'However, the Amundsen Sea is also subject to very strong natural climate variability.

'The simulations suggest that both natural and anthropogenic changes are responsible for the ocean-driven ice loss from the West Antarctic Ice Sheet.'

The C3S findings, meanwhile, are based on computer-generated analyses using billions of measurements from satellites, ships, aircraft and weather stations around the world.

The latest data shows that it was 'anomalously warm' in large parts of the Arctic and Antarctic last month.

In Antarctica daily maximum temperature records were broken, while the Arctic saw its fourth warmest March on record.

Arctic sea ice extent was 3 per cent below the 1991-2020 average.

The BAS study has been published in the journal Geophysical Research Letters.

**Load-Date:** April 6, 2022

**End of Document**



[***Migration Impacts If Sea Level Rises 1.8 Meters***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:654R-M801-JCMN-Y0WX-00000-00&context=1516831)

Newstex Blogs

Wash Park Prophet

April 2, 2022 Saturday 11:15 PM EST

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**Length:** 308 words

**Byline:** andrew

**Body**

Apr 02, 2022( Wash Park Prophet: [*http://washparkprophet.blogspot.com*](http://washparkprophet.blogspot.com) Delivered by Newstex)

[*https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEgZm45D\_qUY9jS7x44lrMdRT1rhcJ8ozU3zTS0ZM26Q2sRzU2OfhJLS47JOEFtu-\_BT89u7m7KP6SnjaG\_WkNQSb9ZOpmK6GM-CzE7ggX9hV8HbZ3FfOEQ6-pX6HW1eu8ds6afGEYTRH4HCt4Pi9NtBRQzFZ3\_nXyeXQi-zPpmlulvRykLPsxE/s2156/Screen%20Shot%202022-04-02%20at%204.26.12%20PM.png*](https://blogger.googleusercontent.com/img/b/R29vZ2xl/AVvXsEgZm45D_qUY9jS7x44lrMdRT1rhcJ8ozU3zTS0ZM26Q2sRzU2OfhJLS47JOEFtu-_BT89u7m7KP6SnjaG_WkNQSb9ZOpmK6GM-CzE7ggX9hV8HbZ3FfOEQ6-pX6HW1eu8ds6afGEYTRH4HCt4Pi9NtBRQzFZ3_nXyeXQi-zPpmlulvRykLPsxE/s2156/Screen%20Shot%202022-04-02%20at%204.26.12%20PM.png)

From PLOS One[1]. Copyright Andrew Oh-Willeke (2005-2020)

[ 1]: [*https://journals.plos.org/plosone/article/figure?id=10.1371%2Fjournal.pone.0227436.g002&fbclid=IwAR0aOn1W8t4C35MiBr47XqvWsXIROV1kL\_tcSU9sQnU2SBqHD1WD78QV6EY*](https://journals.plos.org/plosone/article/figure?id=10.1371%2Fjournal.pone.0227436.g002&fbclid=IwAR0aOn1W8t4C35MiBr47XqvWsXIROV1kL_tcSU9sQnU2SBqHD1WD78QV6EY)

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**Load-Date:** April 2, 2022

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[***Study: Keys to face fierce future flooding***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:652T-9W51-DXVP-V343-00000-00&context=1516831)

Florida Keys Free Press (Marathon, Florida)

March 23, 2022

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**Section:** NEWS; Pg. 1A

**Length:** 1031 words

**Byline:** Elliot Weld, FREE PRESS STAFF

**Body**

FLORIDA KEYS - A new study sponsored by NOAA is projecting U.S. coastlines will see an average of 1 foot of ***sea***-***level*** ***rise*** in the next 28 years.

The Florida Keys are one of the most susceptible areas in the United States to ***rising*** seas, and the effects of climate change are expected to magnify under these projections.

The study was authored in part by Dr. William Sweet, a NOAA ocean scientist who has presented ***sea***-***level*** ***rise*** predictions to the Monroe County Commission in the past. Other authors came from NOAA, NASA, Florida International University and the U.S. Department of Defense, among others. It projects a narrower set of pathways for ***rising*** seas than previously reported, regardless of carbon emissions.

"By 2050, the expected relative ***sea***-***level*** (RSL) will cause tide and storm surge heights to increase and will lead to a shift in U.S. coastal flood regimes, with major and moderate high tide flood events occurring as frequently as moderate and minor high tide flood events occur today," the study reads.

It goes on to say that beyond 2050, greater ***sea***-***level*** ***rise*** predictions will be influenced by higher global temperatures, and are dependent on future emissions pathways, as the world's developed nations seek to shift their economies away from greenhouse gas-emitting forms of energy.

Dr. Ben Kirtman, a professor at the University of Miami's Rosenstiel School of Marine and Atmospheric Science, was not a part of the NOAA study but is a frequent scholar of ***sea***-***level*** ***rise*** and its effects on South Florida. He said most projections are on the conservative side.

"South Florida in particular is starting to show signs of acceleration that are probably not well accounted for in that report. Particularly in changes in the Gulf Stream," Kirtman said.

Kirtman said the NOAA report was an update to a 2017 ***sea***-***level*** projection report, also authored by Sweet.

The 2017 report used various emissions scenarios to predict ***sea***-***level*** ***rise***, whereas the more recent one used global temperatures to predict them, leading to a slight variation in the results. This created some confusion, Kirtman said, since ***sea***-***level*** ***rise*** rates were projected to be a bit lower in some areas in the more recent report.

As far as what the report could mean for the Florida Keys, Kirtman thinks because of the acceleration observed in South Florida, the Keys could be looking at more than 1 foot by 2050 - possibly 1½ to 2 feet of ***sea***-***level*** ***rise***.

"That would be my guess.

Initially, maybe in 2010 to 2013, we were seeing ***sea***-***level*** ***rise*** rates in Florida that were basically in line with the global mean, but it's accelerating," he said.

The Keys are already seeing increased tidal flooding in the streets, particularly in the Key Largo neighborhoods of Twin Lakes and Stillwright Point, the latter of which saw three months of flooded streets in 2019, an all-time high.

Kirtman said that chronic flooding is the biggest concern for impact on human activity. For the recent NOAA projections, Kirtman said the Keys might be expecting "somewhere in the order of 100 days where you're going to have several inches of water for several hours a day." The questions for him are: "When does that become unmanageableft When does that become too much?" Kirtman said the best strategies for mitigation are "holistic" and involve installing natural features rather than seawalls or pumps, which are expensive and take large amounts of energy.

"We will have to think about the type of living arrangements we make," Kirtman said. "Are we going to focus on housing on high ground, where some parts of the built environment will return to its natural state and we'll protect others? I worry we're not making fully thought-out decisions." Most leaders in the Keys - but not all - now tout ***sea***-***level*** ***rise*** strategy as a key part of their campaign.

Monroe County Commissioner Holly Raschien, who represents the Upper Keys, has been a proponent of ***sea***-***level*** ***rise*** and climate change mitigation.

She recently said at a campaign event that she wanted Monroe County to be the model for ***sea***-***level*** ***rise*** strategy in Florida.

"We can't gamble on bestcase scenarios amid great uncertainty," Raschein said.

"Everyone - local taxpayers, visitors, the state and federal government - needs to pitch in to make the Keys the model of resiliency." Raschein said the state government has created a resiliency bill called the Always Ready Act, which creates a statewide resiliency officer and offers funding for projects.

"We won't become resilient enough if we get caught up in the blame game. We need to work together," Raschein added.

The county, and its municipalities, are now part of a plan created by the U.S.

Army Corps of Engineers to raise large portions of the roads in the Keys, with a price tag in the billions.

The county and cities would have to cover 35% of the cost.

Kirtman said one issue is the U.S. is not providing the needed resources to small-town leaders to make the necessary decisions to protect their communities.

"I don't think we're providing the people that need to make these decisions sufficiently robust tools to make them," he said. "I sort of feel like Key West needs to make some really tough decisions. Do they have the tools in order to ask the real 'what if' questions?" Kirtman said a system where municipal leaders can play out real hypotheticals, and get assessments from scholars on different ideas, would be beneficial.

Key West Mayor Teri Johnston agrees that smalltown leaders don't have the resources they need.

The financial stakes of spending billions on climate mitigation are daunting. On Tuesday, March 15, the city heard a presentation on special taxing districts from Terry Lewis, a tax attorney from the law firm Lewis Longman Walker. Johnston said the city is considering setting up special taxing districts to fund Duval Street redevelopment and resilience projects.

"The cost of raising roads and things of that nature is massive," Johnston said. "So if it benefits a certain area, we should have a non-advalorem tax." Johnston said the city was "piggy-backing" on the county's ***sea***-***level*** ***rise*** mitigation, and is probably five years behind the county on that issue. [*eweld@keysnews.com*](mailto:eweld@keysnews.com)

**Graphic**

File photo by EMILIE CALDWELL STEWART/Contributed Tidal waters flood the streets of Stillwright Point in October 2020 despite the deployment of tiger dams.

**Load-Date:** March 24, 2022

**End of Document**



[***Key infra in 6 coastal cities may submerge by '50***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6560-WXR1-F12F-F0KJ-00000-00&context=1516831)

Hindustan Times Lucknow

April 9, 2022 Saturday

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**Length:** 524 words

**Dateline:** New Delhi

**Body**

New Delhi, April 9 -- A new analysis on the impact of ***sea*** ***level*** ***rise*** on coastal Indian cities has revealed that some critical properties and road networks in Mumbai, Kochi, Mangalore, Chennai, Vishakhapatnam, and Thiruvananthapuram will be submerged by 2050.

The analysis by RMSI, a global risk management firm, has found that Haji Ali dargah, Jawahar Lal Nehru Port Trust, Western Express Highway, Bandra-Worli Sea-link,and Queen's Necklace on Marine drive, all in Mumbai, are at risk of submergence.

RMSI considered findings from the Intergovernmental Panel on Climate Change's sixth assessment report 'Climate Change 2021: The Physical Science Basis' released in August last year; various publications based on the IPCC report, the latest climate change data, and its own models to find out possible impact on the Indian coastline.

Six coastal cities of India, Mumbai, Chennai, Kochi, Vizag, Mangalore, and Thiruvananthapuram were considered for this analysis. RMSI's experts created a high-resolution Digital Terrain Model (topography) for the coastline of the identified cities. They then used a coastal flood model to map the cities' inundation levels based on various ***sea***-***level*** ***rise*** forecasts.

IPCC has projected that the ***sea*** ***level*** around India will ***rise*** significantly by 2050. 'Assessment of climate change over the Indian region' a report of the Ministry of Earth Sciences (MoES) also said that ***sea***-***level*** ***rise*** in the North Indian Ocean (NIO) occurred at a rate of 1.06-1.75 mm per year during 1874-2004 and has accelerated to 3.3 mm per year in the last two-and-a-half decades (1993-2017), which is comparable to the current rate of global mean ***sea***-***level*** ***rise***.

The moderate emissions (RCP 4.5) scenario of IPCC projects that steric ***sea*** ***level*** (variation in the ocean volume due to density changes) of the north Indian Ocean will ***rise*** by approximately 300 mm (a foot) relative to the average values from 1986 to 2005, the MoES report said. The corresponding projection for the global mean ***rise*** is approximately 180 mm.

"How much water will go inland is a function of what kind of continental shelf we have. The impact of ***sea*** ***level*** ***rise*** will be different in different parts. No client asked us to do these modelling studies. Because the IPCC report suggested Indian coastal cities could be in danger, we felt we should quantify these findings. We intend to reach out to affected state governments and we will definitely share the findings with the World Bank and National Disaster Management Authority," said Pushpendra Johari, senior VP , Sustainability, RMSI Pvt Ltd.

Johari added that with early knowledge of how coastal cities are going to be impacted, some interventions can be made, including land reclamation; increasing the height of roads and strengthening buildings against corrosion or relocating them.

"We considered RCP 4.5 which is an intermediate scenario. ***Sea*** ***level*** is expected to rose at least 2050 and then stabilise," he said.

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**Load-Date:** April 8, 2022

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[***Key infra in 6 coastal cities may submerge by '50***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655P-R5P1-JDKC-R38J-00000-00&context=1516831)

Hindustan Times Chandigarh

April 8, 2022 Friday

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**Dateline:** New Delhi

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**Load-Date:** April 7, 2022

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[***By 2050, infra in 6 cities in danger***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655S-XT51-JDKC-R41G-00000-00&context=1516831)

Hindustan Times Mumbai

April 8, 2022 Friday

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**Load-Date:** April 7, 2022

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[***United Kingdom : Lower Otter Restoration Project saves rare plants from sea level rise***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651T-J251-F11P-X53T-00000-00&context=1516831)

Mena Report

March 19, 2022 Saturday

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**Length:** 364 words

**Body**

Some of Devons rarest plants are to be moved to new sites in the county as work continues on the Lower Otter Restoration Project (LORP).

The Lower Otter is currently the only known place in Devon where the divided sedge (Carex divisa) is found and is one of only a few sites in the South West where it grows it is deemed nationally scarce.

The survival of these plants is threatened by ***rising*** ***sea*** ***levels*** and the deterioration of embankments at the Lower Otter. Volunteers will be helping to move the yellow-tipped grass-like plant to new sites nearby on 22 March 2022.

Also being moved are some populations of galingale (Cyperus longus), which is also scarce nationally, though less so in Devon than the divided sedge. Unlike the divided sedge, the galingale will be able to continue to survive in some areas of the lower Otter valley.

Three sites with similar ecological characteristics have been chosen to replant these rare species and their progress will be monitored over the next 12 months. One of the chosen sites is grazing marsh associated with the Axe estuary, where divided sedge had been known to grow but was last recorded as present in 1934.

Moving the rare plants follows on from 400 southern marsh orchids that grew on the Lower Otter being relocated elsewhere last year.

Dr Sam Bridgewater, Head of Wildlife and Conservation for landowners, Clinton Devon Estates, said:

The divided sedge is an unassuming little plant which you could be forgiven for overlooking, but its the rarest living thing that the LORP scheme will provide help to.

We hope it will thrive in the new sites it is to be moved to.

New hedgerow planting, using biodegradable protection tubes

This week also saw planting of hedgerows to the north of Little Bank begin. Native species, including hawthorn, blackthorn and dog rose, have been planted in among gaps to existing hedgerows. The LORP project will see a net gain of 1.5km of hedgerow when completed.

The Environment Agency-led LORP project is one of two schemes under the ERDFs Interreg France Channel England funded Promoting Adaptation to Changing Coasts project. The second site of the total 26m project is in the Sane Valley in Quiberville, Normandy.

**Load-Date:** March 20, 2022

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[***Key infra in 6 coastal cities may submerge by '50***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655P-R8B1-F12F-F4JT-00000-00&context=1516831)

Hindustan Times

April 8, 2022 Friday

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**Length:** 525 words

**Dateline:** New Delhi

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**Load-Date:** April 7, 2022

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[***Tampa Bay business leaders: Billions needed for climate change; The Tampa Bay Partnership releases a report that says protecting against sea level rise flooding is a wise investment for the region.***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655C-MFS1-JCBJ-Y1SW-00000-00&context=1516831)

Tampa Bay Times

April 4, 2022 Monday

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**Section:** NEWS; Environment

**Length:** 872 words

**Byline:** Zachary T. Sampson

**Body**

ST. PETERSBURG - Building up Tampa Bay to keep it safe from ***rising*** seas and storms over the next 50 years could save the region more than $2 for every $1 it spends, according to a new report.

The suggested price tag for those upgrades is enormous: $13.4 billion.

"This is about what our region needs to do to be ready for what is going to be inevitably devastating results of ***sea*** ***level*** ***rise***," said Brian Auld, president of the Tampa Bay Rays and chair of the Tampa Bay Partnership's Resilience Task Force, which commissioned the report and released it Tuesday. "It's obviously going to take every single one of us to get it right."

The region could lose $16.9 billion in property value by 2070 because of high tide flooding alone from Citrus to Manatee counties, the report says. At the same time, governments could lose $238 million every year because of declines in property, sales and tourism taxes.

To protect the region from flooding, the report recommends an array of options, including raising and replacing seawalls; constructing berms; replenishing eroded beaches; and elevating homes. It relies on a projection that shows St. Petersburg could see 3.4 feet of ***sea*** ***level*** ***rise*** by 2070, compared to the year 2000. The study estimates losses and savings in 2021 dollars.

Severe weather will add to the cost. A storm that has a 1-in-10 chance of occurring in a given year, the report found, could in 50 years cause several billions of dollars in property damage from flooding.

Auld noted one way that climate change is already affecting the bay area: It's influencing where the Rays may choose to build a new stadium. Waterfront sites such as St. Petersburg's Al Land Stadium are "more expensive and more challenging" because of the threat of flooding and ***rising*** ***sea*** ***levels***. The team had once hoped to build a 34,000-seat, $450 million [*stadium there in 2007*](https://www.tampabay.com/sports/rays/2022/01/20/the-long-and-winding-road-to-tampa-bays-elusive-rays-stadium/), then decided not to seek a public referendum on the plan.

The Tampa Bay Partnership is a coalition of business leaders looking to grow the Tampa Bay region and its economy. Consultants from two engineering firms, Brizaga and AECOM, produced the study with help from the Tampa Bay Regional Planning Council. JPMorgan Chase provided funding.

The findings align with a recent *Tampa Bay Times* special report, "***Rising*** Threat," which revealed ***sea*** ***level*** ***rise*** [*will make storm surges much more damaging*](https://projects.tampabay.com/projects/2022/hurricane/rising-threat/climate-change-flood-storm-surge/).

Existing inequalities will worsen the pain. The neighborhood around Bartlett Park in St. Petersburg is listed in the report as a place that is both vulnerable to future flooding and where more people live in poverty than across the region overall.

"So many times those with the least means are least able to insure themselves against huge catastrophes that might come their way," Auld said. He later added: "We've got to avoid putting Tampa Bay in the equivalent position of being a poor citizen who's not able to make the investments in their future that they need to be able to make."

Preparing for climate change is too expensive for governments or residents to handle alone. Merely beefing up infrastructure will not be enough, the study says. For every public road raised, the surrounding private driveways may need to be lifted, too.

The study suggests that tasks like repairing seawalls and restoring beaches could require as much as 74 percent private investment.

"A lot of our shoreline is owned by private residents," said Alec Bogdanoff, co-founder of Brizaga. "They're going to have to invest in coastal protection."

The consultants and Tampa Bay Partnership debuted the report Tuesday morning at the first day of the Tampa Bay Regional Resiliency Leadership Summit in St. Petersburg.

Bemetra Simmons, the Partnership's president and CEO, called it a "first step" by the local business community to collectively push for more planning for climate change.

"This is not something we're going to solve just by our business community or just by our local governments," she said during a panel discussion at the summit.

Florida's attempts to improve its flood defenses have ramped up in recent years [*as the state has devoted hundreds of millions*](https://www.tampabay.com/news/florida-politics/2022/02/01/florida-gets-another-404-million-for-climate-change-prep/) of dollars to infrastructure projects after years of scant action from Tallahassee.

Tampa Bay cannot simply build its way through climate change, though, according to the Partnership's report. People need to also reduce fossil fuel emissions, which cause global warming by filling the air with planet-warming greenhouse gasses. ***Rising*** temperatures melt ice sheets and cause water to expand, stoking ***sea*** ***level*** ***rise***.

Emissions are an international problem, but the report says states and local governments should do their part by limiting their reliance on fossil fuels.

The Florida Legislature [*has not supported sweeping policies to curb emissions*](https://www.tampabay.com/news/florida-politics/2022/03/12/floridas-statewide-climate-change-response-ignores-cause/). Last year, lawmakers voted for rules that clean energy advocates say will make it harder for cities and counties to reduce their dependence on natural gas.

Auld said government support is important for business leaders who are "wary of putting fingers into political leaders' eyes."

"We need a government that makes it clear to business: 'Hey, if you take a couple steps forward, we have your back, not the opposite,' " he said. "I think we're starting to experience that now in a very material way."

**Graphic**

[*See image link*](http://www.tampabay.com/resizer/D_BeYwUN-Nu420rbCLLUHghV4mY=/cloudfront-us-east-1.images.arcpublishing.com/tbt/2254BY2645D57JA5TMN4XMDSZQ.JPG)

Waterfront homes seen in Oldsmar, at the top of Tampa Bay, that will be vulnerable in the future to storms and ***sea*** ***level*** ***rise***. Tampa Bay Partnership's Resilience Task Force on Tuesday released a report that shows it would cost the region $13.4 billion to prepare for climate change - but it could even more if Tampa Bay remains unprepared.

**Load-Date:** April 6, 2022

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[***AR6 and Sea Level, Part 2: The complexity of measuring GMSL***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6526-0X81-JCMN-Y2Y2-00000-00&context=1516831)

Newstex Blogs

Watts Up With That?

March 21, 2022 Monday 9:06 PM EST

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**Length:** 1647 words

**Byline:** Andy May

**Body**

Mar 21, 2022( Watts Up With That?: [*http://wattsupwiththat.com*](http://wattsupwiththat.com) Delivered by Newstex)

By Andy May

Thomas Frederikse and colleagues published a study of ***sea*** ***level*** data, considering both tide gauges and satellite data in 2020 (Frederikse, et al., 2020). This paper is frequently cited in the Chapter 9 AR6 ***sea*** ***level*** discussion. They found that there are many causes of global and regional ***sea*** ***level*** change that need to be considered. Land over much of the Northern Hemisphere is still rebounding from the melting of the massive glaciers they supported during the Last Glacial Maximum. This causes many northern tide gauges to record ***sea*** ***level*** falling as the land ***rises***. Further, dam construction during the twentieth century caused water to be withheld from the oceans and stored in reservoirs on land, especially between 1960 and 1980. They also tell us that previous assessments of ***sea*** ***level*** were unable to reconcile observations with the calculated contributions of ice-mass loss, dam construction, and thermal expansion of water. As mentioned in Part 1[1] of this series, observed ***sea*** ***level*** change is very small, so this is not surprising. Yearly changes are below the measurement accuracy of the instruments.

The observations of ***sea*** ***level***, ocean temperature, ice-mass loss, water held in man-made reservoirs, and total river discharge to the oceans all have considerable uncertainty, which is why studies have not been able to close the gap between observations. Frederikse and colleagues make another attempt to close the gap. They note that over the past few years much more accurate estimates of all the critical observations have been made available and they collected these in a new estimate.

Their best estimate of the observed ***sea***-***level*** ***rise*** trend from 1900 to 2018 is 1.56 0.33 mm/year, an error of 20%. In Part 1[2] using the NOAA ***sea*** ***level*** record we derived a slope of 1.74 mm/year, with an R2 of 0.97, this value falls within the 90% confidence limits given by Frederikse and colleagues. The observed ***sea*** ***level*** change estimate is shown in dark blue in Figure 1. The sum of ***sea*** ***level*** change components is shown in black. The two major components of ***sea*** ***level*** change are also shown for comparison. Barystatic (ocean volume, excluding thermal expansion) changes are shown in red and thermosteric (ocean volume changes due to thermal expansion) are shown in orange. All curves are centered on their 2002 to 2018 means. Due mostly to the centering period, the match in the component sum and the ***sea*** ***level*** observations looks good in the 21st century. Prior to 1990 it is not very good, but both the sum and the observations match within their respective margins of error. The observed ***sea*** ***level*** uncertainty, prior to 1990, generally exceeds 10 mm; prior to 1960, it exceeds 15 mm. Prior to 1940, it exceeds 20 mm.

[*https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-1-1.pngFigure*](https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-1-1.pngFigure) 1. Frederikse, et al.'s estimate of ***sea*** ***level*** from 1900 to 2018 is shown in blue and compared to the sum of his estimate of barystatic and thermosteric change in black. Barystatic change is shown in red and thermosteric in orange.

The sub-components of barystatic changes examined in the paper are: glacier melting, melting of the Greenland and Antarctic Ice Sheets, and terrestrial water storage (including new dam construction and groundwater depletion). Thermosteric changes are estimated using ocean subsurface temperature measurements. Frederikse, et al. try to reconcile the component total with observed ***sea*** ***level*** changes as measured by satellite and tide gauges using a model and find modest agreement, within the respective margins of error.

The results of his study increase the previous estimates of GMSL (global mean ***sea*** ***level***) ***rise*** in the 1960s and 1970s, after excluding the effect of dam construction. His model also increases the uncertainty prior to 1940. The match is quite poor in the 1920s and 1930s, and the steep ***rise*** in ***sea*** ***level*** from 1930 to 1950, nearly as rapid as in the 21st century, is also not matched well.

While the GMSL rate uncertainty narrows for the period 1993 to 2018, it still exceeds 0.4 mm/year as shown in Figure 2. Both figures are a portion of Frederikse et al.'s Figure 1. Figure 2 shows the 30-year rate of change from his models of barystatic and thermosteric change in red and orange respectively, along with their sum in black. These are compared to the observed 30-year rate of change rate, in blue. Clearly the rate of ***sea*** ***level*** ***rise*** oscillates on a multidecadal scale and probably rose as fast as today in the 1940s, within the margin of error.

In Figure 2, the shaded regions are the 90% confidence intervals. The graph plots the rate of ***sea*** ***level*** ***rise*** in mm/year. The periods where the match between the observations, in blue, and the model, in black do not match are clearer in Figure 2. The match is particularly poor from 1915 to 1950. The rapid slowing of the rate of ***rise*** between 1950 and 1965 is not matched well at all. The rapid ***rise*** from 1990 to 2005 is only marginally better than the other periods.

[*https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-2-1.pngFigure*](https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-2-1.pngFigure) 2. The curves are colored as in Figure 1, but this is a chart of the 30-year rate of change in ***sea*** ***level***, due to thermosteric and barystatic changes in orange and red respectively. The black curve is the sum of the two, and the blue curve is the observed change in ***sea*** ***level***, the shaded regions are the 90% confidence intervals.

Frederikse et al.'s model has a total rate uncertainty of at least one-half mm/year (see black shading in Figure 2) and the uncertainty in the data (blue shading) is even larger. Figure 2 is uncertain, but the roughly 60-year oscillation is significant and matches normal long-term ocean oscillations as described by Wyatt and Curry.[1][3] Wyatt and Curry's stadium wave can be seen in Figures 8 and 9 here[4]. Their roughly 60-year cycle can be divided into a 30-year warming cycle and a 30-year cooling cycle. 1918 to 1942 was a warming period and 1942 to 1976 was a cooling period in their analysis, this fits the data shown in Figure 2 fairly well.

Combining the analysis in Wyatt and Curry with Frederikse et al.'s analysis we can see that variations in ***sea*** ***level*** ***rise*** rates in the 20th century are probably, in part, a result of natural ocean oscillations. The Earth went into a natural warming regime in 1976, that probably ended early in the 21st century, perhaps around 2005, and then entered a cooling regime. Judging from Figure 2, it seems possible that the apparent acceleration in ***sea*** ***level*** ***rise*** from the late-1980s to about 2005 was merely a repeat of the acceleration from about 1925 to the early 1940s. Even if this is not true, it is clear that the data shown in Figures 1 and 2 are not accurate enough to conclude that the overall rate of ***sea*** ***level*** ***rise*** is accelerating, in fact it is possible that we will see a deceleration of ***sea*** ***level*** ***rise*** in the near future.

The statistical methods used in AR6 to show ***sea*** ***level*** ***rise*** acceleration were quite crude, as discussed in Part 1[5]. They simply cherry-picked data and used least squares fits of them to estimate acceleration. In this part we show that the error in estimating ***sea*** ***level*** ***rise*** and its components is so large that showing acceleration definitively is probably not possible. In the next post we will discuss the problems with that approach and provide a more statistically sound projection of the rate of ***sea*** ***level*** ***rise***.

The bibliography can be downloaded here[6].

(Wyatt & Curry, Role for Eurasian Arctic shelf sea ice in a secularly varying hemispheric climate signal during the 20th century, 2014) and (Wyatt, The 'Stadium Wave', 2014) ↑[7]

Article Rating

[ 1]: [*https://andymaypetrophysicist.com/2022/03/19/ar6-and-****sea****-****level****-****rise****-part-1/*](https://andymaypetrophysicist.com/2022/03/19/ar6-and-sea-level-rise-part-1/) [ 2]: [*https://andymaypetrophysicist.com/2022/03/19/ar6-and-****sea****-****level****-****rise****-part-1/*](https://andymaypetrophysicist.com/2022/03/19/ar6-and-sea-level-rise-part-1/) [ 3]: [*https://wattsupwiththat.com/2022/03/21/ar6-and-****sea****-****level****-part-2-the-complexity-of-measuring-gmsl/?utm\_source=rss&utm\_medium=rss&utm\_campaign=ar6-and-****sea****-****level****-part-2-the-complexity-of-measuring-gmsl#post-5483-endnote-1*](https://wattsupwiththat.com/2022/03/21/ar6-and-sea-level-part-2-the-complexity-of-measuring-gmsl/?utm_source=rss&utm_medium=rss&utm_campaign=ar6-and-sea-level-part-2-the-complexity-of-measuring-gmsl#post-5483-endnote-1) [ 4]: [*https://andymaypetrophysicist.com/comparing-early-20th-century-warming-to-late-20th-century-warming*](https://andymaypetrophysicist.com/comparing-early-20th-century-warming-to-late-20th-century-warming)/ [ 5]: [*https://andymaypetrophysicist.com/2022/03/19/ar6-and-****sea****-****level****-****rise****-part-1/*](https://andymaypetrophysicist.com/2022/03/19/ar6-and-sea-level-rise-part-1/) [ 6]: [*https://andymaypetrophysicist.com/wp-content/uploads/2022/03/Post-2-bibliography.pdf*](https://andymaypetrophysicist.com/wp-content/uploads/2022/03/Post-2-bibliography.pdf) [ 7]: [*https://wattsupwiththat.com/2022/03/21/ar6-and-****sea****-****level****-part-2-the-complexity-of-measuring-gmsl/?utm\_source=rss&utm\_medium=rss&utm\_campaign=ar6-and-****sea****-****level****-part-2-the-complexity-of-measuring-gmsl#post-5483-endnote-ref-1*](https://wattsupwiththat.com/2022/03/21/ar6-and-sea-level-part-2-the-complexity-of-measuring-gmsl/?utm_source=rss&utm_medium=rss&utm_campaign=ar6-and-sea-level-part-2-the-complexity-of-measuring-gmsl#post-5483-endnote-ref-1)

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[***Ice shelf larger than New York City disintegrated in East Antarctica***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:653G-RBS1-DYY9-00MY-00000-00&context=1516831)

CE Noticias Financieras English

March 27, 2022 Sunday

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**Length:** 777 words

**Body**

An ice shelf larger than New York City disintegrated in East Antarctica, the first major shelf to collapse there in more than four decades of satellite observations.

The Conger Ice Shelf, about 460 square kilometers, broke up off the continent on March 15. Its disintegration has alarmed scientists, who have long considered East Antarctic ice to be relatively stable and much less vulnerable to global warming compared to West Antarctic ice.

The ice shelves surrounding Antarctica protect the continent's ice sheets and glaciers. If the shelves give way, it creates a pathway for ice streams from surrounding glaciers to spill into the ocean and contribute to ***sea*** ***level*** ***rise***. The ice shelves themselves do not directly raise ***sea*** ***level*** because they are already floating in the ocean.

In just the past three weeks, sea ice levels surrounding the contents fell to an all-time low and temperatures in the interior of East Antarctica soared 70 degrees above normal, breaking records.

"We're seeing these things earlier than we expected," said Peter Neff, a University of Minnesota research assistant professor and glaciology expert.

Antarctic ice loss has accelerated in recent years-much of it coming from West Antarctica-and is a major factor in global ***sea*** ***level*** ***rise***. What is happening in East Antarctica is especially important because if all of its ice were to melt, ***sea*** ***level*** would ***rise*** by more than 30 meters.

The collapse of the Conger Ice Shelf occurred at the start of the record-breaking heat wave in East Antarctica. On March 18, temperatures rose 50 to 90 degrees above normal in parts of the East Antarctic Ice Sheet and rain, a rare occurrence on the continent, fell near the coast.

Temperatures near where the ice shelf broke off began to ***rise*** above the melting point just as it separated from the continent. A weather station in Casey, Antarctica, about 300 kilometers from the Conger Ice Shelf, had maximum temperatures above freezing between March 15 and 18.

Neff said the heat pulse, transported over the continent by a normally intense moisture plume known as an atmospheric river, probably played a relatively small role in the collapse of the ice shelf. But it may have contributed to its disintegration, he added.

Low levels of sea ice surrounding Antarctica probably played a larger role in hastening the ice shelf's demise, Neff said. The ice extent dropped below 2 million square kilometers on Feb. 25, the lowest level in 43 years of observations, amid windy and unusually warm conditions.

Satellite images show that its disintegration has evolved over many years, but that the recent collapse has been rapid.

He described the ice shelf's disappearance as a wake-up call for scientists studying the region.

"We expected the western ice shelves to do this, but not the eastern ice shelves," he said in a telephone interview. "That's what has caught people's attention. We really need to do more comprehensive monitoring of all these processes in East Antarctica. Small mistakes in East Antarctica can lead to big oversights."

Neff said that, despite the surprising collapse of the Conger Ice Shelf, his main concern about Antarctica and its potential to contribute to dangerous amounts of ***sea*** ***level*** ***rise*** lies in the west.

West Antarctica "is the one that will first cause big problems for the whole world with ***sea*** ***level*** ***rise***," he said.

In December, scientists concluded that an ice shelf on the periphery of the Thwaites Glacier in West Antarctica could break off within the next five years, accelerating the flow of meltwater and fueling ***sea*** ***level*** ***rise***.

Neff said the contribution to ***sea*** ***level*** ***rise*** from the Conger Ice Shelf is only a "drop in the bucket," relatively speaking. Compared to West Antarctica, East Antarctica is colder, higher, drier and less vulnerable to ***rising*** temperatures.

Still, Helen Fricker, a professor at Scripps Institution of Oceanography, said in an email that ice shelves like Conger "play an important role in reinforcing the ice sheet on land behind, which has implications for ***sea*** ***level*** ***rise***."

"This event demonstrates that it is important to continue to monitor the edges of Antarctica, where significant changes are occurring," he wrote.

In a TikTok video posted on Twitter, Neff concluded, "This is going to keep happening in a warming world, so the best thing we can do is get rid of our fossil fuels, stop emitting greenhouse gases and limit the amount of warming we experience."

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Global warming: what are the risks that marine cold spells are disappearing from the oceans?

Whale baleen may indicate climate variations, science says

NASA's incredible image of stars 26,000 light-years away from Earth

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[***Bay to lose land in rising sea risk***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651Y-KVH1-JD3N-52NR-00000-00&context=1516831)

The Courier Mail (Australia)

March 21, 2022 Monday

CourierMailWB Edition

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**Section:** NEWS; Pg. 12

**Length:** 258 words

**Byline:** Scott Kovacevic

**Body**

WIDE BAY TIN Can Bay, Craignish and Moore Park Beach are among the Wide Bay suburbs and towns facing expanded water views if a predicted ***sea*** ***level*** ***rise*** comes to fruition.

Digital modelling by Coast Risk Australia has painted a confronting picture about the potential impacts of climate change and ***rising*** ***sea*** ***levels*** over the next 80 years.

The modelling uses predicted ***sea*** ***level*** ***rise*** scenarios based on the Intergovernmental Panel on Climate Change Fifth Assessment Report.

These range from a high scenario of 0.84m by 2100, and a much less likely scenario in which levels ***rise*** 2m by 2100, and 5m by 2150.

If a 0.84m ***rise*** becomes reality Tin Can Bay will lose the tip of Norman Point while water views along the Esplanade will become clearer.

Popular tourist spot Inskip Point will lose a significant chunk of land under such a scenario, too.

At Hervey Bay, Eli Waters will become much wetter, as will Craignish and Toogoom.

The biggest impact under a 0.84m ***rise*** will be felt north of Bundaberg. Burnett Heads, Barubbra Island, and Moore Park Beach will all be significantly impacted by a 0.84m ***rise***.

Heritage listed Fraser Island faces a significant threat from ***rising*** ***sea*** ***levels*** too, with the modelling showing half the island will be inundated.

The damage would be much worse under a 2m ***rise***, which Coastal Risk says was a "low confidence" of eventuating but "cannot be ruled out due to deep uncertainty in ice sheet processes". Under that scenario the entirety of Norman Point stretching from Oyster Parade to the Yacht Club would become an underwater world.

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[***AR6 and Sea Level, Part 3, A Statistically Valid Forecast***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6528-PN01-JCMN-Y3BN-00000-00&context=1516831)

Newstex Blogs

Watts Up With That?

March 22, 2022 Tuesday 6:07 PM EST

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**Length:** 2514 words

**Byline:** Andy May

**Body**

Mar 22, 2022( Watts Up With That?: [*http://wattsupwiththat.com*](http://wattsupwiththat.com) Delivered by Newstex)

Lots of pressure to publish this post early and it is raining this morning here in The Woodlands, so no golf. I checked it over and think it is OK. Here you go!

By Andy May

In Part 1[1] of this series, we examined the data and analysis that was presented in AR6[2] to support their conclusion that ***sea*** ***level*** ***rise*** is accelerating. In Part 2[3] we looked at a serious examination of the observational record for ***sea*** ***level*** ***rise*** over the past 120 years and the modeled components of that ***rise***. We concluded in Part 1[4] that the statistical evidence presented in AR6 for acceleration was crude and cherry-picked. In Part 2[5] we saw that the error in both the estimates of ***sea*** ***level*** ***rise*** and in estimating the components of that ***rise*** is very large. The error precluded determining acceleration with any confidence, but the data revealed an approximately 60-year oscillation of the rate of ***sea*** ***level*** ***rise*** that matches known natural ocean cycles.

Modern statistical tools allow us to forecast time series, like GMSL (global mean ***sea*** ***level***) change, in a more valid and sophisticated way than simply comparing cherry-picked least squares fits as the IPCC does in AR6. Our forecast is based on pure statistics. It is done in the correct way, but not necessarily correct, statistics are like that. We will not know for sure until 2100. That said, let's do it. If you have a certain kind of nerdy mind, you will enjoy this.

Figure 1 is a plot of the data we will use—the NOAA ***sea*** ***level*** dataset. Simply looking at it we can tell it is autocorrelated[6], which means that each quarter's mean ***sea*** ***level*** estimate is highly dependent upon the previous quarter's value. Autocorrelation is important to consider in least squares regression, especially when forecasting time series, but routinely ignored by the IPCC.

[*https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-1-2.pngFigure*](https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-1-2.pngFigure) 1. NOAA mean ***sea*** ***level*** anomaly, 1900 to 2022. Each dot is one quarter (3 months).

Figure 2 plots each ***sea*** ***level*** estimate versus the previous estimate, this is called a plot of the first lag and the correlation of the two is a measure of autocorrelation. The R2 of the first lag is 0.97, so ***sea*** ***level*** is very autocorrelated. This is obvious but means that normal least squares linear fit statistics are invalid, the least squares statistics, such as R2, assume that the errors of regression are independent[7]. Least squares, as used in AR6 to show acceleration, is inappropriate with a dataset like this. Most of any given value is heavily dependent upon the previous value. This means the mean-square-error (MSE) will be much too small, causing the error of the fit to be too small. As a result, any least squares line of the data in Figure 1 or any portion of that data is statistically useless, unless the autocorrelation is accounted for.

[*https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-2-2.pngFigure*](https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-2-2.pngFigure) 2. Plot of GMSL versus the previous GMSL, the first lag. The values are highly correlated. The small autocorrelation plot shows that GMSL is highly autocorrelated for at least 7 years.

So how can we forecast GMSL in a statistically valid way? We clearly cannot use least squares and need to apply more advanced techniques. The first step is to remove the autocorrelation from the data, this is normally done by subtracting the previous GMSL value from the current one and progressing in this way throughout the data set. We have done this and show a plot of the result in Figure 3.

[*https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-3.pngFigure*](https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-3.pngFigure) 3 A plot of the first difference of GMSL. The plot is random and fairly uniform left to right, suggesting that the autocorrelation is removed, and the data are stationary.

The first difference data from GMSL looks pretty good, very much like white noise. This is exactly what we want for valid statistical analysis and forecasting. We will be using an R[8] function called 'arima' to create our GMSL forecast, and this function requires three parameters to work, they are called p, d, and q. These parameters tell arima how to condition the input data and build a model that can project valid future values. The plot in Figure 3 shows us that 'd' is one. That means taking one difference of adjoining values removes autocorrelation. We also need the data to be stationary[9], that is the statistical properties do not change with time (left to right). The original dataset (Figure 1) was clearly not stationary, and this is OK, we just do not want the way GMSL changes to be a function of time for this analysis. The R[10] Augmented Dickey-Fuller Test (ADF[11]) function confirms this, as the original dataset has an ADF p value[12] of 0.79, meaning it is non-stationary. The arima p value is not the same as the statistical p test.

The differences plotted in Figure 3 have an ADF p value of 0.01, well below 0.05, the threshold needed to show stationarity. Data are stationary when the distribution over the period being studied is evenly distributed around the mean. That is the distribution, up and down, does not vary significantly with the time axis (x).

Next, we need to derive the arima p and q values. For this we need the ACF (autocorrelation) and PACF (partial autocorrelation) plots shown in Figure 4.

[*https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-4.pngFigure*](https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-4.pngFigure) 4. ACF[13] and PACF[14] plots to determine p and q. The top plot shows that any value of one or over is possible for p since the series is very strongly autocorrelated at all lags. The lower plot shows that once the first level autocorrelation is removed only two significant autocorrelations remain (1 and 3) so q=2.

Analyzing the GMSL time series gives us an arima[15] parameter set of (1,1,2) for (p,d,q). We can also run an R function called auto.arima[16] to see what parameters it recommends. We find that it settles on (1,1,2) as well. This is good confirmation that our parameter selection is correct. Figure 5 plots the results.

[*https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-5.pngFigure*](https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-5.pngFigure) 5. The results of an arima forecasting model. The top plot shows the residuals, next we see the ACF of the residuals and the Q-Q plot[17], both look good. The bottom plot gives the Ljung-Box statistics for various lags and they are all over 0.05, which means that the residuals are white noise, exactly what we want.

Figure 5 tells us that the model is successfully capturing the essence of the trends in mean ***sea*** ***level*** from 1880 through 2020. The model residuals show no trend and they are not autocorrelated. Figure 6 shows the arima forecast from the (1,1,2) model.

[*https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-6.png*](https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-6.png) Figure 6. The arima forecast of mean ***sea*** ***level*** to 2100. The confidence limits plotted are 95% limits. A histogram of the model residuals is shown to the lower left. The residuals are pleasingly normal.

Figure 7 is a plot of the forecast[18] from Excel that is easier to read. The forecast we created predicts that GMSL will ***rise*** between 148 (6 inches) and 258 mm (10 inches) by 2100. Many researchers call this alarming[19], but humans have successfully adapted to much higher rates of ***sea*** ***level*** ***rise*** in the past as we can see in Figure 2 of Post 1[20], and they did so without the technology we have today. When we consider that the average open ocean daily tide range is 1,000 mm or three feet, eight inches of ***sea*** ***level*** ***rise*** over 100 years does not seem like much. In the 20th century ***sea*** ***level*** rose 5.5 inches[21], did anyone notice or care, aside from a few researchers?

[*https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-7.pngFigure*](https://149366104.v2.pressablecdn.com/wp-content/uploads/2022/03/Figure-7.pngFigure) 7. The forecast with more detail. The model predicts mean ***sea*** ***level*** in 2100 of 203 mm over the 1993-2008 average. The 95% confidence limits are 148 (6 inches) to 258 mm (10 inches) and marked with a curly brace. The range of predictions is not alarming, it is just over the 140 mm or 5.5 inches observed in the 20th century.

Conclusions

In the United States we would call the AR6 attempt to convince us that the rate of GMSL ***rise*** is accelerating, using adjoining cherry-picked least squares lines 'high school,' meaning unsophisticated. Their method is problematic because GMSL is heavily autocorrelated and non-stationary, rendering their cherry-picked least squares fits and least squares statistics invalid.

Our fit, using the R function arima, is at least statistically valid. We specifically corrected for autocorrelation and forced the series to be stationary. We also addressed the minor partial autocorrelation that was left at one quarter and three quarters. The residuals of our model passed both the overall Ljung-Box test[22] and multiple-lag Ljung-Box tests for white noise, meaning the arima model properly captured the 140-year trend in the NOAA ***sea*** ***level*** data.

Thus, while AR6 cherry-picked periods to support their conclusion that GMSL is accelerating, we reached the opposite conclusion using all the data in a statistically valid way. This does not mean that our forecast is correct, but it does mean that the AR6 speculation that ***sea*** ***level*** might ***rise*** 5 meters by 2150 is extremely unlikely and is best characterized as irresponsible speculation. Our analysis found no statistical evidence of acceleration and produced a linear extrapolation.

While warming of Earth's surface is clearly the reason land-based glaciers are melting, which does contribute to ***rising*** ***sea*** ***level***, AR6 provides no evidence the warming is caused by human activities. They use models to infer humans caused it, but unfortunately their models are also not statistically valid as shown in Part 2[23], here[24], and by McKitrick and Christy[25] (McKitrick & Christy, 2018). We can all agree that humans probably have some impact on atmospheric warming, but we do not know how much is caused by humans and how much is natural, because we are emerging from the unusually cold Little Ice Age[26]—the 'preindustrial' period. Further, as we saw in Part 2[27], the 30-year rates of ***sea*** ***level*** ***rise*** reveal a distinctly natural-looking oscillation. Glacial ice and ice sheet melting is likely responsible for most of ***sea*** ***level*** ***rise***, as AR6 states, but the human fraction of that warming might be quite small.

Thus, from a purely statistical point of view, the AR6 claims are childishly invalid. A proper analysis of the data leads to a forecast of roughly 20 cm (~8 inches) of ***sea*** ***level*** ***rise*** by 2100. In the year 2100, our descendants will know who was right.

The data and R code to create the figures in this chapter can be downloaded here[28]. The R code and spreadsheet provide much more detail about the arima forecast, including references not supplied below.

McKitrick, R., & Christy, J. (2018, July 6). A Test of the Tropical 200- to 300-hPa Warming Rate in Climate Models, Earth and Space Science. Earth and Space Science, 5(9), 529-536. Retrieved from [*https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018EA000401*](https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018EA000401)

4.5 2 votes Article Rating

[ 1]: [*https://andymaypetrophysicist.com/2022/03/19/ar6-and-****sea****-****level****-****rise****-part-1/*](https://andymaypetrophysicist.com/2022/03/19/ar6-and-sea-level-rise-part-1/) [ 2]: [*https://www.ipcc.ch/assessment-report/ar6/*](https://www.ipcc.ch/assessment-report/ar6/) [ 3]: [*https://andymaypetrophysicist.com/2022/03/21/ar6-and-****sea****-****level****-part-2-the-complexity-of-measuring-gmsl/*](https://andymaypetrophysicist.com/2022/03/21/ar6-and-sea-level-part-2-the-complexity-of-measuring-gmsl/) [ 4]: [*https://andymaypetrophysicist.com/2022/03/19/ar6-and-****sea****-****level****-****rise****-part-1/*](https://andymaypetrophysicist.com/2022/03/19/ar6-and-sea-level-rise-part-1/) [ 5]: [*https://andymaypetrophysicist.com/2022/03/21/ar6-and-****sea****-****level****-part-2-the-complexity-of-measuring-gmsl/*](https://andymaypetrophysicist.com/2022/03/21/ar6-and-sea-level-part-2-the-complexity-of-measuring-gmsl/) [ 6]: [*https://www.investopedia.com/terms/a/autocorrelation.asp#:~:text=Autocorrelation%201%20Understanding%20Autocorrelation.%20Autocorrelation%20can%20also%20be,Technical%20Analysis.%20...%203%20Example%20of%20Autocorrelation.%20*](https://www.investopedia.com/terms/a/autocorrelation.asp#:~:text=Autocorrelation%201%20Understanding%20Autocorrelation.%20Autocorrelation%20can%20also%20be,Technical%20Analysis.%20...%203%20Example%20of%20Autocorrelation.%20) [ 7]: [*https://online.stat.psu.edu/stat501/book/export/html/995*](https://online.stat.psu.edu/stat501/book/export/html/995) [ 8]: [*https://www.r-project.org*](https://www.r-project.org)/ [ 9]: [*https://towardsdatascience.com/stationarity-in-time-series-analysis-90c94f27322*](https://towardsdatascience.com/stationarity-in-time-series-analysis-90c94f27322) [ 10]: [*https://www.r-project.org*](https://www.r-project.org)/ [ 11]: [*https://www.r-bloggers.com/2021/12/augmented-dickey-fuller-adf-test-in-r/*](https://www.r-bloggers.com/2021/12/augmented-dickey-fuller-adf-test-in-r/) [ 12]: [*https://www.investopedia.com/terms/p/p-value.asp#:~:text=Key%20Takeaways%201%20A%20p-value%20is%20a%20measure,addition%20to%20preselected%20confidence%20levels%20for%20hypothesis%20testing*](https://www.investopedia.com/terms/p/p-value.asp#:~:text=Key%20Takeaways%201%20A%20p-value%20is%20a%20measure,addition%20to%20preselected%20confidence%20levels%20for%20hypothesis%20testing). 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[***Thousands of properties are at risk from rising sea levels and tides. Here's how to protect yourself against coastal erosion and inundation***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6558-9T71-JBN5-F1MX-00000-00&context=1516831)

ABC Premium News (Australia)

April 5, 2022 Tuesday

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**Length:** 1340 words

**Highlight:** Buying a home involves a lot of research and checks — but when it comes to the effects of ***sea*** ***level*** ***rise***, buyers have largely been left to go it alone.

**Body**

Wild swells have [*battered the NSW coast over the weekend*](https://www.abc.net.au/news/2022-04-02/surf-conditions-ease-after-wild-weather/100961758), with Sydney's iconic Bondi Beach disappearing beneath raging ocean.

Up the coast, the northern beaches also copped a beating and the surf club at Newcastle's Redhead Beach was inundated by waves, washing away the wheelchair ramp to the beach.

The conditions have sparked concerns over damage from erosion, with Waverley Council Mayor Paula Masselos warning the state's entire coastline has been affected.

"Every beach along the New South Wales coast has significant coast erosion, from Bondi to Manly, Cronulla and up along the Mid North Coast," he said.

And it's not just in NSW. ***Rising*** ***sea*** ***levels*** are posing a risk for properties all across Australia — now and many decades into the future.

The latest report from the Intergovernmental Panel on Climate Change (IPCC) — the most [*comprehensive report on climate change*](https://www.abc.net.au/news/2021-08-11/what-does-the-ipcc-report-mean-for-australia/100364884) ever released — estimates a ***sea*** ***level*** ***rise*** of up to 55 centimetres by the end of the century, while not ruling out a two-metre increase in the same period.

In 2009, more than a decade before the IPCC report, the federal government's now-dissolved Department of Climate Change estimated that between 157,000 and 247,600 individual residential buildings could be at risk of inundation if ***sea*** ***levels*** were to ***rise*** by 1.1 metres.

Experts have warned that some of these homes could soon become uninsurable. In the worst-case scenario, owners could be left with properties they cannot live in, afford to fix, or sell.

Even so, living by the water and the lifestyle it offers continues to attract many hopeful home buyers. And it's predicted that the trend towards remote working, fast-tracked by the COVID-19 pandemic, could inspire even more people to make a sea-change.

So, what can you do to ensure your dream home will remain so for decades to come? Here's what you need to know.

**Buyers must do their own research**

Climate change poses an array of risks that could impact private property. When it comes to ***sea*** ***level*** ***rise***, the two main possibilities are erosion, when coastal foundations are worn away by tides, and inundation, which refers to flooding caused by ***rising*** ***sea*** ***levels***.

"People need to take this issue very seriously," says Dr Karl Mallon, the chief executive of Climate Valuation — an organisation that provides climate change risk analysis to banks and insurers.

"Home buyers can't depend on insurers, banks, or councils to alert them or protect them from future problems from extreme weather or climate change."

That means doing your own research before putting down a deposit. But what should people be looking for — and where should they go for accurate information?

Organisations offering climate risk analysis to private property owners, like Climate Valuation, are one place to start.

These services allow property buyers to search an address and receive a score for the property's climate change risk level for the present and into the future, depending on the building's location, structure type, age, and materials.

A quick, free search could alert buyers to possible issues that require further investigation. "If you're seeing a 'C' either now, or in 2050, that's a big red flag and people can then choose to do their own research," Mallon says.

But, he adds: "Even for a really informed home buyer, getting access to the information they need to make a decision is actually quite difficult.

"At the moment, it's very much buyer beware."

One thing to consider is the property's elevation, which can typically be found in survey documentation. The higher the property's current and projected position above ***sea*** ***level*** the safer it generally will be from coastal inundation.

Some councils also have flood maps available to the public or, depending on where you plan to live, may offer sea ***rise*** maps.

When researching the risk of inundation, Mallon says it's important to consider the impact of potential storm surges as well as ***sea*** ***level*** ***rise*** over time on coastal or low lying property.

**Three things to look for**

The next question is what damage is likely if sea water does encroach near, or onto, the property.

Mallon says buyers should consider three key questions:

* Will water reach the property, either now, in a storm surge, or over the next few decades?

1. Could water enter the home?
2. If water does get into the property, will it cause damage?

If the answer to the first two questions is yes, it's time to ask if the property has been built to withstand flooding: are the foundations elevated or is the home made of flood-resistant materials?

For example, a traditional Queenslander home is built on raised stumps or pillars to allow water to pass under the structure.

And certain building materials, such as fibre cement, concrete, or bricks, generally cope better with inundation than gyprock, soft woods or fibreglass.

Even if the home was originally built to be flood-safe, it's important to keep in mind that modifications may have been made to the property after it was first designed — such as a granny flat or extension under the original structure.

Potential buyers should also look into what — if any — coastal management plans are already in place in the area, and what the council is planning to do in the future to protect assets. This may include building sea walls or barriers along an estuary.

For example, last year construction began on a controversial 1.3-metre sea wall from Collaroy to South Narrabeen in Sydney's north, designed to prevent future erosion threatening beachfront homes.

Home owners along the stretch have chipped in up to 80 per cent of funding for the project. The remaining funds will come from the state government and local council.

**Why it's important to plan ahead**

Climate change modelling tends to deal with dates far into the future and beyond many of our lifetimes. This makes it difficult to assess the gravity of risk facing individual owners.

Most mortgages in Australia are structured for up to 30 years, but Mallon says property owners should be thinking further ahead when deciding where to buy and build.

There are a number of reasons for this.

Firstly, ***sea*** ***levels*** may ***rise*** faster than has so far been predicted.

But more importantly, when it comes time to sell, Mallon says banks will be looking at the vulnerability of the property in the coming decades.

This means that even if the risk to a property is low when the owner wants to sell it in 30 years, the person they wish to sell it to may not be able to get a mortgage if the risk is set to increase over the next 30 years.

This means property owners could face problems long before they've experienced the physical effects of climate change.

"You have to take a long term view because other people are taking a long term view and that's how they'll choose to value your property," Mallon says.

**Look carefully at insurance policies**

What home insurance will actually cover is another area to examine closely: does the policy include acts of the sea, such as inundation? The answer is probably not.

The [*Insurance Council of Australia*](https://insurancecouncil.com.au/issues-in-focus/climate-change-action/) states that no region is currently "uninsurable" but acknowledges that "some regions may become difficult to insure in the future unless governments invest in appropriate physical mitigation and adaptation strategies".

According to the Insurance Council, actions of the sea are generally not covered by home insurance. They urge anyone concerned about these hazards to check their policies and speak to their insurer.

Last year, the Australian Competition and Consumer Commission (ACCC) found that extreme weather events had forced the cost of insurance up so significantly that as many as [*20 per cent of residents in Northern Australia chose to go without it*](https://www.abc.net.au/news/2021-01-05/accc-northern-australia-insurance-inquiry-recommendations/13029936).

"Our concern is that we are still hearing stories of people that have bought homes, they've not checked the insurability, they find that the flood cover is very expensive … or it's become very expensive," Mallon says.

"If [home buyers] go to their insurance company and ask 'will my insurance be the same in 30 years as it is today?' They won't get an answer to that question."

**Load-Date:** April 5, 2022

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[***PUB considering sea barriers to protect south-west coast; Feasibility study will also look at raising industrial estates' ground level as an alternative solution***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6511-H0F1-DYX4-001M-00000-00&context=1516831)

The Straits Times (Singapore)

March 17, 2022 Thursday

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**Section:** SINGAPORE

**Length:** 765 words

**Byline:** Cheryl Tan

**Body**

To better protect parts of Singapore's coastline from extreme ***sea***-***level*** events, barriers resembling large metal "arms" could be deployed in the future.

Storm surge barriers have been used in countries such as the Netherlands to protect areas from flooding. Hinged at the coast, they "hug" the coastline to allow ships to pass, but can swing outwards in the open waters before extreme high tide events hit.

National water agency PUB is studying the feasibility of deploying such structures to protect Singapore's south-western coastline from storm surges - higher-than-usual tides caused by storms brewing offshore.

With mean ***sea*** ***levels*** expected to ***rise*** due to climate change, storm surges could contribute to extreme ***sea***-***level*** events and cause coastal flooding in low-lying areas.

The local coastline is vulnerable to storm surges at varying degrees, depending on the orientation of the coast, depth of water, wind speed and tide levels.

The south-western coast supports various waterfront activities, including offshore and marine, logistics, and the energy and chemical sector, said Ms Hazel Khoo, director of PUB's Coastal Protection Department, yesterday in response to queries from The Straits Times. "Coastal barriers could be an effective solution against extreme ***sea***-***level*** ***rise*** and will be assessed to ensure that our maritime traffic and operational activities of the waterfront industries are not adversely affected."

PUB called for a tender last Friday to study the feasibility of coastal barriers, such as storm surge barriers, and raising the ground level of mainland industrial estates as an alternative solution.

The narrow channel of water between the south-western coastline of mainland Singapore and Jurong Island makes storm surge barriers feasible, as they could fully enclose the channel as needed and be left open for seacraft to pass through otherwise.

The study will examine three areas: the northern coast of Jurong Island, the Jurong coastal area including West Coast Park and Pasir Panjang Terminal, and part of Tuas, which includes the Tuas Water Reclamation Plant and various shipping yards.

Other than storm surge barriers, the study will also look into barrages - dam-like structures - with navigational locks.

These locks are openings that allow vessels to pass through, but can be shut to protect against high tides and storm surges.

Barrages such as Singapore's Marina Barrage, on the other hand, are permanent barriers with gates that can be opened to discharge excess stormwater. They can also be equipped with navigational locks to allow vessel movements between two bodies with different water levels.

The study will also include a preliminary analysis of various coastal adaptation solutions, including the possibility of raising the ground levels of JTC's estates during redevelopment. By studying this option, PUB will be able to determine the extent of protection it could provide.

Singapore has already moved to protect itself from future ***sea***-***level*** ***rise***, by lifting upcoming infrastructure such as the Tuas Port by 5m above mean ***sea***-***level*** ***rise***.

The Centre for Climate Research Singapore has projected that climate change could cause a mean ***sea***-***level*** ***rise*** of up to 1m by 2100.

Taking into account extreme high tides and coastal surge, mean ***sea*** ***levels*** could go up by 4m to 5m.

But PUB said it was taking a longer-term view, examining how to protect these areas against possible inundation at a mean ***sea***-***level*** ***rise*** of 2m.

"Given the uncertainty of climate change projections, it is important that Singapore have in place plans and strategies in the event actual or projected ***sea*** ***levels*** are higher," said Ms Khoo.

The two-year study, which is expected to start by the second half of this year, will be conducted concurrently with JTC's site-specific study of Jurong Island, and PUB will integrate the findings of both studies to assess the appropriate coastal protection options for the south-western coast.

The JTC study is one of eight site-specific studies that PUB will be calling for in phases to see how different parts of Singapore will be protected from ***sea***-***level*** ***rise***. The City-East Coast study is ongoing.

Factors such as costs (constructability, operations and maintenance of the barriers) and existing and long-term land use plans will be considered for the coastal barriers study, said PUB. The study could cost up to $3 million.

In the course of the study, PUB and the appointed consultant will work closely with other government agencies and waterfront companies within and around the study area to seek their feedback, said the agency.

**Load-Date:** March 16, 2022

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[***Protecting Parris Island from rising sea levels is urgent, leaders say***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:652G-0WR1-DYJM-M0D8-00000-00&context=1516831)

The Island Packet

March 23, 2022 Wednesday

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**Section:** beaufort\_news

**Length:** 902 words

**Byline:**  Sarah Haselhorst

The Island Packet

**Body**

Efforts to protect Parris Island and its Marine Corps basic training base from climate change can't be put on hold, local, state and national leaders said during an event organized by The Nature Conservancy in Beaufort on Tuesday.

It's a sense of urgency that Dale Threatt-Taylor, executive director of the South Carolina chapter, said she feels has surged off the scale.

Protecting the base-- an 8,095-acre site that trains 20,000 recruits a year -- from climate change isn't a new conversation. But rapidly ***rising*** ***sea*** ***levels*** and increased hurricane frequency, among other climate change concerns, is escalating the island's vulnerability.

Not only are the island's facilities threatened, leaders said, but it is an issue of national security.

Simply put: If climate-battered facilities were forced to close on the island, recruit training would be interrupted and preparedness slowed.

"Operational readiness is going to be the No. 1 issue," U.S. Rep. Nancy Mace, R-S.C., said. "Any military base on the coast is going to have very similar issues, but the rate of ***sea*** ***level*** ***rise*** is very concerning. We've got to be thinking, 2030, 2050, what do we need to have on the base? What does that look like to ensure the longevity of Parris Island?"

The base also has a huge economic footprint in Beaufort, Jasper, Hampton and Colleton counties, in the ballpark of over $600 million, according to a 2017 report prepared for the South Carolina Military Base Task Force.

The highest projected ***sea*** ***level*** ***rise*** at Parris Island is 6.4 feet by 2100. That would cause water to overrun about three-quarters of the Marine Corps' Parris Island land, according to the Union of Concerned Scientists. A hurricane would only expedite the destruction.

While Parris Island has dodged total inundation from recent hurricanes, leaders on Tuesday pointed to the rebuilding of Florida's Tyndall Air Force Base after Hurricane Michael decimated it, which required nearly $5 billion in repairs.

'The longer you wait, the harder it's going to be'

The threat of hurricanes isn't a new concern for Parris Island leaders.

Retired Marine Brig. Gen. Stephen Cheney, the Parris Island base commander between 1999 and 2001, recalled Hurricane Floyd and its predicted destruction of the training site. Back then, in September 1999, he was told the site would be under seven feet of water. Floyd brushed Parris Island but shocked Cheney into realizing the site's vulnerability.

Now, over two decades later, Cheney said the need to act is more pertinent than ever.

Cheney said he doesn't think problems at Parris Island are so bad now that a catastrophic event would totally destroy the island.

"In that context, I don't think it's too late," said Cheney, who serves as president emeritus of the American Security Project. "The longer you wait, the harder it's going to be. You want to make that gamble? I think not," he said.

Cheney said most people won't think decades into the future, meaning the effects of climate change are a far away concern. But long-range planning isn't uncommon, and certainly not for the Department of Defense, he said.

"If you're going to build a ship, particularly an aircraft carrier, you plan for that ship's life to be 50 years old. Right now, they're going to the drawing board and saying, 'What's the threat going to be in 50 years? How do we appropriate funds we need to build the ship?'" Cheney said.

He believes the conversation should be no different when it comes to climate change and military structures.

"The ***sea*** ***level***, at the minimum, (will ***rise***) 3 feet... So why aren't you planning for that instead of worrying about the ship you're going to have in 40, 50 years?" he questioned.

Seawall talks

Cheney sees a two-pronged approach for armoring Parris Island against climate changes: mitigation and adaptation.

Mitigation measures, according to Cheney, are broader and more pervasive than adaptation, tackling issues such as lessening carbon dioxide emissions. He nodded to the Department of Defense's massive fuel use as contributing to greenhouse gas emissions.

Cheney said adapting to inevitable weather threats would require installing a sea wall where the island is most vulnerable to flooding.

In Charleston, a proposed 8-mile sea wall is estimated to cost $1.1 billion, according to The Associated Press. However, Cheney said parts of Parris Island that are not used would not need sea wall protection. Other infrastructure concerns include maintaining nearly 100-year-old buildings on the island.

Building a sea wall at Parris Island would cost millions, not billions, Cheney said, and because the facility is federally owned, the sea wall would need to be federally funded.

The Army Corps of Engineers has been at the head of recent conversations and efforts to construct sea walls in South Carolina, Mace said. Depending on where people want to lay sea wall, she said it can be a "touchy issue."

"How you get your priorities is not easy," she said.

Mace urged federal, state and local leaders to communicate among one another to ensure they can assess needed funds. If and when the funds are appropriated, Mace said she'd fight "tooth and nail" to get resources where they need to be.

As Parris Island stands today, state, local and national leaders agree on protecting the Marine recruit site and Cheney is sure of one thing: "It ain't gonna close," he said. "The Marine Corps is very good at keeping its spaces alive."

**Load-Date:** March 25, 2022

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[***Laura Tobin predicts Welsh town will be submerged under water by 2054 amid climate crisis***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:654C-3D71-DY4H-K3V2-00000-00&context=1516831)

irishmirror.ie

April 1, 2022 Friday 8:00 AM GMT

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**Section:** CELEBRITY NEWS; Version:1

**Length:** 646 words

**Byline:** By, Susan Knox

**Highlight:** Good Morning Britain star Laura Tobin has predicted that the people of Fairbourne, in Wales, will be the first climate change refugees as their homeland may be completely submerged under water by 2054

**Body**

Laura Tobin has predicted that the residents of a small village in Wales will be first to suffer from ***rising***-***sea*** ***levels*** within the next 30 years.

The Good Morning Britain star, 40, shared the terrifying predictions on the detrimental effects of climate change in her brand-new book, Every Day Ways To Save The Planet.

In one particular chapter on ***rising***-***sea*** ***levels***, flooding, and extreme weather, Laura explained that Britain is already experiencing severe effects.

The broadcast meteorologist revealed that the people of Fairbourne, in Wales, will be the first people to suffer.

"It's easy to think that these changes are so far away from us that we won't be affected, but Britain is soon to have its first climate change refugees," the ITV star explained.

"The people of Fairbourne, a village in Gwynedd, Wales, have been told that by 2054, their village will be 'decommissioned' because of the threat of ***sea***-***level*** ***rise*** and coastal flooding.

"It has proven too costly to maintain and increase flood defences, so the locals will have to leave their homes before the 450 houses, a pub, post office and several shops are dismantled.

"The people of Fairbourne may be the first people in the UK going through this, but it's likely that they won't be the last."

Laura went on to discuss a journey she went on which left her completely shocked.

The Good Morning Britain star, was shocked to learn that the Isles of Scilly will be split into three due to ***rising*** ***sea***-***levels***.

"I was lucky enough to visit the Isles of Scilly to report on climate change in 2021. It is the most beautiful place, but if the projections of a one-metre ***sea***-***level*** ***rise*** happen by 2100, then the main Island of St Mary's would be split into three," she explained.

"They will be the place that is most impacted by climate change in the UK."

Laura also shared some more terrifying statistics -one in particular which predicted that by 2050, 300 million people's homes will fall below the current level of coastal flooding.

As well as that, ***rising*** ***sea*** ***levels*** will intensify the impact of hurricanes and typhoons on coastal areas.

It's also predicted that Marshall Islands, another archipelago in the Pacific Ocean, could be lost to climate change as early as 2080. Most of the Marshall Islands lie less than 2m above ***sea*** ***level***, meaning the 55,000 inhabitants are at serious risk.

Laura explained that we have seen global average ***sea*** ***levels*** ***rise*** by 21-24cm since 1880, with about a third of that happening in the last two and a half decades alone.

This is a result of land ice melting and adding water to the oceans, and also a ***rise*** in temperature of the water, which expands when hot.

Around the world we have already seen an increase in coastal erosion, widespread coastal flooding and land becoming permanently submerged.

If that wasn't enough, there is also a huge threat of mass flooding.

***Sea***-***level*** ***rise*** because of climate change is not the only thing to cause flooding around the world.

Higher temperatures actually cause more rain because warm air holds more moisture, which increases the risk of extreme rainfall events.

In her brand-new book, Every Day Ways To Save The Planet, Laura detailed her terrifying predictions in the hope of encouraging others to be more climate conscious.

Within the page of her new book, which is released by Mirror Books, Laura offers plenty of tips and tricks to help people make a difference to saving the planet by making small everyday changes to their routines -including recycling, organising food waste, and cutting down on the use of plastics.

The broadcast meteorologist has also shared a number of shocking statistics in the book -one in particular which stated that the UK only recycles 47% of it's plastic waste.

Laura Tobin: Everyday Ways To Save Our Planet, RRP £14.99, is out on 7 April and published by Mirror Books.

**Load-Date:** April 1, 2022

**End of Document**



[***Laura Tobin predicts Welsh town will be submerged under water by 2054 amid climate crisis***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:654C-3D71-DY4H-K3X5-00000-00&context=1516831)

mirror.co.uk

April 1, 2022 Friday 8:00 AM GMT

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**Section:** CELEBRITY NEWS; Version:1

**Length:** 646 words

**Byline:** By, Susan Knox

**Highlight:** Good Morning Britain star Laura Tobin has predicted that the people of Fairbourne, in Wales, will be the first climate change refugees as their homeland may be completely submerged under water by 2054

**Body**

Laura Tobin has predicted that the residents of a small village in Wales will be first to suffer from ***rising***-***sea*** ***levels*** within the next 30 years.

The Good Morning Britain star, 40, shared the terrifying predictions on the detrimental effects of climate change in her brand-new book, Every Day Ways To Save The Planet.

In one particular chapter on ***rising***-***sea*** ***levels***, flooding, and extreme weather, Laura explained that Britain is already experiencing severe effects.

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**Load-Date:** April 1, 2022

**End of Document**



[***Fighting the tides: Maldives races to reclaim more land as sea levels rise***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:654H-C9R1-JCDN-135B-00000-00&context=1516831)

Channel NewsAsia

April 2, 2022 Saturday 6:00 AM GMT

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**Length:** 2026 words

**Byline:** Jack Board SOURCE: CNA

**Body**

MALE: It only takes a few minutes on a speedboat from the docks of the heaving Maldivian capital before the iconic colours of this island nation come into view.

The intensity of the azure water is almost unreal. This is postcard Maldives.

And amid this shimmering seascape, new islands are emerging.

One, for a future resort, is already dotted with palm trees that will decorate walkways for guests and line a pure white but artificial beach. Another is crammed with diggers and construction workers putting together the foundations of buildings.

In the quest for more land, reclamation projects like these are abundant throughout the Maldives.

As these islands form - from sand dredged up from lagoons and seabeds - others fall away. Most of the country's 1200 islands are under threat from ***rising*** ***sea*** ***levels*** and being slowly swallowed by the waves through erosion.

Building to ensure safety has become ingrained as a survival tactic in one of the most vulnerable places to climate change.

***Sea*** ***level*** ***rise*** is a problem for the entire world due to global warming, which causes glaciers to melt and the expansion of water in the ocean.

For the past half a century, ***sea*** ***levels*** have been ***rising*** at an accelerating rate, the fastest in 3,000 years.

Over the last decade, the rate has been about 4mm per year and for low lying states like the Maldives, the situation is already alarming.

Coastal flooding and storm surges will become even more common as temperatures increase.

"Even an incremental increase in ***sea*** ***level*** ***rise*** poses significant challenges for us," Aminath Shauna, the Maldives' Minister of Environment, Climate Change and Technology told CNA.

"Our coral reefs (are) bleaching and all the islands in the Maldives have run out of freshwater. And we face increased severity of storms, our islands are getting flooded more and more, and the weather has become more extreme," she said.

"I want people to know that we are actually living. We are experiencing the realities of the impacts of climate change on a daily basis."

It is on the small islands where the effects are already impeding people's daily lives. WAVES ARE ***RISING*** HIGHER

On the island of Gulhi, home to close to 1,000 people, the climate challenges are front and centre.

Just metres from the island's famed "Bikini Beach", a popular spot for tourists, the coastline has been left ragged. Skeletal roots of mangrove trees entangle with a haphazard trail of discarded construction materials that are now being used to keep the waves at bay.

"During the rainy season or sometimes in the summer season when the tide's much higher, these waves come in completely. This area I'm standing now also will be underwater actually," said Mohamed Raisan, the secretary general of Gulhi Council. "Our hospital is right next to us and sometimes the salt water is affecting it. Even the waste goes inside the hospital as well.

"We ask locals to dump this construction waste to kind of minimise the problem, but it doesn't fully eradicate it. And now the government and the council are trying to actually reclaim this whole area," he said.

Their plan is to more than double the original size of Gulhi through a massive reclamation project. The outcome will be two-fold - more room to live and develop as well as increased safety from the ***rising*** tide. It is exactly the playbook the national government has used to expand land around Male, which is the most densely populated capital city in the world.

Twenty-five years ago, it embarked on an ambitious project of "conjuring up land from the lagoon", to eventually house 240,000 people in a smart, safe city, called Hulhumale, which is now connected by bridge to Male.

The second phase of Hulhumale is still underway. For a country so land-deprived, the new island where tall apartment buildings are being constructed, flanked by long artificial beaches, is notable for its vastness.

The Housing Development Corporation (HDC), the government-owned enterprise charged with managing the project, previously branded the project the "City of Hope". The area has been raised 2m above ***sea*** ***level***, an attempt to minimise the risks of flooding and coastal inundation and protect its infrastructure. Previous mistakes made in Male to reclaim close to the surrounding reefs have not been repeated in order to avoid high swells impacting the city.

It is symbolic of the anxiety of climate change and such measures are being made right across the atolls as new islands are reclaimed from the sea.

"We can only take steps from what we know and what we can foresee at this given time. I would say Hulhumale is a very, very safe place," said HDC's managing director Suhail Ahmed.

"But what we don't know is how much ***sea*** ***level*** ***rise*** we are going to get within the next 50 or 100 years." LOOKING FOR ALTERNATIVES

Despite the merits of land reclamation - for climate adaptation and economic and social reasons - there remains strong opposition to the manner in which projects are done in the country.

Building new land is fundamentally reshaping nature. It impacts coral reefs, tidal flows, marine life and vegetation. This can push the problem of erosion to new areas instead of solving it.

"We find a lot of projects designed and implemented in a lot of these islands that destroy the natural barriers to climate change. And one of the main issues that we find with it is the fact that people are not consulted in any of these processes," said Sara Naseem from Transparency Maldives.

"Quite often, these projects are designed in a way that it actually makes the islands more vulnerable to climate change. And so while we raise funds to increase the resilience of the islands, while we raise funds to protect our mangroves and our wetlands, you also find that mangroves are destroyed in another part of the island and coral reefs are destroyed for reclamation projects." The government is adamant that its environmental protections and assessments are sincere, with the resilience and prosperity of people central to decisions being made. There are also economic considerations - climate change is proving extremely expensive for this small nation.

"It's a double edged sword for us. And when we think about reclamation, we also know that countries like ours, our reefs, our marine resources, of which we have very much depended on, are impacted because of reclamation," said Shauna the minister.

"But at the same time, we also need land, we also need higher ground for us to continue to live on these islands. "We need to use a mix of hard engineering and soft engineering solutions. To protect our islands, we need to look for ways to raise the level of our lands as well, which also means finding ways to increase our land and think of ways to protect the population and people who live on these islands."

She said that about 35 per cent of the national budget is currently spent on coastal protection and flood prevention. "Because of climate change, we are having to invest heavily. Resources that otherwise could have been spent on education, the health sector, transport, and other development needs are now having to be reallocated and reprioritised to spend on coastal protection, flood prevention measures and the provision of water and sewage services."

Naseem of Transparency Maldives argued that a bigger national discussion needs to happen - about the viability of continuing to rely on building to safety instead of putting more resources into less impactful adaptation measures.

"Do we need destructive projects that build more land for these islands? Or do we really need sustainable development that increases the resilience of these people and island communities?

"Building to safety might just be a race that we can never quite complete against sea surges and ***rising*** ***sea*** ***levels***. And so looking at other ways we can sustainably develop islands and increase the resilience of these islands is more important. And currently, there's also a lack of research that's done here," she said. LIVING ON THE WATER

There are some who think land reclamation could become a thing of the past, with innovation that will forever change the way Maldivians live.

Being close to the ocean has - naturally - been etched in the country's DNA. Now, one development wants thousands to, literally, live on it.

Maldives Floating City, which remains presently still a concept project, promises within just a few years to house 15,000 people on floating concrete modules that connect like Lego blocks in a lagoon close to Male.

It might look like science fiction: A colourful spiral design of thousands of homes alongside sandy roads and palm trees, powered by renewable energy and a modern sewage system. But the company behind it is adamant that the technology will work and that it is both commercially and environmentally viable.

"Land reclamation is not done for fun. It is an absolute necessity in this moment, because you can't tell the people that you can't expand. So that has been very difficult to manage," said Ibrahim Riyaz, the director of the project, which is a Dutch Docklands development.

"The curiosity is there from the people if there is another way of doing it, but still we haven't demonstrated it yet. So we believe that this project is going to actually bring that to the people. Seeing is believing here.

"From all kinds of studies we have done, this is cheaper than reclamation. And then of course, remember that the impact is less," he said. The moored housing modules are designed to move up and down with the tide, giving flexibility in the event of storm events, and future proofing against ***sea*** ***level*** ***rise***.

The project plans to release prototype housing this year. There are grander designs to build floating airports, golf courses and harbours around the world, if the enterprise proves to be a success.

Living so close to the water is natural for Maldivians, Riyaz argued, and this project will turn back the clock to a way of traditional living, combined with modern, low impact environmental innovation.

"Every house is waterfront, every house has a backyard and every house has a terrace. It's a life we have been used to until very recently," he said.

"So we think we can take us back to the time of how we used to live, instead of currently being like birds in concrete jungles." "IT'S OUR BLOODLINE"

Re-establishing Maldivians' connection to the sea is central to Shaaziya Saeed's life. As a surfer, conservationist and dive instructor, she spends more time in the water than most people.

She has watched first hand over many years how the country's precious underwater resources have been undermined, mostly by man.

The organisation she co-founded - Save Our Waves - is dedicated to protecting surf breaks around the country's islands. Many are threatened or have disappeared due to development projects, resort building and land reclamation.

The mission is not to simply save the sport, but to remind people about the importance of the marine ecosystem. "The waves break on top of the reef and it stops the erosion on the islands. But if there is a man made development or land reclamation or anything happening, this natural thing to protect the island is gone. Very soon, the corals will be dying," she said.

"Because of global warming, the waves will get a little bit higher when it is high tide. So these kinds of things are getting more frequent when we play with our natural environment."

She spends her days teaching young children how to surf. The seas may be ***rising*** and the warnings might be grim - that the waves will one day swallow these islands - but she wants them to engage with the natural world and fight for it.

"Maybe some people are scared of the ocean because of what they have heard from the TV. But still, they are somehow connected to the ocean. We all breathe the oxygen from the ocean. So it's all connected. It's our bloodline."

***Sea*** ***level*** ***rise*** is already a live reality in the Maldives. It will be an existential threat to the young generation who will contend with the decisions made today.

All the protections provided by nature and human engineering may still not be enough if the world does not take the necessary urgent action to fight climate change. INITIAL: jb(aw)

**Load-Date:** April 4, 2022

**End of Document**



[***UNION MINISTER DR JITENDRA SINGH SAYS, RECENT SCIENTIFIC STUDIES HAVE PROJECTED A DECREASE IN ANNUAL RAINFALL FOR CHENNAI AT THE RATE OF 6.398 MM/YEAR DURING THE NEXT THREE DECADES (2020-2050)***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6540-5411-JCBF-S25F-00000-00&context=1516831)

States News Service

March 30, 2022 Wednesday

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**Length:** 295 words

**Byline:** States News Service

**Dateline:** NEW DELHI, India

**Body**

The following information was released by the Government of India:

The Minister also informed that it is expected that the ***sea*** ***level*** will continue to ***rise*** in the coming several decades

Posted On: 30 MAR 2022 5:14PM by PIB Delhi

Union Minister of State (Independent Charge) Science and Technology; Minister of State (Independent Charge) Earth Sciences; MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh said that r ecent scientific studies have projected a decrease in annual rainfall for Chennai at the rate of 6.398 mm/year during the next three decades (2020-2050). However, these results are based on projections using a single regional climate model and there are large uncertainties in projecting rainfall changes at regional / local scales.

In a written reply to a question in the Lok Sabha today, Dr Jitendra Singh said, the reduction in the projected rainfall would lead to reducing the recharge of the coastal aquifer and in addition to this, increased extraction of groundwater will also affect the coastal aquifers.

The Minister also informed that it is expected that the ***sea*** ***level*** will continue to ***rise*** in the coming several decades. As per the 6th Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC), relative to 1995-2014, the global mean ***sea*** ***level*** is expected to ***rise*** by 0.28 - 0.55 m under the very low greenhouse emission scenario (SSP1-1.9), 0.44 - 0.76 m under the intermediate emission scenario (SSP2-4.5) and 0.98 - 1.88 under the very high emission scenario (SSP5-8.5) by 2100. However, the regional ***sea*** ***level*** change can differ significantly from the global mean. The regional ***sea*** ***level*** ***rise*** estimate for the Chennai coast and its impact on freshwater aquifers have not yet been studied.

**Load-Date:** March 30, 2022

**End of Document**



[***UNION MINISTER DR JITENDRA SINGH SAYS, RECENT SCIENTIFIC STUDIES HAVE PROJECTED A DECREASE IN ANNUAL RAINFALL FOR CHENNAI AT THE RATE OF 6.398 MM/YEAR DURING THE NEXT THREE DECADES (2020-2050)***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6540-52G1-JCBF-S3YD-00000-00&context=1516831)

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**End of Document**



[***'It's happening now': how rising sea levels are causing a US migration crisis***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655N-3RC1-JBNF-W3DY-00000-00&context=1516831)

The Guardian (London)

April 7, 2022 Thursday 11:00 AM GMT

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**Section:** ENVIRONMENT; Version:2

**Length:** 2579 words

**Byline:** Max Ufberg

**Highlight:** The coming mass migration of flood-prone areas will have huge social and economic costs - but the government doesn't have an adequate plan

**Body**

***Sea*** ***levels*** have risen [*about 9in*](https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level#:~:text=Global%20mean%20sea%20level%20has,of%20seawater%20as%20it%20warms) since 1880, with one-third of that gain from the last 25 years alone. Every year, a flurry of reports are published warning of the risk to towns and cities along coastal areas.

It's one thing to hear about a looming disaster; it's another to see the cataclysm play out in real time. That's what's happening in Taholah, a village on Washington's coast that acts as the capital for the Quinault Indian Nation, a tribe of about 3,600 members. In Taholah, climate change-caused ***sea*** ***level*** ***rise*** has brought to the community a fast receding shoreline, and with it a heightened threat of flooding: according to Quinault estimates, the ocean level could [*increase by 2.6ft*](https://www.theguardian.com/environment/2021/apr/12/native-communities-quileute-tribal-school) by 2100, pushing storm surges higher and bringing waves closer to town.

On an overcast February morning, Larry Ralston, the 62-year-old treasurer of the Quinault Nation, drove his silver Ford SUV down a network of Taholah's unmarked gravel roads, telling me about what this place used to look like, before climate change permanently reconfigured the landscape.

Parked on a rock face overlooking the Pacific, he nodded toward a moss-covered boulder towering out of the water. As a kid in the 60s, Ralston said, he was able to trek by foot to the rock. And now? He reckons the water is 30ft deep. Back then the ocean didn't seem like a menace - at least not an existential one. That's no longer the case: some 660 Taholah residents who border the ocean now find themselves living in an increasingly dangerous flood zone. The only solution is for everyone - and everything - in the village to move uphill.

"We can see firsthand what's happening," Ralston told me. "There's no denying it."

\*\*\*

Taholah signals what's to come for coastal communities across the country.

Already, [*about 15 million American homes*](https://www.fastcompany.com/90722653/this-noaa-map-shows-how-your-neighborhood-will-flood-with-each-foot-of-sea-level-rise) are at risk of flooding, and the threat is only going to get worse. A [*report*](https://oceanservice.noaa.gov/hazards/sealevelrise/sealevelrise-tech-report.html) released in February by the National Oceanic and Atmospheric Administration (Noaa) projected that ***sea*** ***level*** along the US coastline would ***rise*** by 10 to 12in, on average, in the next 30 years - an uptick that would make damaging flooding occur 10 times more often than it does today.

"It's important to understand in these communities that ***sea*** ***level*** ***rise*** is happening now," said William Sweet, an oceanographer with Noaa's National Ocean Service and the country's top scientist studying ***sea*** ***level*** ***rise***. "Its impacts are happening now, and those impacts will grow worse in the next 30 years. Minor-nuisance flooding will be replaced by flooding that's more damaging to economies and to infrastructure."

That future could very well touch off a mass migration of people away from coastline and flood zones. Research published in 2020 in the journal PLOS One estimated that ***sea*** ***level*** ***rise*** could cause [*over 13 million Americans*](https://timesofsandiego.com/tech/2020/01/24/usc-rising-sea-levels-will-force-13-million-americans-to-relocate-inland/) to relocate inland by 2100 - an outcome with huge economic, social and political consequences.

Yet, even with the deluge of warnings, there is no centralized lifeline available to coastal communities. There are a number of federal programs designed to give assistance to such areas through government bodies like the Federal Emergency Management Agency and the Department of Housing and Urban Development (Hud), but those pots of money are far from adequate to tackle a problem of this scale. Some local governments have chosen to offer - and in a few cases mandate - buyouts to homeowners in vulnerable areas, who wind up dispersing. Others would prefer to keep the neighborhood intact - in Taholah's case, by moving the whole village.

In 2017, the Quinault Tribal Council adopted the [*Taholah Village Relocation Master Plan*](https://www.quinaultindiannation.com/planning/projectinfo.html) , which would move the lower enclave of the village about a half-mile uphill by 2030, where a new 200-acre development would offer flood-free land for over 300 housing units, a police station, a courthouse, a K-12 school and a museum, among other buildings. The initiative makes the Quinault [*among the first*](https://www.thearcticinstitute.org/wp-content/uploads/2017/09/The-United-States-Climate-Change-Relocation-Plan_2017.pdf) in the US - alongside communities in [*Louisiana*](https://www.theguardian.com/environment/2016/mar/23/native-american-tribes-first-nations-climate-change-environment-indican-removal-act) and [*Alaska*](https://www.theguardian.com/environment/2021/jun/08/it-was-sad-having-to-leave-climate-crisis-splits-alaskan-town-in-half) , among others - to voluntarily opt for a strategy of managed retreat away from impending climate threats.

To date, the council has been able to build a new administrative complex, a so-called generations building to house Head Start and senior programs, and approximately 150 homes - construction that is owed to a combination of US Department of Agriculture grants, Hud money and the tribe's own funds.

To pay for the rest, Ralston estimates they'll need an additional $200m - a daunting sum, especially considering the bipartisan infrastructure bill that was signed into law by Joe Biden last year provided just $130m to support relocation efforts for the [*574 federally recognized tribes*](https://www.federalregister.gov/documents/2021/01/29/2021-01606/indian-entities-recognized-by-and-eligible-to-receive-services-from-the-united-states-bureau-of) across the US.

According to the [*Department of Health and Human Services*](https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=3&lvlid=62) , there are roughly 5.7 million American Indians and Alaska Natives in the US, many of whom are on the frontlines of climate change. A multi-year study [*published*](https://www.science.org/doi/10.1126/science.abe4943) last year in the journal Science found that Indigenous nations in the US not only lost 99% of their historical land, but what relatively little they were eventually allotted are often more exposed to climate change hazards than their historical lands.

The Quinault Nation settled permanently on their 189,621-acre reservation - much of it conifer forest and [*unsuitable to farming*](https://www.u-s-history.com/pages/hl66.html) - in the 19th century, after a long and at times contentious negotiation with the Washington government and the Bureau of Indian Affairs. Though the allotted land was still a far cry from what was lost, the ocean provided a natural icebox for sockeye salmon (known as "blueback" among the Quinault peoples), a unique fish that is central to the Quinault identity, and is under threat due in part to ocean acidification and warmer waters.

"There's a parity between the Quinault people and the blueback," Ralston said as his SUV ambled past a large illustrated cutout of the salmon affixed to a lamppost. "We try to save our blueback, so we can save ourselves."

'I wanted this community'

Two weeks later and 2,400-some miles away from Taholah, I was in the Allen Field subdivision of Houston, Texas, talking with Dolores Mendoza, a 35-year-old mother of three. She is trying to figure out how to convince people in the neighborhood - many of whom are relatives - that the county's effort to remove them from their homes shouldn't be ignored.

Taholah and Harris county are a study in contrasts: the former, a cash-strapped program that, if successful, would keep a neighborhood intact; and the latter a messy but better-funded effort that will ultimately move people out of high-risk zones but tear a community apart.

I met Mendoza, who works as a credit controller at an inspection agency, on a chilly afternoon at her former home, a three-bedroom house that's just a stone's throw from the [*Greens Bayou watershed*](https://www.greensbayou.org/). Harris county bought the place in December, paying Mendoza a total of $300,000 for the property ($70,000 for the house and $230,000 to relocate). The sale was a coup for her, given that she paid $62,000 to buy the 1,200sq ft house in 2010. She's since moved to Kingwood, a wealthier neighborhood about 15 miles away.

That's not to say Mendoza was keen on leaving. She grew up in Allen Field, and, by her count, still has family living in 13 different nearby houses. "I wanted this community," she said. "It's not pretty to look at, but my family's here." It's only a matter of time before that's no longer the case.

As we walked through the beige-colored house, which had been ransacked and vandalized in the two months since its sale, Mendoza recalled how the place used to look when she and her three kids lived there. "This was mine," she said, gesturing toward a room that was empty except for the shards of glass littered on the floor. "I had my bed here. My makeup vanity here. My TV over here."

Harris county is a sprawling region of [*4.7 million people,*](https://www.census.gov/quickfacts/harriscountytexas) about [*half*](https://www.census.gov/quickfacts/houstoncitytexas) of whom live in Houston. Much like Taholah, it is caught in climate change's crosshairs. Hurricanes are becoming [*more common*](https://www.washingtonpost.com/weather/2019/09/20/flooded-again-climate-change-is-making-flooding-more-frequent-southeast-texasthanks-part-climate-change/) in the area, bringing with them enough rainwater to flood the state's bayou systems. Hurricane Harvey, which hit Houston in 2017 and took the lives of [*at least 88*](https://www.texastribune.org/2017/10/13/harveys-death-toll-reaches-93-people/) in Texas, was the third "500-year flood" within the last three years. Worse yet, the Texas coast has sunk about [*2ft*](https://undark.org/2021/06/14/texas-sized-effort-to-fend-off-rising-seas/) within the last century, due in part to excessive groundwater pumping, making the state more vulnerable to flooding.

But Harris county also bears a different distinction: it is the national leader in federally funded home buyouts, responsible for some 2,500 acquisitions, on top of 1,000 homes purchased by the Harris county flood control district with local funds. Since the 1980s, Fema has supported over 43,000 property buyouts in the US. That is well short of the [*3.63 million people*](https://www.inverse.com/science/flood-risk-spike#:~:text=Right%20now%2C%203.63%20million%20people,number%20even%20more%20%E2%80%94%20adding%206.) in the country who are likely to encounter flooding every year.

Until the last few years, buyouts in Harris county were all voluntary and favored affluent and white recipients, mirroring a [*national trend*](https://www.npr.org/2019/03/05/688786177/how-federal-disaster-money-favors-the-rich). In 2020, still reeling from Hurricane Harvey, the county secured funding through Fema and state agencies to introduce a new mandatory buyout program for around 400 mostly residential properties spread throughout eight areas.

It's estimated the mandatory program will affect about 2,000 people, about 13% of the local populace. In Allen Field, many of the homes that fall under the mandatory buyout guidelines are on Darjean Street, where Mendoza's family still lives.

Eligible homeowners in Allen Field - 86% of whom are non-white, according to [*census data*](https://harrisrecovery.org/buyout_interest_area_maps_and_profiles/) - say the buyout process has been confusing and inefficient.

Some residents were baffled when they first received a legalese-laden mailer explaining that they would have to sell their home to the government. Many in the area aren't fluent in English, making the flyers even more confusing. "There's a lot of red tape that makes it very difficult for families to figure out how to navigate the process," said Shirley Ronquillo, a local community activist who has helped residents navigate buyout programs.

Nor is it clear to many what their lives will look like when they move to a new neighborhood, which could be many miles away. According to a [*2019 study*](https://academic.oup.com/socpro/article-abstract/66/3/448/5074453?redirectedFrom=fulltext) published in the journal Social Problems, buyouts cause more significant erosion to the social fabric of communities with lower-value homes and Black and brown residents, in large part because they're forced to move farther away to find affordable housing. (The community services department spokesperson said the program assigns to anyone in the buyout program a relocation specialist to "provide referrals to community resources and organizations to provide further assistance to residents".)

There's also an issue of protraction. "It still takes Harris county over two years to close on the average property," said Rob Moore, a senior policy analyst with the Natural Resources Defense Council, an environmental advocacy group. Some people, tired of waiting for the government, sell their homes to exploitative speculators, often for [*far less*](https://e360.yale.edu/features/as-climate-risks-worsen-u.s.-flood-buyouts-fail-to-meet-the-need) than they'd make in a buyout program.

'Why are they being asked to leave?'

While Taholah is a better organized effort, it's also, paradoxically, a less wellfunded one.

"Unfortunately, the limited federal resources available are even less accessible to tribal communities," said Washington representative Derek Kilmer, who worked to secure $500,000 for the Quinaults' relocation efforts in the fiscal year 2022. Kilmer also sponsored the [*Tribal Coastal Resiliency Act*](https://www.congress.gov/bill/117th-congress/house-bill/1415/text#:~:text=To%20amend%20the%20Coastal%20Zone,%E2%80%9CTribal%20Coastal%20Resiliency%20Act%E2%80%9D.) , which would provide further support to Indigenous communities on coastal issues.

Any additional funding would probably come through the housing, commerce or interior departments, or the Federal Emergency Management Agency - all of which are in the process of [*creating or revamping relocation programs*](https://www.nytimes.com/2020/08/26/climate/flooding-relocation-managed-retreat.html). But getting money to a community as small as Taholah, where the median household income is [*about $32,000*](https://datausa.io/profile/geo/taholah-wa/) , can be a challenge. "Fema repeatedly told us that these competitive funds are based on numbers, not on need," said Ralston, the Quinault treasurer. "Hurricane Katrina affected a quarter million people. Hurricane Taholah only affects 850 people. So, where are you going to put your money?"

The Quinault Nation applied for two additional grants through Fema in 2020, totaling about $126,000,000. A Fema spokesperson wrote in an email that both applications were selected for review. "We anticipate the planning grant to be awarded soon."

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Taholah's lower village features rows of houses - many of them modest and worn - alongside a gym, a seafood wholesaler, a community center, a gas station-cum-deli, and a few other businesses. Many homes have boats scattered unceremoniously on their yards. There's a 10ft seawall separating the town from the Pacific, though it's been [*breached*](https://www.seattletimes.com/seattle-news/environment/this-tribe-has-lived-on-the-coast-of-washington-for-thousands-of-years-now-climate-change-is-forcing-it-uphill/) repeatedly in the last few years, despite repeated improvements by the army corps of engineers. "We used to get flooding in the lower village every three to five years," Ralston said. Now it's every year."

Ralston told me about his plans to commemorate the place they'll leave behind. He imagines a park, well-maintained and accessible to the public, with fruit trees and picnic benches. "Just to memorialize the families that used to live here," he said before letting out a quiet sigh. "Obviously that may not happen for a while. It's just a vision."

In Allen Field, Mendoza says that the memory of Harvey - and the lack of government support in the wake of the hurricane - left a bad taste. Harvey hit low-income and non-white areas like Mendoza's [*hardest*](https://archive.thinkprogress.org/hurricane-harvey-hit-low-income-communities-hardest-6d13506b7e60/) , thanks to crumbling infrastructure and insufficient flood control measures.

Ronquillo, the community activist, offered a more scathing critique: "You have a government entity coming in and saying, 'you have to leave.' Why are they being asked to leave? Because there was years of negligence, lack of support in our communities of color," she said.

"Harvey was terrifying," Mendoza said. "I was here by myself with my kids. I didn't even know how we were going to get out." Help never came from the government; it was her brother-in-law, riding in on a hot-wired boat, who rescued Mendoza and her children.

Mendoza waited for a year and half until the county could make good on its offer. She said she was told by the county not to spend money on repairs since she was going to be offloading the asset anyway. "They don't want us to repair our houses, so we have leaking roofs, broken pipes, electrical problems." (The community services department spokesperson said the county "encourages the homeowner to make repairs in the cases where by not making the repair a person's health and safety are endangered".)

After leaving her house, Mendoza and I walked for a few minutes along the banks of Greens Bayou, where she reflected on her new life. The new house is great, she says. As is the kids' school. But she still feels like a stranger. "I've seen my grandma twice since I moved," she said. "Usually I'd see her every day, checking the mail when I'd go pick up the kids for school. Now we don't have that community. I don't know my neighbors."

At that moment a pair of adolescent boys ran by us, each one gripping a large ice cream shake. Mendoza knows the boys well; they're close with her family. "It's cold," she said to them with a laugh. "Y'all should have your jackets on."

**Load-Date:** April 7, 2022

**End of Document**



[***Shipyard 'set to flood' due to impact of climate change***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6540-4FB1-F0JC-M1BK-00000-00&context=1516831)

The Mail

March 30, 2022 Wednesday

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**Length:** 347 words

**Byline:** [*Dan Taylor*](http://Dan Taylor)

**Body**

BARROW'S shipyard is at 'very great' risk of flooding\xC2in the near future, according to a report.\xC2

Findings by the Nuclear Consulting Group suggest\xC2BAE's shipyard would be left 'profoundly vulnerable' to\xC2flooding from ***sea***-***level*** ***rises*** due to the impact of climate change.\xC2

It claimed the shipyard was among nine nuclear sites that are threatened by the possibility of increased rainfall and a ***rise*** in ***sea*** ***levels***.

The report is based on models predicting ***sea*** ***levels*** in\xC22050 following the effects of climate change.\xC2\xC2\xC2

The Government and BAE bosses have stressed sites like the shipyard are prepared for the potential effects of climate change.

Writing in the report Dr Paul Dorfman, the chair of the Nuclear Consulting Group think tank, said:\xC2"Present UK coastal military nuclear infrastructure is profoundly vulnerable to flooding from ***sea***-***level*** ***rise***, storm intensity and storm surge \xE2 with inland nuclear facilities also facing inundation and flooding.

"Ministry of Defence and nuclear regulatory mitigation efforts will become obsolete, and sooner than planned.

"In other words, UK nuclear military bases are set to flood."

The next generation of Trident nuclear submarines are being built in Barrow, alongside the Astute hunter-killer boats.

And raising concern about the shipyard, Dr\xC2Dorfman warned: "Despite the key role the shipyard plays in the UK nuclear military enterprise, climate change (even in lower-mid range projections) will challenge the utility and viability of the facility due to the combined impact of future ***sea***-***level*** ***rise***, storm surge and flooding."

A Royal Navy spokesperson said: \xE2We are aware of the content of this report, which is based on a worst case scenario.

"The Ministry of Defence is not complacent when planning against any emerging threats, including the potential effect of climate change, for all our capabilities.\xE2

A spokesman for BAE said: "Alongside our partners, we constantly review the range of robust plans that are in place to deal with any emerging threats, including the potential threat of climate change."

**Load-Date:** March 30, 2022

**End of Document**



[***Cities Around the World That Will Soon Be Underwater***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655T-J6J1-JCMN-Y41G-00000-00&context=1516831)

Newstex Blogs

24/7 Wall St.

April 7, 2022 Thursday 11:10 PM EST

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**Length:** 690 words

**Byline:** Mike Sauter

**Body**

Apr 07, 2022( 24/7 Wall St.: [*http://www.247wallst.com*](http://www.247wallst.com)/ Delivered by Newstex)

Special Report

***Sea*** ***level*** ***rise*** is one of the most serious problems facing humans as a result of climate change. ***Rising*** waters cause and may result in the loss of land if levels continue to ***rise***. All around the world, low-lying areas are at risk. By the end of this century, land currently home to 200 million people will likely be permanently below the high tide line.

Because of the economic benefits associated with access to water — shipping, arable soil, fisheries, tourism, and recreation — dense urban areas have long been concentrated along coastal regions. Today, about 40% of the world's population live within 60 miles of the coast.

As the climate crisis intensifies, however, coastal living has become a major liability. Global ***sea*** ***levels*** are projected to ***rise*** between 2 and 7 feet by 2050, and possibly more. By the end of the century, ***sea*** ***levels*** could ***rise*** as much as 20 feet. In this scenario, the United States alone would lose nearly 50,000 square miles, which today are home to 23.4 million people.

Frequent flooding is one of the first problems associated with ***sea*** ***level*** ***rise***.

24/7 Wall St. used data from Climate Central — an independent organization of scientists and journalists researching and reporting on climate change — to identify 25 major metropolitan areas and urban agglomerations worldwide that are projected to be at risk of substantial flooding by 2050 as a result of ***sea*** ***level*** ***rise*** due to climate change. The data assembled by Climate Central is documented in the report, 'New elevation data triple estimates of global vulnerability to ***sea***-***level*** ***rise*** and coastal flooding[1].'

These projections are near the high end of the range of ***sea*** ***level*** futures anticipated by the scientific community. We elected to concentrate on the high-risk scenario because, while there are still steps the world can take to address the problems of climate change, the world is not on track to meet even the more modest milestones outlined in the Paris Agreement.

While most of the cities on this list are in Asian nations, the United States is still at substantial risk for coastal flooding. Two of the cities selected for our list are in the United States, and many coastal cities and towns are at risk from flooding and coastal erosion. Here are 30 American beaches that may soon disappear.[2]

Click here to see 25 cities around the world that will soon be underwater[3] Click here to see our full methodology[4]

[ 1]: [*https://www.nature.com/articles/s41467-019-12808-z*](https://www.nature.com/articles/s41467-019-12808-z) [ 2]: [*https://247wallst.com/special-report/2019/12/17/30-popular-beaches-at-risk-of-disappearing-due-to-erosion/*](https://247wallst.com/special-report/2019/12/17/30-popular-beaches-at-risk-of-disappearing-due-to-erosion/) [ 3]: [*https://247wallst.com/special-report/2022/04/07/cities-around-the-world-that-will-soon-be-underwater-3/2/*](https://247wallst.com/special-report/2022/04/07/cities-around-the-world-that-will-soon-be-underwater-3/2/) [ 4]: [*https://247wallst.com/special-report/2022/04/07/cities-around-the-world-that-will-soon-be-underwater-3/7/*](https://247wallst.com/special-report/2022/04/07/cities-around-the-world-that-will-soon-be-underwater-3/7/)

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**Load-Date:** April 7, 2022

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[***Library event focuses on local author’s warning about sea levels***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:656Y-7J91-DXVP-V3TX-00000-00&context=1516831)

Pacifica Tribune (California)

April 12, 2022

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**Section:** OPINION

**Length:** 466 words

**Byline:** Clay Lambert

**Body**

For years, decades actually, people around the world have known about the dangers of climate change and ***sea*** ***level*** ***rise*** and largely chosen to ignore our collective fraught future. There are a number of reasons for that willful denial. One of them is that it's sometimes difficult to picture what is just over the horizon.

Enter Coastsider Christina Conklin and her seaweed.

Conklin is the co-author, along with sustainability expert Marina Psaros, of "The Atlas of Disappearing Places." She and her book, which was published last year, are the focus of a special virtual discussion facilitated by the San Mateo County Library system. Conklin will talk about the book, the environment and our opportunities to save ourselves at 6:30 p.m. on April 20. (Registration is required. Visit smcl.org and click the Events tab to navigate to the discussion. At last check, the Half Moon Bay branch also had free copies of the hardcover book for the taking.)

There are many resources for those wishing to learn about ***sea*** ***level*** ***rise***. It can be tough reading partly because the topic is complex. A Google search returns hundreds of seemingly contradictory results from an array of sources, some more reliable than others.

Conklin and Psaros find a way through the thicket by organizing their colorful, coffee-table-sized book into four parts: "Changing Chemistry," "Strengthening Storms," "Warming Waters" and "***Rising*** Seas." They find examples from around the world, from the Bay Area to Bangladesh, to explain how a ***rising*** sea is affecting people and the planet. It's relatable science for non-scientists.

The highlight may be that seaweed. Conklin, who is an artist, writer and researcher, told Review staff writer Emma Spaeth that the memorable maps in the book began with a trip to Pillar Point Harbor. She developed an ink-on-dried-seaweed technique to illustrate current and future effects of ***sea*** ***level*** ***rise***, and the images are illuminating.

The National Oceanic and Atmospheric Administration recently reported U.S. residents can expect as much as a foot of ***sea*** ***level*** ***rise*** over the next 30 years. There are estimates that 13 million Americans will need to flee coastal areas for more inland living arrangements by 2100. The Guardian published a story last week detailing how that migration has already begun right here in the United States.

Yet we continue to act as if climate change is a problem for our grandkids. It will be, of course, but we can work now to mitigate their pain.

Conklin nods to our descendants in the book's dedication. "To the ocean, and all the people acting bravely to change the story of our fragile, fluid planet. And to the readers who find this in a used bookstore in 50 years and do what is needed next."

It is also incumbent upon us all to do what is needed now.

Clay Lambert

**Load-Date:** April 13, 2022

**End of Document**



[***Library event focuses on local author’s warning about sea levels***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6574-W2S1-DXVP-V466-00000-00&context=1516831)

Half Moon Bay Review (California)

April 13, 2022

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**Section:** EDITORIALS

**Length:** 463 words

**Byline:** Clay Lambert

**Body**

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It is also incumbent upon us all to do what is needed now.

**Load-Date:** April 14, 2022

**End of Document**



[***Survey: Majority of Louisiana residents say coastal land loss will harm the state***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:657M-G531-JBSN-3047-00000-00&context=1516831)

The Reveille: Louisiana State University

April 15, 2022 Friday

University Wire

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**Section:** NEWS; Pg. 1

**Length:** 705 words

**Byline:** Piper Hutchinson

**Body**

Most Louisiana residents think that coastal land loss will harm the state as a whole, according to the latest installment of the Louisiana Survey from the Reilly Center at LSU.

The report, the second installment in a six-part series of the Reilly Center's Louisiana Survey, shows that while a majority of Louisianians believe that land loss will hurt the state, just half believe that it will affect them personally.

Among the report's findings:

* 85% of residents believe land loss will cause a great deal or moderate amount of harm to Louisianans living along the coast. Nearly three quarters said it will cause harm to the state as a whole.

1. About 85% said land loss poses a threat to future generations of Louisianans, while 63% said that it would harm their own generation.
2. In total, half of respondents believe land lost will harm them personally. That percentage is higher for coastal residents, with 70% of residents saying they will be personally affected by it.

The Louisiana Survey results are based on responses from 508 adult Louisiana residents who were surveyed from Feb. 21 to March 14.

A combination of natural sinking, subsidence from the Mississippi River's inability to replenish its sediment deposits and ***sea*** ***level*** ***rise*** via climate change has resulted in the state losing over 2,000 square miles of coastal land since the 1930s, according to the Restore the Mississippi River Delta project.

Those combinations and future ***sea***-***level*** ***rise*** projections put Louisiana in a uniquely unfortunate position. The Gulf Coast is projected to see 14-18 inches of ***sea*** ***level*** ***rise*** by midcentury, with Louisiana and Texas seeing the worst of it, according to the National Oceanic and Atmospheric Association's 2022 ***Sea*** ***Level*** ***Rise*** Technical Report.

+2

US coast to see century's worth of ***sea*** ***level*** ***rise*** by 2050. Louisiana projected to see worst of it

In the next 30 years, ***sea*** ***levels*** along U.S. coastlines are projected to ***rise*** by the same amo...

The survey indicated that a majority of residents support elevation requirements for new construction to avoid flooding but did not support paying to renovate current structures.

Nearly 90% support elevation requirements for new construction in flood-prone areas and 62% support paying owners to elevate existing buildings in this area. Opinion is very closely divided about requiring property owners to elevate without mentioning paying them to do so.

Public opinion is also almost evenly split about paying residents to move out of areas at high risk of flooding and prohibiting new construction.

A majority did say that they oppose raising insurance rates for those in flood prone areas.

Most Louisianians also said that they think hurricanes are getting stronger and more frequent.

Nearly 70% of respondents said hurricanes hitting Louisiana are stronger than those in the past, while 62% said that the number of hurricanes impacting the state has increased.

The report notes that there is a significant regional variation in these responses, with residents in the southern half of the state increasingly concerned about more damaging hurricanes.

Nearly three quarters of respondents in metro New Orleans said hurricanes are stronger. As you move north, that number shrinks. Sixty-eight percent of those in metropolitan Baton Rouge agreed, but in north Louisiana, the share falls to 56%.

Climate experts say heavy rainfall, hurricanes and the flooding they bring will become more severe on average as the planet warms.?Hurricanes won't necessarily become more frequent, however, since the conditions that give ***rise*** to cyclones are complicated.

Some models suggest warming since the industrial revolution has already aggravated previous natural disasters in the country, including in Louisiana.

While most think that hurricanes are stronger and more frequent than in the past, fewer said that flooding in their community is more common than in the past.

Less than half of respondents said flooding in their local community is more common. The report notes that there are regional differences in responses on this question as well.

68% of those in the Baton Rouge area said that flooding has increased, while 43% of those in New Orleans agreed. Just 26% of respondents in north Louisiana said the same.

**Load-Date:** April 16, 2022

**End of Document**



[***The Ocean Is Coming for Homes. That’s Not Priced In.***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6551-N6S1-JBKS-P0KN-00000-00&context=1516831)

Wealth Management

April 4, 2022

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**Length:** 816 words

**Byline:** Bloomberg

**Body**

(Bloomberg Opinion) -- The ***rise*** in ***sea*** ***levels*** is on track to increase highly destructive flooding fivefold in the U.S. by 2050, but a new study of home prices in coastal Florida suggests buyers are oblivious or indifferent to the risk. Governments need to take action to ensure that everyone has the right information about this critical threat.

Freddie Mac researchers led by Ajita Atreya found that homes directly exposed to projected ***sea***-***level*** ***rise*** command no discount over those that aren’t. There were discounts for homes in designated flood plains, but that’s probably to offset the cost of flood insurance they must carry if financed with a government-backed mortgage rather than future ***sea***-***level*** risk. The findings hold true for investment properties in addition to those bought as primary residences.

In all, the market’s willingness to look past ***sea***-***level*** risk amounts to a dangerous oversight. About 40% of the U.S. population lives in coastal counties, according to the National Oceanic and Atmospheric Administration, and NOAA researchers now project an average of 10 to 12 inches of ***sea***-***level*** ***rise*** by 2050, even if the world manages to cut greenhouse gas emissions before then.

Yet many buyers are clearly lacking important information. Florida and many other states don’t even require sellers to disclose past floods, let alone tell buyers that a home faces sea-***rise*** risk. In a ranking from the Natural Resources Defense Council’s website, Florida is among 21 states that receive an “F" in flood disclosure, meaning there’s no statutory or regulatory requirement for flood disclosure at the time of sale. Even in the states that require disclosure, they often come at the 11th hour, when buyers are signing stacks of closing documents, according to Michael Gerrard, director of the Sabin Center for Climate Change Law at Columbia Law School. Renters typically get fewer protections than buyers.

As the Freddie Mac study showed, insurance premiums do influence behavior: Buyers in designated flood zones tend to discount property values. Unfortunately, the government’s flood zones still don’t consider the future impacts of ***sea***-***level*** ***rise***. Not having forward-looking flood maps “is like driving a car only looking into your rearview mirror," Joel Scata, a water and climate attorney with the NRDC, told me. Understandably, politicians and their constituents often fight flood-plain designations out of concern they will depress the value of properties in their area. Government leaders in vulnerable states and municipalities should instead take the long view: accurate, forward-looking maps would encourage needed mitigation efforts.

Clearly, there have been some positive developments on addressing the so-called information asymmetries in flood risk for real estate. Realtor.com and Redfin Corp. have teamed up with nonprofit First Street Foundation to provide flood risk ratings for properties on their websites, and First Street’s founder Matthew Eby said he would like to extend the resource to more government entities. “We’re just trying to get people the information so that everyone is on the same playing field," he told me by phone on Thursday. Meanwhile, Hawaii is set to become the first state to require sea-***rise*** disclosures, effective on May 1. Others should follow suit.

Of course, disclosure laws alone aren’t a solution to the world’s climate problems. “It’s very low hanging fruit, and yes it’s important," Abigail Fleming, an environmental justice lawyer and University of Miami School of Law professor, told me this week. As she pointed out, flood disclosures may also have adverse effects on housing prices for low- and middle-income households, some of which aren’t in vulnerable areas by choice but because they have no other options. That’s why climate action plans should combine disclosure requirements with mitigation efforts, voluntary home buyouts in vulnerable areas, relocation assistance and general education on flood risk that reaches people before they’re about to buy or rent a home.

Even then, some parts of the housing market are likely to keep ignoring reality. As a Florida resident, I’ve seen firsthand how many homebuyers conclude (correctly or not) that their investment horizon is short enough that ***sea***-***level*** ***rise*** won’t matter. It’s also possible that near-term supply-demand dynamics are overwhelming analyses of the area’s long-term prospects. Like other parts of the Sun Belt, Florida is experiencing an influx of new arrivals seeking year-round warm weather, nice beaches and a vibrant culture. The real estate taxes they pay may ultimately help communities adapt to the challenge of ***sea***-***level*** ***rise***, but it’s important first that everyone acknowledge the size and scope of the problem — and that includes the housing market.

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**Load-Date:** April 4, 2022

**End of Document**



[***Coastal home buyers are ignoring rising flood risks, despite clear warnings and rising insurance premiums***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:652X-P2B1-JB75-90CF-00000-00&context=1516831)

The Conversation - United States

March 25, 2022 Friday 12:21 PM EST

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**Length:** 1177 words

**Byline:** Risa Palm, Professor of Urban Studies and Public Health, Georgia State University

**Highlight:** We asked 680 Florida real estate agents what they're seeing in the market. Here's what they said.

**Body**

Apollo Beach, Florida, is a maze of canals lined with hundreds of houses perched right near the water's edge. The whole community, just south of Tampa, is only about 3 feet above ***sea*** ***level***, meaning it's at risk from storm surge as ***sea*** ***levels*** ***rise***.

Homebuyers along the U.S. coasts can check each property's flood risk as easily as they check the size of the bedrooms - most coastal real estate listings now [*include future flood risk details*](https://theconversation.com/new-flood-maps-show-us-damage-rising-26-in-next-30-years-due-to-climate-change-alone-and-the-inequity-is-stark-175958) that take climate change into account. In Apollo Beach, for example, many of the properties are at least 9 out of 10 on the flood risk scale.

That knowledge isn't stopping homebuyers, though.

Waterfront homes are [*selling within days*](https://www.redfin.com/city/21199/FL/Apollo-Beach/housing-market) of going on the market, and the same story is playing out [*all along the South Florida coast*](https://business.fau.edu/newsroom/press-releases/2022/top-overvalued-metro-housing-markets.php) at a time when [*scientific*](https://theconversation.com/what-drives-sea-level-rise-us-report-warns-of-1-foot-rise-within-three-decades-and-more-frequent-flooding-177211) [*reports*](https://theconversation.com/new-flood-maps-show-us-damage-rising-26-in-next-30-years-due-to-climate-change-alone-and-the-inequity-is-stark-175958) [*are warning*](https://theconversation.com/high-tide-flood-risk-is-accelerating-putting-coastal-economies-at-risk-164481) about the ***rising*** risks of coastal flooding as the planet warms.

We are professors of [*urban geography*](https://scholar.google.com/citations?user=d7a2JDMAAAAJ&hl=en) and [*American politics*](https://scholar.google.com/citations?user=JKXl2AYAAAAJ&hl=en) who follow the real estate industry. To understand why people are ignoring a risk that could lead to expensive damage and eventually lower their property value, we talked to hundreds of Florida real estate agents about their clients' motivations and concerns.

Here's what we learned.

**Nothing pushes buyers to consider long-term risk**

We surveyed 680 licensed Florida Realtors in late 2020. Their [*responses suggest*](https://doi.org/10.1007/978-3-030-88435-2_1) that prospective homebuyers, by and large, are not taking elevation or flood vulnerability into account when searching for new homes, and the availability of detailed flood risk maps has had little or no impact on them.

Part of the problem may be that mortgage lenders and appraisers aren't accounting for properties' vulnerability to ***sea*** ***level*** ***rise***, so homebuyers aren't immediately feeling the risk in their pocketbooks. Wealthier buyers who don't need a mortgage [*aren't required*](https://money.com/flood-insurance-cost-2021/) to purchase flood insurance, and Congress has a [*history of rolling back*](https://doi.org/10.1007/978-3-030-88435-2_1) flood insurance rate increases.

In short, nothing is forcing buyers to consider the long-term risks.

At the same time, studies are clearly showing how risks translate into costs. One recent paper by scientists who create flood risk maps found that Hillsborough County, Florida, home to Apollo Beach and Tampa, is likely to see a [*70% increase*](https://theconversation.com/new-flood-maps-show-us-damage-rising-26-in-next-30-years-due-to-climate-change-alone-and-the-inequity-is-stark-175958) in annual flood damage by 2050 because of climate change. That's less than a 30-year mortgage away.

**What real estate agents are hearing**

We reasoned when we [*started the survey in 2020*](https://doi.org/10.1007/978-3-030-88435-2_1) that if some segment of the population was avoiding property at risk of flooding, then demand should decline and prices should fall. Our [*previous survey in 2018*](https://doi.org/10.1007/978-3-030-32602-9), involving coastal Florida homeowners, had found that Republicans and Democrats alike believed that their future home values would not be affected by ***rising*** seas.

To test the theory that the market is largely ignoring flood risk, we asked real estate agents what they saw: To what extent had they observed house prices either falling or not ***rising*** as rapidly for properties at risk of flooding? Forty-five percent reported "not at all." Only 11 of the 680 agents indicated that house prices for properties at risk of flooding were "very frequently" stagnating or falling.

We also asked if they had seen mortgage lenders declining loan applications or increasing charges for loans in flood-prone areas, in the form of points or mortgage insurance, for example. Sixty percent said, "not at all," and only 7% said "somewhat frequently," "very frequently" or "all the time."

The vast majority of agents, almost 70%, said they expect little impact on the property market in the next five to 10 years.

Here's some of what they said.

"People are and will still buy in the coastal areas of Florida, and if they are buying, there will be no decrease in value. The largest pool of buyers driving market are retired or soon to be retired people and they have the belief that they will be long gone before there is any impact from climate change. They mainly are buying on emotion and not factoring in the long-term cost of ownership. They are also buying with cash and no mortgage."

Even lenders currently have no real incentives to decline mortgage applications for properties at risk from future ***sea*** ***level*** ***rise***. Federal agencies that purchase conforming mortgages [*do not currently require*](https://doi.org/10.1007/978-3-030-88435-2_1) the collection of information about flood risk or likely ***sea*** ***level*** ***rise***. If these requirements were to change, then flood risk would be translated into lending decision.

"Buyers of coastal properties are financially able to be more risk-oblivious and can afford the higher rate for insurance or be self-insured. ***Sea***-***level*** ***rise*** is not currently top-of-mind in our local market."

Federal flood insurance has been heavily subsidized by U.S. tax dollars for years. In fact, the National Flood Insurance Program owes the U.S. Treasury [*about $20 billion*](https://sgp.fas.org/crs/homesec/R44593.pdf) for expenses exceeding the premiums homeowners pay. As of April 1, 2022, [*all of its new and renewed flood insurance policies*](https://www.fema.gov/flood-insurance/risk-rating) will be subject to a [*new pricing system termed Risk Rating 2.0*](https://www.fema.gov/flood-insurance/risk-rating%5D(https://www.fema.gov/flood-insurance/risk-rating) designed to take risk into account.

But the program [*faces political pressure from members of Congress*](https://www.nytimes.com/2021/03/18/climate/chuck-schumer-fema-flood-insurance.html) to ensure rates do not ***rise*** too quickly or get too high. Further, buyers who purchase houses for cash, a relatively large part of the market in South Florida, are not subject to flood insurance requirements.

"Wealthy people will still be enamored by the idea of living in front of the sea, but they will probably spend a lot of money making the property more resilient to the effects of ***sea***-***level*** ***rise***. This means that maybe the demand for high end properties will not weaken so much."

A few agents suggested that wealthy homeowners are taking the risks seriously and plan to invest in structural changes [*such as elevating homes*](https://help.floodfactor.com/hc/en-us/articles/360049475913-Consider-elevating-your-home) that could make their properties safer from ***sea*** ***level*** ***rise*** and storm surge.

**The market isn't integrating long-term risks**

Because of [***rising******sea******levels*** *and storm risks*](https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_CrossChapterPaper2.pdf) resulting from climate change, we conclude that many of the houses currently being sold in south Florida will not outlast their 30-year mortgages without damage or expensive adaptations, and that the resale of houses vulnerable to ***sea*** ***level*** ***rise*** is very likely to become [*increasingly difficult*](https://doi.org/10.1007/978-3-030-88435-2_1%22%22).

Florida policymakers to date have either ignored the risk or have taken only limited measures to patch weaknesses, sometimes increasing the risks elsewhere. For example, when [*sea walls*](https://www.orlandosentinel.com/opinion/os-ed-florida-without-beaches-blame-seawalls-20170925-story.html) are erected, they can change how sand washes in, increasing erosion in neighboring areas.

Many people believe "the market" will take care of this issue: that homebuyers, recognizing the looming risks, will discount prices on vulnerable properties, eventually reducing their attractiveness and value. But what we heard from Florida real estate agents casts doubt on the assumption that the market has yet integrated this risk.

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**The authors do not work for, consult, own shares in or receive funding from any company or organisation that would benefit from this article, and have disclosed no relevant affiliations beyond their academic appointment.**

**Load-Date:** March 25, 2022

**End of Document**



[***Lyttelton area first to have climate plans***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655N-VW51-JCBN-V0GD-00000-00&context=1516831)

The Press (Christchurch, New Zealand)

April 8, 2022 Friday

Print Edition

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**Section:** NEWS; NATIONAL; Pg. 11

**Length:** 414 words

**Byline:** Tina Law

**Body**

Whakaraupo Lyttelton Harbour will be the first area in Christchurch to go through climate change planning as the city council works to tackle the effects of ***rising*** ***sea*** ***levels***.

Christchurch City Council yesterday approved guidelines for adapting existing areas following extensive consultation carried out late last year.

It will consider five options when adapting areas to cope with the effects of climate change, including retreating from coastal areas and trying to keep the water at bay by building seawalls or stopbanks.

Continuing to live in areas is another option, as is living with the hazard while adapting buildings and infrastructure to cope. Not moving into the way of the hazard in the first place is another option, but that is too late for some areas.

Scientists predict New Zealand will experience about 30 centimetres of ***sea*** ***level*** ***rise*** by 2050, 50cm by 2075 and 1 metre by 2115.

A coastal hazards assessment conducted for the council by Tonkin and Taylor indicated a 1.5 metre ***sea*** ***level*** ***rise*** would result in about 26,500 properties across the city and Banks Peninsula experiencing coastal flooding, erosion and ***rising*** groundwater.

Instead of tackling issues city- wide at the same time, the council decided in 2020 to separate the city into seven groupings covering 23 communities. It will start with the Whakaraupo Lyttelton Harbour area, which includes Charteris Bay, Teddington, Allandale, and Governors Bay.

The council yesterday also appointed a coastal panel, which would be made up of community and runanga representatives, to work with the council throughout the process.

Council head of planning and consents John Higgins said the process would begin in spring.

An earlier start was anticipated, but the high rates of Covid- 19 created challenges for a process that involved important face-to- face meetings with runanga, the coastal panel and the wider community, he said.

The process was expected to take about 18 months. No decisions have been made yet on the next area to go through the process.

The last time the council tried to tackle the impact of ***sea*** ***level*** ***rise***, in 2015, it triggered widespread outrage. The issue was thrust upon communities as part of a fast-tracked district plan review forced on the council by the Government.

Following the public outcry, the Government allowed the council to deal with the impact of climate change through its normal processes. This time the council is taking time to consult widely before developing any proposed changes.

**Load-Date:** April 7, 2022

**End of Document**



[***Global flood losses hit $82bn last year***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6552-WSM1-JCV0-21VT-00000-00&context=1516831)

The Mercury (South Africa)

April 5, 2022 Tuesday

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**Section:** METL; Pg. 2

**Length:** 247 words

**Body**

Flooding cost the global economy more than $82 billion (R1.2 trillion) last year, accounting for nearly a third of all losses from natural catastrophes, reinsurance agency Swiss Re Institute has reported.

A new study in the journal Nature found that stormy seas around Scotland and northern England have unleashed an increasing number of extreme storm surges in recent decades.

“Floods affect nearly a third of the world population, more than any other peril,” said Martin Bertogg, head of catastrophe perils at Swiss Re, in a statement. In 2021, there were more than 50 severe flood events across the world, often triggered by extreme rainfall and coastal storm surges.

Scientists long thought that more severe flooding along low-lying coastlines was driven only by the world’s ***rising*** ***sea*** ***levels***, caused by climate change melting polar ice and warming ocean waters so they expand.

But scientists found that, in northern areas of the UK, stronger and more frequent storms over the North Atlantic since 1960 led to more extreme storm surges, according to the Nature study released last week.

The increased storm activity was as much to blame for the increase in extreme storm flooding as was ***sea*** ***level*** ***rise***.

“Most countries assume that the likelihood of surge extremes will remain the same and only account for ***sea*** ***level*** ***rise***,” said lead author Francisco Calafat at the National Oceanography Centre in the UK. This may cause governments to underestimate future flooding, he said. | Reuters

**Load-Date:** April 4, 2022

**End of Document**



[***Opinion: How the environmental movement might die. What that means for Cape Cod.***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:657Y-Y5R1-JCMC-W3B0-00000-00&context=1516831)

Cape Cod Times

April 15, 2022 Friday

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**Section:** RENEWABLE ENERGY NEWS & CLIMATE CHANGE NEWS

**Length:** 832 words

**Byline:** Lawrence Brown

**Body**

A brand-new UN climate warning has just been issued. The planet is heating up. Parts of the Antarctic have seen temperatures 70 degrees warmer than average. Very soon, we’ll pass the point when – whatever we do – consequences will rain down on the planet, maybe for centuries. We’ve needed real commitment and are still waiting.

For a little while, it seemed we might collect the national will to replace fossil fuels with renewable energy. Consider the advantages. We’d be independent of any nation’s petroleum forever. The Middle East… anybody.

Then Russia invaded Ukraine. Suddenly it was made clear that Europe could no longer be dependent on Russian oil and gas. What had long been considered strategic speculation suddenly became fact. Who can fill that huge appetite for energy? Maybe the Middle East could, but Europe would still run the risk of instability or extremism cutting their supply. No, the only really dependable and friendly source is the United States.

[*Link to Image*](https://www.gannett-cdn.com/presto/2022/01/31/NCCT/3fd2578f-0af0-4764-8df8-f9e25a6023cc-brown.jpg)

It will take years for Europe to build the seaport infrastructure to handle all that natural gas and distribute it. But if, as it seems, we’ve entered a new Cold War, it will be a strategic necessity to do it. Banks will cough up the big loans. As a result, the fossil fuel industry will get a new lease on life that will last for decades.

Here’s why this matters to places like Cape Cod. The most immediately endangered communities to ***sea***-***level*** ***rise*** are the shallow coastlines like New Orleans or Bangladesh, or peninsulas and island archipelagos. We’re on that list.

America faces a collision of two goods: protect the European democracies, and ourselves, from tyranny – or turn the climate crisis around before we, our children and grandchildren are forced to live under continually degrading conditions. One problem must be dealt with now. The other threatens us long term.

**More:** [*Mass. Senate hopes to pass climate resiliency, offshore wind legislation by Earth Day*](https://www.capecodtimes.com/story/news/2022/04/08/cape-cod-ma-senate-hopes-pass-climate-change-offshore-wind-bill-by-earth-day/9471368002/)

We’ll supply the oil and gas; we’ll open the ground and take it out. Petroleum lobbies will raise their voices and dish out the money. It will be irresistible. And necessary.

We’ll pay for it out here on the Cape. Google "***sea***-***level*** ***rise*** on Cape Cod, how vulnerable are we?" It’s technical, but you can’t miss what they’re saying. Then Google “[*www.capecodcommission.org*](http://www.capecodcommission.org) › file › Econ...PDF, Economic Impacts of Climate Change on Cape.”

Here's what it covers. It lays out the costs of ***sea***-***level*** ***rise*** by the foot and spells out for each community on the Cape what value will be lost. It's often in the billions — private and public wealth — gone. Submerged.

Google the "Barnstable Clean Water Coalition video '***Sea*** ***Level*** ***Rise***: What Does the Future Hold?'” Then Google “***Sea*** ***level*** ***rise***" – just that – for a broader view of the issue.

**More:** [*Woods Hole scientist John Holdren nets national award*](https://www.capecodtimes.com/story/news/2022/03/23/woods-hole-john-holdren-public-welfare-medal-national-academy-sciences/7076106001/)

If there’s a recent pattern to global climate studies, it’s revealing how a cascade of mutually supporting consequences is accelerating the arrival of bad news. Arctic ice melts, exposing darker land and water to absorb more sunlight. Permafrost is thawing out after tens of thousands of years releasing methane gas – 25 times more effective than carbon dioxide in trapping Earth’s heat.

I was about to reassure you that there’s no cause for panic and then almost changed my mind. Russia’s invasion and the cascade of geopolitical consequences are about to trigger a long-term series of responses that will boost, not limit, our fossil fuel industry. And that may well doom our response to global warming. Should Republicans regain Congress, that last outcome may become a certainty.

For Europeans as well as ourselves, renewable energy is the best long-range solution for energy independence and self-sufficiency. But we can’t fool ourselves. For them as for us, our homes are mostly designed for fossil fuel heating and cooking. Our house, for example, has an emergency generator in case the power goes out. Making it electric defeats its entire purpose. None of this is going to change quickly.

**Opinion:** [*Insect love is a hard sell in Wellfleet*](https://www.capecodtimes.com/story/opinion/2022/04/12/opinion-insects-important-but-cape-cod-mosquitoes-maddening-wellfleet-herring-river-brent-harold/9512733002/)

Policymakers on Cape Cod must begin to factor ***sea***-***level*** ***rise*** into almost every decision we make. It will pit our economic interests against our environmental interests – a cruel dilemma. We must begin thinking about defensive measures to mitigate the worst consequences of what’s coming.

Some strategies will depend on strengthening our natural defenses, protecting wetlands for example… asking ourselves where our next beaches will be when the familiar ones are drowned. Others may require actual earthworks and expensive engineering defenses that will cost a lot of money. The sooner we start, the more years we’ll have to amortize the costs. We may have less time than we’d expected.

*Lawrence Brown is a columnist for the Cape Cod Times. Email him at c* [*olumnresponse@gmail.co*](mailto:olumnresponse@gmail.co) *m.*

*This article originally appeared on Cape Cod Times:* [*Opinion: How the environmental movement might die. What that means for Cape Cod.*](https://www.capecodtimes.com/story/opinion/2022/04/15/opinion-what-means-cape-cod-if-environmental-movement-dies-lawrence-brown-climate-change/7276406001/)

**Load-Date:** April 18, 2022

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[***A North Carolinian is the U.S. watchman for rising seas. And he's worried.***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6515-HCV1-JC3J-X3TH-00000-00&context=1516831)

The News & Observer (Raleigh, North Carolina)

March 17, 2022 Thursday

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**Section:** opinion

**Length:** 670 words

**Byline:**  Ned Barnett

News & Observer

**Body**

After I wrote recently about a new federal report on ***sea*** ***level*** ***rise***, a reader pointed out to me that the report wasn't just about the coast, it also has a tie to Raleigh.

The report's lead author, William Sweet, grew up in Raleigh and vacationed as a youth on Topsail Island. A graduate of Sanderson High School, where he played for the soccer team in the early 1990s, Sweet went on to graduate from UNC-Chapel Hill and earn his master's and his doctorate from N.C. State University.

Today Sweet, an oceanographer at the National Oceanic and Atmospheric Administration (NOAA), is the agency's leading expert on ***sea*** ***level*** ***rise***. He lives in Annapolis, Md., and explores the Chesapeake Bay, but he regularly ventures south to the Outer Banks and other barrier islands in North Carolina.

I spoke with Sweet this week about how a ***rising*** sea will affect North Carolina's coast. His report estimates that the ***sea*** ***level*** along parts of the coast could ***rise*** as much as 14 inches by 2050.

"This is real, this is happening. It's not an end-of-century issue any longer," Sweet said. He hopes the data and maps provided by NOAA will spur coastal communities to take steps now to adjust to the change. "It doesn't have to be a slow-motion disaster," he said.

Beyond 2050, Sweet said, it's unclear whether the ***rise*** in ***sea*** ***level*** will moderate or accelerate. It depends on the extent to which greenhouse gas emissions continue to heat the atmosphere, whether ice sheets in Greenland and Antarctica slide into the sea and how much seawater expands as it warms.

"It's all conditioned ultimately by what humans do in terms of emissions and heating," he said. "Unfortunately, you can't just look into a crystal ball and say what the answer is going to be. But the takeaway is that less emissions equals less chance of overall higher ***sea*** ***level*** ***rise***."

The threat is obvious for the vulnerable Outer Banks, where tides are not only higher, but the islands themselves are moving toward the mainland. That dynamic speeds the collapse of beach homes into the encroaching sea and sends sand and rushing water over portions of U.S. Highway 12.

But the risk is not limited to the most vulnerable areas. Morehead City, Wilmington, Beaufort and other coastal North Carolina towns and cities are also seeing the effects. ***Rising*** ***sea*** ***levels*** are producing more flooding, even on sunny days. That backs up stormwater drains and makes septic systems malfunction and roads impassable. More serious flooding resulting from water ***rising*** three feet above high tide level now might occur once in several years, Sweet said, but by 2050 it could happen several times a year.

"The kind of flooding that can be problematic is definitely going to be fairly routine unless preventive measures are taken now to mitigate against those impacts," he said. "That's why we're trying to provide the (flood) maps so folks can look and get a sense of what's at risk."

Some coastal geologists think the battle against the sea is already lost. New coastal development should end and people should accept that the sea that human activity has caused to ***rise*** will take its share of the shore.

Sweet takes a more moderate view: Coastal communities don't need to retreat, but they will need to adjust.

For Sweet, the ***rise*** of the sea is not just about science. It's also about the threat to places he knew in summers past, such as Topsail Island and other parts of the North Carolina coast.

"The barrier islands will move and erode and change," he said. "In general it means as seas creep up, you're going to have increased erosion, more permeation of the barrier island itself through groundwater and over-topping and back bay flooding. It's just going to create more of a challenge to maintain the footprint in these shifting barrier islands, which Topsail is."

Sweet added, "One thing is certain: ***Sea*** ***level*** is on the ***rise*** and unless some preventive upfront action is taken, the impact will grow in time."

Associate opinion editor Ned Barnett can be reached at 919-829-4512, or [*nbarnett@newsobserver.com*](mailto:nbarnett@newsobserver.com)

**Load-Date:** March 17, 2022

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[***Coastal home buyers are ignoring rising flood risks, despite clear warnings and rising insurance premiums***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:652W-KHS1-DY6B-21XH-00000-00&context=1516831)

MENAFN - Business & Finance News (English)

March 25, 2022 Friday

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**Length:** 1064 words

**Body**

[*Link to Image*](https://menafn.com/updates/pr/2022-03/25/TC_4925eimage_story.PNG)

[*Link to Story*](https://menafn.com/1103914607/Coastal-home-buyers-are-ignoring-rising-flood-risks-despite-clear-warnings-and-rising-insurance-premiums)

Apollo Beach, Florida, is a maze of canals lined with hundreds of houses perched right near the water's edge. The whole community, just south of Tampa, is only about 3 feet above ***sea*** ***level***, meaning it's at risk from storm surge as ***sea*** ***levels*** ***rise***.

Homebuyers along the U.S. coasts can check each property's flood risk as easily as they check the size of the bedrooms - most coastal real estate listings now include future flood risk details that take climate change into account. In Apollo Beach, for example, many of the properties are at least 9 out of 10 on the flood risk scale.

That knowledge isn't stopping homebuyers, though.

Waterfront homes are selling within days of going on the market, and the same story is playing out all along the South Florida coast at a time when scientific reports are warning about the ***rising*** risks of coastal flooding as the planet warms.

We are professors of urban geography and American politics who follow the real estate industry. To understand why people are ignoring a risk that could lead to expensive damage and eventually lower their property value, we talked to hundreds of Florida real estate agents about their clients' motivations and concerns.

Here's what we learned.

Nothing pushes buyers to consider long-term riskWe surveyed 680 licensed Florida Realtors in late 2020. Their responses suggest that prospective homebuyers, by and large, are not taking elevation or flood vulnerability into account when searching for new homes, and the availability of detailed flood risk maps has had little or no impact on them.

Part of the problem may be that mortgage lenders and appraisers aren't accounting for properties' vulnerability to ***sea*** ***level*** ***rise***, so homebuyers aren't immediately feeling the risk in their pocketbooks. Wealthier buyers who don't need a mortgage aren't required to purchase flood insurance, and Congress has a history of rolling back flood insurance rate increases.

In short, nothing is forcing buyers to consider the long-term risks.

Many Florida beachfront homes and communities are at risk from ***sea*** ***level*** ***rise*** and storm surge. Jeffrey Greenberg/Universal Images Group via Getty Images At the same time, studies are clearly showing how risks translate into costs. One recent paper by scientists who create flood risk maps found that Hillsborough County, Florida, home to Apollo Beach and Tampa, is likely to see a 70% increase in annual flood damage by 2050 because of climate change. That's less than a 30-year mortgage away.

What real estate agents are hearingWe reasoned when we started the survey in 2020 that if some segment of the population was avoiding property at risk of flooding, then demand should decline and prices should fall. Our previous survey in 2018 , involving coastal Florida homeowners, had found that Republicans and Democrats alike believed that their future home values would not be affected by ***rising*** seas.

To test the theory that the market is largely ignoring flood risk, we asked real estate agents what they saw: To what extent had they observed house prices either falling or not ***rising*** as rapidly for properties at risk of flooding? Forty-five percent reported"not at all." Only 11 of the 680 agents indicated that house prices for properties at risk of flooding were"very frequently" stagnating or falling.

We also asked if they had seen mortgage lenders declining loan applications or increasing charges for loans in flood-prone areas, in the form of points or mortgage insurance, for example. Sixty percent said,"not at all," and only 7% said"somewhat frequently,""very frequently" or"all the time."

The vast majority of agents, almost 70%, said they expect little impact on the property market in the next five to 10 years.

Here's some of what they said.

Even lenders currently have no real incentives to decline mortgage applications for properties at risk from future ***sea*** ***level*** ***rise***. Federal agencies that purchase conforming mortgages do not currently require the collection of information about flood risk or likely ***sea*** ***level*** ***rise***. If these requirements were to change, then flood risk would be translated into lending decision.

Federal flood insurance has been heavily subsidized by U.S. tax dollars for years. In fact, the National Flood Insurance Program owes the U.S. Treasury about $20 billion for expenses exceeding the premiums homeowners pay. As of April 1, 2022, all of its new and renewed flood insurance policies will be subject to a new pricing system termed Risk Rating 2.0 designed to take risk into account.

But the program faces political pressure from members of Congress to ensure rates do not ***rise*** too quickly or get too high. Further, buyers who purchase houses for cash, a relatively large part of the market in South Florida, are not subject to flood insurance requirements.

A few agents suggested that wealthy homeowners are taking the risks seriously and plan to invest in structural changes such as elevating homes that could make their properties safer from ***sea*** ***level*** ***rise*** and storm surge.

The market isn't integrating long-term risksBecause of ***rising*** ***sea*** ***levels*** and storm risks resulting from climate change, we conclude that many of the houses currently being sold in south Florida will not outlast their 30-year mortgages without damage or expensive adaptations, and that the resale of houses vulnerable to ***sea*** ***level*** ***rise*** is very likely to become increasingly difficult .

Florida isn't the only state dealing with coastal flooding. Businesses in Annapolis, Md., face increasingly frequent high tide and storm surge flooding, as do homeowners in parts of Virginia, South Carolina and other states. Jim Watson/AFP via Getty Images Florida policymakers to date have either ignored the risk or have taken only limited measures to patch weaknesses, sometimes increasing the risks elsewhere. For example, when sea walls are erected, they can change how sand washes in, increasing erosion in neighboring areas.

Many people believe"the market" will take care of this issue: that homebuyers, recognizing the looming risks, will discount prices on vulnerable properties, eventually reducing their attractiveness and value. But what we heard from Florida real estate agents casts doubt on the assumption that the market has yet integrated this risk.

[Read The Conversation daily by subscribing to our newsletter .]

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**Load-Date:** March 25, 2022

**End of Document**



[***-MIT - QA, Climate Grand Challenges finalists on using data and science to forecast climate-related risk***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655V-WXY1-F0K1-N2D2-00000-00&context=1516831)

ENP Newswire

April 8, 2022 Friday

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**Length:** 1843 words

**Body**

This is the final article in a four-part interview series featuring the work of the 27 MIT Climate Grand Challenges finalist teams, which received a total of $ 2.7 million in startup funding to advance their projects.

This month, the Institute will name a subset of the finalists as multiyear flagship projects.

Advances in computation, artificial intelligence, robotics, and data science are enabling a new generation of observational tools and scientific modeling with the potential to produce timely, reliable, and quantitative analysis of future climate risks at a local scale. These projections can increase the accuracy and efficacy of early warning systems, improve emergency planning, and provide actionable information for climate mitigation and adaptation efforts, as human actions continue to change planetary conditions.

In conversations prepared for MIT News, faculty from four Climate Grand Challenges teams with projects in the competition's 'Using data and science to forecast climate-related risk' category describe the promising new technologies that can help scientists understand the Earth's climate system on a finer scale than ever before. (The other Climate Grand Challenges research themes include building equity and fairness into climate solutions, removing, managing, and storing greenhouse gases, and decarbonizing complex industries and processes.) The following responses have been edited for length and clarity.

An observational system that can initiate a climate risk forecasting revolution

Despite recent technological advances and massive volumes of data, climate forecasts remain highly uncertain. Gaps in observational capabilities create substantial challenges to predicting extreme weather events and establishing effective mitigation and adaptation strategies. R. John Hansman, the T. Wilson Professor of Aeronautics and Astronautics and director of the MIT International Center for Air Transportation, discusses the Stratospheric Airborne Climate Observatory System (SACOS) being developed together with Brent Minchew, the Cecil and Ida Green Career Development Professor in the Department of Earth, Atmospheric and Planetary Sciences (EAPS), and a team that includes researchers from MIT Lincoln Laboratory and Harvard University.

How does SACOS reduce uncertainty in climate risk forecasting

There is a critical need for higher spatial and temporal resolution observations of the climate system than are currently available through remote (satellite or airborne) and surface (in-situ) sensing. We are developing an ensemble of high-endurance, solar-powered aircraft with instrument systems capable of performing months-long climate observing missions that satellites or aircraft alone cannot fulfill. Summer months are ideal for SACOS operations, as many key climate phenomena are active and short night periods reduce the battery mass, vehicle size, and technical risks. These observations hold the potential to inform and predict, allowing emergency planners, policymakers, and the rest of society to better prepare for the changes to come.

Describe the types of observing missions where SACOS could provide critical improvements.

The demise of the Antarctic Ice Sheet, which is leading to ***rising*** ***sea*** ***levels*** around the world and threatening the displacement of millions of people, is one example. Current ***sea*** ***level*** forecasts struggle to account for giant fissures that create massive icebergs and cause the Antarctic Ice Sheet to flow more rapidly into the ocean. SACOS can track these fissures to accurately forecast ice slippage and give impacted populations enough time to prepare or evacuate. Elsewhere, widespread droughts cause rampant wildfires and water shortages. SACOS has the ability to monitor soil moisture and humidity in critically dry regions to identify where and when wildfires and droughts are imminent. SACOS also offers the most effective method to measure, track, and predict local ozone depletion over North America, which has resulted in increasingly severe summer thunderstorms.

Quantifying and managing the risks of ***sea***-***level*** ***rise***

Prevailing estimates of ***sea***-***level*** ***rise*** range from approximately 20 centimeters to 2 meters by the end of the century, with the associated costs on the order of trillions of dollars. The instability of certain portions of the world's ice sheets creates vast uncertainties, complicating how the world prepares for and responds to these potential changes. EAPS Professor Brent Minchew is leading another Climate Grand Challenges finalist team working on an integrated, multidisciplinary effort to improve the scientific understanding of ***sea***-***level*** ***rise*** and provide actionable information and tools to manage the risks it poses.

What have been the most significant challenges to understanding the potential rates of ***sea***-***level*** ***rise***

West Antarctica is one of the most remote, inaccessible, and hostile places on Earth - to people and equipment. Thus, opportunities to observe the collapse of the West Antarctic Ice Sheet, which contains enough ice to raise global ***sea*** ***levels*** by about 3 meters, are limited and current observations crudely resolved. It is essential that we understand how the floating edge of the ice sheets, often called ice shelves, fracture and collapse because they provide critical forces that govern the rate of ice mass loss and can stabilize the West Antarctic Ice Sheet.

How will your project advance what is currently known about ***sea***-***level*** ***rise***

We aim to advance global-scale projections of ***sea***-***level*** ***rise*** through novel observational technologies and computational models of ice sheet change and to link those predictions to region- to neighborhood-scale estimates of costs and adaptation strategies. To do this, we propose two novel instruments: a first-of-its-kind drone that can fly for months at a time over Antarctica making continuous observations of critical areas and an airdropped seismometer and GPS bundle that can be deployed to vulnerable and hard-to-reach areas of the ice sheet. This technology will provide greater data quality and density and will observe the ice sheet at frequencies that are currently inaccessible - elements that are essential for understanding the physics governing the evolution of the ice sheet and ***sea***-***level*** ***rise***.

Changing flood risk for coastal communities in the developing world

Globally, more than 600 million people live in low-elevation coastal areas that face an increasing risk of flooding from ***sea***-***level*** ***rise***. This includes two-thirds of cities with populations of more than 5 million and regions that conduct the vast majority of global trade. Dara Entekhabi, the Bacardi and Stockholm Water Foundations Professor in the Department of Civil and Environmental Engineering and professor in the Department of Earth, Atmospheric, and Planetary Sciences, outlines an interdisciplinary partnership that leverages data and technology to guide short-term and chart long-term adaptation pathways with Miho Mazereeuw, associate professor of architecture and urbanism and director of the Urban Risk Lab in the School of Architecture and Planning, and Danielle Wood, assistant professor in the Program in Media Arts and Sciences and the Department of Aeronautics and Astronautics.

What is the key problem this program seeks to address

The accumulated heating of the Earth system due to fossil burning is largely absorbed by the oceans, and the stored heat expands the ocean volume leading to increased base height for tides. When the high tides inundate a city, the condition is referred to as 'sunny day' flooding, but the saline waters corrode infrastructure and wreak havoc on daily routines. The danger ahead for many coastal cities in the developing world is the combination of increasing high tide intrusions, coupled with heavy precipitation storm events.

How will your proposed solutions impact flood risk management

We are producing detailed risk maps for coastal cities in developing countries using newly available, very high-resolution remote-sensing data from space-borne instruments, as well as historical tides records and regional storm characteristics. Using these datasets, we aim to produce street-by-street risk maps that provide local decision-makers and stakeholders with a way to estimate present and future flood risks. With the model of future tides and probabilistic precipitation events, we can forecast future inundation by a flooding event, decadal changes with various climate-change and ***sea***-***level*** ***rise*** projections, and an increase in the likelihood of sunny-day flooding. Working closely with local partners, we will develop toolkits to explore short-term emergency response, as well as long-term mitigation and adaptation techniques in six pilot locations in South and Southeast Asia, Africa, and South America.

Ocean vital signs

On average, every person on Earth generates fossil fuel emissions equivalent to an 8-pound bag of carbon, every day. Much of this is absorbed by the ocean, but there is wide variability in the estimates of oceanic absorption, which translates into differences of trillions of dollars in the required cost of mitigation. In the Department of Earth, Atmospheric and Planetary Sciences, Christopher Hill, a principal research engineer specializing in Earth and planetary computational science, works with Ryan Woosley, a principal research scientist focusing on the carbon cycle and ocean acidification. Hill explains that they hope to use artificial intelligence and machine learning to help resolve this uncertainty.

What is the current state of knowledge on air-sea interactions

Obtaining specific, accurate field measurements of critical physical, chemical, and biological exchanges between the ocean and the planet have historically entailed expensive science missions with large ship-based infrastructure that leave gaps in real-time data about significant ocean climate processes. Recent advances in highly scalable in-situ autonomous observing and navigation combined with airborne, remote sensing, and machine learning innovations have the potential to transform data gathering, provide more accurate information, and address fundamental scientific questions around air-sea interaction.

How will your approach accelerate real-time, autonomous surface ocean observing from an experimental research endeavor to a permanent and impactful solution

Our project seeks to demonstrate how a scalable surface ocean observing network can be launched and operated, and to illustrate how this can reduce uncertainties in estimates of air-sea carbon dioxide exchange. With an initial high-impact goal of substantially eliminating the vast uncertainties that plague our understanding of ocean uptake of carbon dioxide, we will gather critical measurements for improving extended weather and climate forecast models and reducing climate impact uncertainty. The results have the potential to more accurately identify trillions of dollars worth of economic activity.

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

**Load-Date:** April 8, 2022

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[***Union Minister Dr Jitendra Singh says, recent scientific studies have projected a decrease in annual rainfall for Chennai at the rate of 6.398 mm/year during the next three decades (2020-2050)***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:656R-40M1-DYDW-755M-00000-00&context=1516831)

Indian Government News

April 12, 2022 Tuesday

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**Length:** 261 words

**Dateline:** New Delhi, 2022-04-12 17:05:55

**Body**

April 12 -- Union Minister of State (Independent Charge) Science & Technology; Minister of State (Independent Charge) Earth Sciences; MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh said that recent scientific studies have projected a decrease in annual rainfall for Chennai at the rate of 6.398 mm/year during the next three decades (2020-2050). However, these results are based on projections using a single regional climate model and there are large uncertainties in projecting rainfall changes at regional / local scales.

In a written reply to a question in the Lok Sabha today, Dr Jitendra Singh said, the reduction in the projected rainfall would lead to reducing the recharge of the coastal aquifer and in addition to this, increased extraction of groundwater will also affect the coastal aquifers.

The Minister also informed that it is expected that the ***sea*** ***level*** will continue to ***rise*** in the coming several decades. As per the 6th Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC), relative to 1995-2014, the global mean ***sea*** ***level*** is expected to ***rise*** by 0.28 - 0.55 m under the very low greenhouse emission scenario (SSP1-1.9), 0.44 - 0.76 m under the intermediate emission scenario (SSP2-4.5) and 0.98 - 1.88 under the very high emission scenario (SSP5-8.5) by 2100. However, the regional ***sea*** ***level*** change can differ significantly from the global mean. The regional ***sea*** ***level*** ***rise*** estimate for the Chennai coast and its impact on freshwater aquifers have not yet been studied.

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**Load-Date:** April 12, 2022

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[***Dr Jitendra Singh says that recent scientific studies have projected a decrease in annual rainfall for Chennai***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:654C-K491-DXMP-K4PH-00000-00&context=1516831)

Indianbureaucracy.com

April 1, 2022 Friday 6:30 AM EST

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**Length:** 257 words

**Byline:** Editor

**Body**

Union Minister of State (Independent Charge) Science & Technology; Minister of State (Independent Charge) Earth Sciences; MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh said that recent scientific studies have projected a decrease in annual rainfall for Chennai at the rate of 6.398 mm/year during the next three decades (2020-2050). However, these results are based on projections using a single regional climate model and there are large uncertainties in projecting rainfall changes at regional / local scales.

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[***Sentinel-6: New International Sea Level Satellite***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6546-FCV1-JCMN-Y4F8-00000-00&context=1516831)

Newstex Blogs

Watts Up With That?

March 31, 2022 Thursday 2:11 PM EST

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**Length:** 2900 words

**Byline:** Kip Hansen

**Body**

Mar 31, 2022( Watts Up With That?: [*http://wattsupwiththat.com*](http://wattsupwiththat.com) Delivered by Newstex)

Guest Essay by Kip Hansen — 31 March 2022

SciTech Daily[1] proudly announced on 27 March 2022:

'On March 22, the newest U.S.-European ***sea*** ***level*** satellite, named Sentinel-6 Michael Freilich, became the official reference satellite for global ***sea*** ***level*** measurements. This means that sea surface height data collected by other satellites will be compared to the information produced by Sentinel-6 Michael Freilich to ensure their accuracy. ' .

'These missions, of which Sentinel-6 Michael Freilich is the latest, are the gold standard when it comes to ***sea*** ***level*** measurements, which are critical for understanding and monitoring climate change,' said Josh Willis, Sentinel-6 Michael Freilich project scientist at NASA's Jet Propulsion Laboratory in Southern California.'

'Long-term records of ***sea*** ***level*** height are key to monitoring how much, and how fast, the oceans are ***rising*** in a warming climate. 'We can't lose track of how much ***sea*** ***level*** has gone up because if we do, it's hard to predict what's going to happen in the decades to come,' Willis added.'

'The unprecedented accuracy of the ***sea*** ***level*** measurements provided by this mission ensures not only the continuity of a 30-year data record, but allows improving our understanding of climate change and the impact of ***rising*** seas on coastal areas and communities,' said Julia Figa Saldana, ocean altimetry program manager at the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT).'

The measurement (sort of) of ***sea*** ***level*** by satellite telemetry began in late 1992 with the first TOPEX/Poseidon satellite, followed by Jason 1, 2 and 3. There were a few other short term satellites involved but NOAA gives us this graphic[2] version:

Charting the data[3] from the .csv file for that same graphic in Excel gives us this:

The two charts give quite a different visual impression.

In the top chart displayed by NOAA[4], the data 'have been smoothed with a 4-month boxcar filter[5].' I have no idea why this is being done, but in January 2020, I discovered the fact in personal communication[6] with Eric W. Leuliette, Branch Chief, NOAA's Laboratory for Satellite Altimetry. He kindly added a note to this effect at the top of the NOAA web page which displays the graph.

In the Excel-produced chart from the data file, we see a lot of variability, particularly in the Topex data, with the variability narrowing in later missions. This graphic also is more linear. The last 15 months look like this:

The last four data points show a drop in ***sea*** ***level*** of 8 mm, which may be the seasonal drop in the Northern Hemisphere winter.

The press release quoted at the beginning claims 'unprecedented accuracy of the ***sea*** ***level*** measurements provided by this mission'. If this is meant to refer to the new satellite, Sentinel-6, then we can compare this to the accuracy of the previous Jason missions. For the Jason missions, the technical specification for original measurement error in the altimetry function of Jason's 1, 2 and 3 of +/- 3.4 cm. [Ref: Jason-3 Products Handbook[7], Section 2.3.1, pg 10 ], with a hope that this new requirement could 'enable reduction of sea-surface height errors to 2.5 cm RMS.' Now, understand that that is the specified requirement for accuracy of each and every single surface height measurement by the Jason missions. That range means that every measurement made must be guaranteed to be within a band 6.8 cm wide, 95% of the time. Let's be clear, that 6.8 cm is 20 times the size of the signal (change) claimed to be found between many of the individual GMSL data points in the NOAA data file. If one looks again at the Excel-produced graph of the data file, we see that the individual data points for Topex themselves have a month-to-month range of 20 mm, which signifies that if we add the specified allowable uncertainty range, we have a total accuracy range of 88 mm (about 3.5 inches). In the latest missions, this figure is reduced (through lower month-to-month variability) to about 73 mm (2.9 inches). Summarizing, the expected combined standard uncertainty for Jason 1-3 was +/-3.4 mm giving a total range of uncertainty for the data set of about 73 mm - about 3 inches — in present time.

Note: This last assumes that the range must include the variability - which some may disagree with - but it follows from the logic that the sea surface height is not physically changing rapidly enough (in the ten days between data points) to produce differences as great as 3 mm, thus the variability recorded must be in the measurement itself, thus must be considered as adding to the total uncertainty.

Is the new Sentinel-6 mission designed to do better than that?

To find out, we must look to the 'Sentinel-6 Mission Requirements Document (MRD)[8]' (located via the web page 'S6 altimetry reference documents[9]' at EUMETSAT[10]).

Quoting that document: [ inches added ]

'10.3 Requirements on the Near Real Time altimetry product service (ALT-NRT) 'For average sea states, the combined standard uncertainty of the 1-Hz sea surface height measurements shall be less than 5.79 cm [ 2.28 in ] for LR ALT-NRT products and less than 5.65 cm [ 2.22 in ] for HR ALT-NRT products. Note: The goal for the combined standard uncertainty is 3.46 cm [ 1.36 in ] for LR ALT-NRT products and 3.35 cm [ 1.32 in ] for HR ALT-NRT products.' NRT = Near Real Time, ALT = Altimetry, LR = Low Resolution, HR = High Resolution Combined standard uncertainty should be notated as +/-.[11]

So, Jason 1-3, combined standard uncertainty spec'd at 3.4 cm with a hope of getting to +/- 2.45 cm. Sentinel-6 spec'd to 5.79/5.76 cm with a goal of 3.46/3.35 cm. There is, of course, the question of definitions in both specifications, but I think it would be fair to compare Jason's 3.4 cm with Sentinel's goal of 3.35 cm - giving Sentinel-6 a not-so-large 0.5 mm improvement over a 6.8 or 6.7 cm range. So, improvement is improvement - but that is less than 1% better.

Where there will be improvement though is in the joining the new Sentinel measurements with the previous Jason measurements. How this is being done, according to the SciTech press release, is this:

'Later this year, teams will move Jason-3 into what's called an interleaved orbit. From that new position, the ground track - or the strip of Earth that Jason-3's instruments see as the satellite travels around the planet - will run in between the ground tracks of successive orbits for Sentinel-6 Michael Freilich. Jason-3 will keep measuring ***sea*** ***level*** height from the interleaved orbit, although it will no longer serve as the official reference ***sea*** ***level*** satellite. But by continuing to collect ***sea*** ***level*** data, Jason-3 will essentially double the number of measurements seen by each pass of Sentinel-6 Michael Freilich, helping to greatly increase the spatial resolution of ***sea*** ***level*** measurements provided by both satellites.'

So, in the real world, we will have a new satellite that has the same expected combined standard uncertainty as the existing Jason-3, but there will be an opportunity to compare adjacent measurement tracks as a side check confirmation.

That said, the late Nils-Axel Mörner[12] published a paper in 2004 which sharply criticized the methodologies of satellite ***sea*** ***level*** ***rise*** measurements - and R. Steven Nerem[13] et al. of the CU ***Sea*** ***Level*** Research Group[14] fired back years later with a comment[15], followed by Mörner responding very politely[16]. I wrote about the exchange here at WUWT 4 years ago[17]. That essay lists many of the corrections and adjustments and confounders that must be taken into account in all satellite ***sea*** ***level*** measurements. Many of the confounding factors are not only uncertain but unknown and unknowable - thus unmeasured, thus merely 'best guesses'.

Just to give one example, again from the Sentinel-6 Mission Requirements Document[18]:

10.2.1 Significant wave height measurement performance Because extremely low and high sea states are rare and wave buoys are not operating well in these conditions, it will be hard to validate significant wave height measurements outside of the range of 0.5 to 8 m [ 19.7 to 315 in ]. Hence, the requirement below is restricted to that range. However, it is required that the altimeter is able to measure up to wave heights of 20 m, and that its performance at extreme sea states will be determined during commissioning.For all ALT Level 2 products, the uncertainty of 1-Hz measurements of significant wave height in the range of 0.5 to 8 m shall be less than 15 cm plus 5% of significant wave height.Note: The goal is 10 cm plus 5% of significant wave height.

Why is this significant? They cannot calculate sea surface height without adjustment for the wave heights. Waves that range from almost-nothing to 20 meters. They think they can get a good idea of wave heights between 0.5m and 8m with a goal for uncertainty of '10 cm plus 5% of significant wave height'. Outside that range, apparently all bets are off. How much uncertainty is that if waves are 8 meters? That's 10 cm plus 40 cm = 50 cm = 0.5 meter = about 20 inches. To be perfectly fair, that is +/- 50 cm. How is it that they adjust for that much uncertainty - a whole meter in unknown surface height? (Admittedly, not that exactly, that's the bottom-to-top of the waves, the sea surface height is somewhere between.)

Bottom Line:

1. There is a new satellite up that, among other things, will measure ***sea*** ***level*** ***rise***. It is in reality no more accurate than the previous ***sea*** ***level*** ***rise*** monitoring satellites, the Jason series, but it will continue the long-term effort begun in late 1992.

2. ***Sea*** ***Level*** changes measured by satellite and reported in single digit millimeters are the result of computational hubris:

Computational Hubris:[19] 'An inordinate and unjustified trust, or faith if you like, in the power of advanced computational machines and processes to produce highly accurate and extremely precise results from relatively inaccurate and imprecise, highly uncertain data using techniques and methods that have not been tested nor verified to be suited to, or sufficient for, the purpose.' — Kip Hansen

3. Satellite reported ***Sea*** ***Level*** ***Rise*** is not a measure of changes in the actual level of the sea surface - or sea surface height — or its ***rise*** or fall, at all. Quoting the ***Sea*** ***Level*** Research Group[20] at the University of Colorado, which is headed by Steven Nerem:

'The term 'global mean ***sea*** ***level***' in the context of our research is defined as the area-weighted mean of all of the sea surface height anomalies measured by the altimeter in a single, 10-day satellite track repeat cycle. It can also be thought of as the 'eustatic ***sea*** ***level***.' The eustatic ***sea*** ***level*** is not a physical ***sea*** ***level*** (since the ***sea*** ***levels*** relative to local land surfaces vary depending on land motion and other factors), but it represents the level if all of the water in the oceans were contained in a single basin. Changes to this eustatic level are caused by changes in total ocean water mass (e.g., ice sheet runoff), changes in the size of the ocean basin (e.g.,GIA), or density changes of the water (e.g.,thermalexpansion). The time series of the GMSL estimates over the TOPEX and Jason missions beginning in 1992 to the present indicates a mostly linear trend after correction for inter-mission biases between instruments.' [ source[21] - see last paragraph ]

4. The 3.0 mm of satellite reported annual ***sea*** ***level*** ***rise*** does not show up as a ***rise*** in absolute mean ***sea*** ***level*** at the world's GPS-corrected tide gauges which directly measure mean sea surface height at each location. (Absolute ***sea*** ***level*** represents the sea height relative to the center of the Earth - meaning an actual ***rising*** of the sea surface upwards.) This reality-based fact is as yet unexplained and is a controversial topic.

5. The ONLY ***sea*** ***level***, or its ***rise*** or fall, of any importance to any locality or its governmental bodies is Local Relative ***Sea*** ***Level***. This ***sea*** ***level*** ***rise*** (or fall) caused by ***rising*** absolute ***sea*** ***level*** ***rise*** combined with vertical land movement (in most instances, downward) determines the magnitude of any risk or threat from ***sea*** ***level*** ***rise*** for that location.

6. Many localities which have valuable infrastructure built on land only a few inches or feet above existing mean ***sea*** ***level*** for their location are already at risk of flooding by spring tides and storm surge and need to initiate changes in building codes and begin mitigation immediately. The sea will continue to ***rise***, ever so slowly.

7. Finally, almost everything about ***sea*** ***level*** ***rise*** is controversial and readers should turn their critical thinking skills knob up to FULL when reading anything, including this essay, on the topic.

# # # # #

Author's Comment:

Josh Willis' comment to SciTech caught my attention. He said: 'We can't lose track of how much ***sea*** ***level*** has gone up because if we do, it's hard to predict what's going to happen in the decades to come.'

How would it be possible to 'lose track' of ***sea*** ***level*** ***rise***? The sea is just there. ***Sea*** ***level*** is where its surface hits the land all around the world. If it ***rises***, we will see it ***rise***. It is not something that is hidden and thus, if we turn our backs for a decade or so, can be lost track of. That is unless it is something so small and inconsequential that we'd miss it without satellites telling us that it is ***rising***. As the metric GMSL-as-measured-by-NOAA is only 3 millimeters a year, wouldn't it be enough to measure it once a decade? Then, ten years from now, we could expect to see a 30 mm ***rise*** - about 1.2 inches.and if it rose at an alarming 4 mm a year, 40 mm or 1.5 inches. And if SLR doubled? We'd see about 60 mm or 2.4 inches of ***rise***.

That's true only if satellite measured Eustatic ***Sea*** ***Level*** ***rise*** actually arrives at our shores, our harbors, our bays and inlets. To date, it hasn't.

Unless you are just making a general comment, remember to say who you are talking to: Like 'Kip, I think.'

Thanks for reading.

# # # # #

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**Load-Date:** March 31, 2022

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[***South China Sea level has risen by 150 mm since 1900: study***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:653G-2M81-DY91-H1BF-00000-00&context=1516831)

Xinhua General News Service

March 28, 2022 Monday 12:33 PM GMT

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**Section:** CHINA NEWS

**Length:** 234 words

**Byline:** 王晨曦

**Body**

BEIJING, March 28 (Xinhua) -- Chinese researchers have reconstructed the history of the South China Sea's ***sea***-***level*** shift using local corals and found that the ***sea*** ***level*** has risen by 150 mm since 1900. The study, carried out by researchers from the South China Sea Institute of Oceanology under the Chinese Academy of Sciences (CAS) and other institutions in the country, focused on Porites coral, a wide-spread coral in the South China Sea with a high growth rate, clear annual growth layer and sensitive response to the change of seawater environment. The researchers analyzed the correlation mechanism between the oxygen stable isotopes of Porites coral and ***sea*** ***level***, sea surface salinity, sea surface temperature and rainfall of the South China Sea, and reconstructed the ***sea*** ***level*** record at an annual resolution.

The study showed that the ***sea*** ***level*** fell by 0.73 mm per year from 1850 to 1900, and then rose by 1.31 mm per year from 1900 to 2015. The ***sea***-***level*** ***rise*** in the South China Sea has accelerated, ***rising*** by 3.75 mm per year since 1993. The study found that the ***sea***-***level*** changes in the South China Sea may be the result of a combination of solar activity and greenhouse gases from 1850 to 1950, and greenhouse gases may have been the dominant factor behind the rapid ***rise*** of ***sea*** ***level*** since 1950. The study was published in the journal Palaeogeography, Palaeoclimatology, Palaeoecology. Enditem

**Load-Date:** March 28, 2022

**End of Document**



[***India: Union Minister Dr Jitendra Singh says, recent scientific studies have projected a decrease in annual rainfall for Chennai at the rate of 6.398 mm/year during the next three decades (2020-2050)***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6549-FMT1-JBHT-D1B9-00000-00&context=1516831)

Asia News Monitor

April 1, 2022 Friday

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**Section:** GENERAL NEWS

**Length:** 267 words

**Dateline:** Bangkok

**Body**

**FULL TEXT**

Union Minister of State (Independent Charge) Science & Technology; Minister of State (Independent Charge) Earth Sciences; MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh said that recent scientific studies have projected a decrease in annual rainfall for Chennai at the rate of 6.398 mm/year during the next three decades (2020-2050). However, these results are based on projections using a single regional climate model and there are large uncertainties in projecting rainfall changes at regional / local scales.

In a written reply to a question in the Lok Sabha today, Dr Jitendra Singh said, the reduction in the projected rainfall would lead to reducing the recharge of the coastal aquifer and in addition to this, increased extraction of groundwater will also affect the coastal aquifers.

The Minister also informed that it is expected that the ***sea*** ***level*** will continue to ***rise*** in the coming several decades. As per the 6th Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC), relative to 1995-2014, the global mean ***sea*** ***level*** is expected to ***rise*** by 0.28 - 0.55 m under the very low greenhouse emission scenario (SSP1-1.9), 0.44 - 0.76 m under the intermediate emission scenario (SSP2-4.5) and 0.98 - 1.88 under the very high emission scenario (SSP5-8.5) by 2100. However, the regional ***sea*** ***level*** change can differ significantly from the global mean. The regional ***sea*** ***level*** ***rise*** estimate for the Chennai coast and its impact on freshwater aquifers have not yet been studied.

(Press Information Bureau, Government of India)

**Load-Date:** March 31, 2022

**End of Document**



[***India: Union Minister Dr Jitendra Singh says, recent scientific studies have projected a decrease in annual rainfall for Chennai at the rate of 6.398 mm/year during the next three decades (2020-2050)***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6546-4T81-JB5P-J0NK-00000-00&context=1516831)

Thai News Service

April 1, 2022 Friday

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**Section:** GENERAL NEWS

**Length:** 265 words

**Body**

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(Press Information Bureau, Government of India)

**Load-Date:** March 31, 2022

**End of Document**



[***Keys secures $14M in federal funding***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6558-8T71-JBCN-4208-00000-00&context=1516831)

The Key West Citizen (Florida)

April 5, 2022 Tuesday

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**Section:** NEWS; Pg. A1

**Length:** 570 words

**Byline:** CITIZEN STAFF

**Body**

The Florida Keys fared well in the recently passed 2022 federal government budget, with the chain of islands securing nearly $14 million in water quality, housing and ***sea*** ***level*** ***rise*** mitigation funding.

In the budget, $6 million went toward Florida Keys water quality improvement projects, $2.5 million to the Key West Housing Authority and $5.4 million for ***sea*** ***level*** ***rise*** mitigation projects for the Twin Lakes neighborhood in Key Largo, which is already experiencing ***sea*** ***level*** ***rise*** impacts and seasonal flooding.

All total, U.S. Congressman Carlos A. Gimenez (R-Miami-Dade County) said his congressional office secured over $23.7 million in funding for Florida’s 26th Congressional District. Each community project funding request submitted by Gimenez’s office was approved, leaving his office with a 100% track record in securing critical funding for South Florida, he said.

“One of the most important functions in my role as a member of Congress is ensuring that Florida’s 26th Congressional District gets the funding it needs to support critical infrastructure projects and the work of our community’s non-profit organizations. I want to thank my colleague Congressman Mario Diaz-Balart, who serves on the House Appropriations Committee, for his help in ensuring this important funding to South Florida was included in the bill,” Gimenez said.

The Twin Lakes funding comes at a critical time as the neighborhood experiences frequent flooding for prolonged periods during heavy rainfall, storm surge, high tide, and king tide events that cause damage to public roads and private properties and creates safety issues for the residents.

“This money was secured thanks to our staff and our federal lobbyist, who jumped on a funding opportunity that hasn’t been available for the past decade,” Mayor David Rice said. “A major thank you to Rep. Carlos Gimenez for supporting and advancing this appropriation. Without functioning roadways, operational stormwater systems, and supporting infrastructure, the community cannot remain safe and secure.”

The Monroe County government has made been ***sea*** ***level*** ***rise*** mitigation projects as priority in recent years and is working on several roadway and facilities adaptation projects. The shovel-ready project consists of road elevation and new drainage and stormwater collection systems and is also funded with Resilience Florida funding appropriated in the state budget. The project is entirely funded with state and federal funds.

Neighborhood-wide flooding mitigation is not easy nor inexpensive. “Water management, stormwater road runoff, and residential properties all have to be considered,” Director of Roads and Bridges Judy Clarke said. “We wish it were as simple as raising the road, but it isn’t.”

The project encompasses 4,633 linear feet of roadway and will protect 105 residential structures in Twin Lakes Subdivision.

Monroe County has been working toward a resilient Florida Keys for more than a decade and has been working on a Roadway Vulnerability Analysis and Capital Plan, which should be finished in June 2022. The plan uses environmental and human-use factors in assessing the flooding vulnerability of 300 miles of county roads. “The vulnerable roads are across the entire Florida Keys; therefore, we will need a united front to move forward on funding and construction alternatives given our preliminary assessments,” said Chief Resilience Officer Rhonda Haag.

**Load-Date:** April 5, 2022

**End of Document**



[***Candidate wants to cut waste, opposes new tax***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6522-R2C1-DXVP-V12N-00000-00&context=1516831)

Daily Post (Palo Alto, California)

March 21, 2022 Monday

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**Section:** NEWS; Pg. 1

**Length:** 479 words

**Byline:** EMILY MIBACH Daily Post Staff Writer

**Body**

San Mateo County Supervisor candidate Virginia Chang Kiraly wants to cut frivolous spending by the county and opposes a possible parcel tax that might appear on the November ballot.

Chang Kiraly, 58, who serves on two elected boards the Menlo Park Fire Board and San Mateo County Harbor Board said she’s tired of seeing the public’s money being “taken for granted.”

For instance, Chang Kiraly wants to get rid of the $750,000 per year each county supervisor gets of Measure K money to spend on issues, nonprofits, projects or events, related to their districts. Measure K is a half-cent sales tax voters approved in 2016.

Chang Kiraly said there is much more the supervisors can be doing with the money instead. She suggested using the $5 million for a water rescue program off the coast.

She also decried the fact that the county is exploring a parcel tax to battle ***sea*** ***level*** ***rise*** and fire risk. Chang Kiraly pointed out that residents are already paying taxes for special districts, such the two where she’s on the board, which are already doing work to protect against ***sea*** ***level*** ***rise*** or fire risk.

Chang Kiraly added that special districts are often overlooked and not brought to the table when issues are being discussed. She pointed to the One Shoreline undertaking, a new government agency aimed at ***sea*** ***level*** ***rise*** protection for San Mateo County, and said that the Harbor District was not brought in to discuss the plan, even though it runs two harbors along the county’s coast.

Chang Kiraly says she would bring a different viewpoint to the county Board of Supervisors because of her experience on the Menlo Park fire and county Harbor District boards.

Harbor District board discord

The Harbor District has been in the headlines for years because of infighting on its board of directors. But that’s ended and now, she says, the district is the “success story of San Mateo County.”

She said with the current majority, the district has been able to manage its money well and get big projects done, such as the “living shoreline project” at Pillar Point Harbor, which is aimed at restoring the beach, improving drainage and fight erosion from ***sea*** ***level*** ***rise***.

Chang Kiraly is one of four candidates running to take the seat currently held by Don Horsley on the Board of Supervisors. Horsley cannot run again because of term limits. His district includes San Carlos, Atherton, Woodside, Portola Valley, Pacifica, Half Moon Bay and parts of Menlo Park and Belmont.

Also seeking Horsley’s seat is San Carlos Mayor Laura Parmer-Lohan, Menlo Park Councilman Ray Mueller and Steven Booker, a Half Moon Bay resident and political director for IBEW 617.

The Post is publishing articles after interviewing candidates for the various races on the ballot. Pick up the Post to read about the candidates Chang Kiraly is running against and others who will appear on the June 7 ballot.

**Graphic**

CHANG-KIRALY

**Load-Date:** March 21, 2022

**End of Document**



[***Lower Otter Restoration Project saves rare plants from sea level rise***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651C-NXC1-JC7J-N3JC-00000-00&context=1516831)

Gov.uk

March 18, 2022 Friday 11:45 AM GMT

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**Length:** 355 words

**Body**

The Lower Otter is currently the only known place in Devon where the divided sedge (Carex divisa) is found and is one of only a few sites in the South West where it grows – it is deemed nationally scarce.

The survival of these plants is threatened by ***rising*** ***sea*** ***levels*** and the deterioration of embankments at the Lower Otter. Volunteers will be helping to move the yellow-tipped grass-like plant to new sites nearby on 22 March 2022.

Also being moved are some populations of galingale (Cyperus longus), which is also scarce nationally, though less so in Devon than the divided sedge. Unlike the divided sedge, the galingale will be able to continue to survive in some areas of the lower Otter valley.

Three sites with similar ecological characteristics have been chosen to replant these rare species and their progress will be monitored over the next 12 months. One of the chosen sites is grazing marsh associated with the Axe estuary, where divided sedge had been known to grow but was last recorded as present in 1934.

Moving the rare plants follows on from 400 southern marsh orchids that grew on the Lower Otter being relocated elsewhere last year.

Dr Sam Bridgewater, Head of Wildlife and Conservation for landowners, Clinton Devon Estates, said:

The divided sedge is an unassuming little plant which you could be forgiven for overlooking, but it’s the rarest living thing that the LORP scheme will provide help to.

We hope it will thrive in the new sites it is to be moved to.

New hedgerow planting, using biodegradable protection tubes

This week also saw planting of hedgerows to the north of Little Bank begin. Native species, including hawthorn, blackthorn and dog rose, have been planted in among gaps to existing hedgerows. The LORP project will see a net gain of 1.5km of hedgerow when completed.

The Environment Agency-led LORP project is one of two schemes under the ERDF’s Interreg France Channel England funded Promoting Adaptation to Changing Coasts project. The second site of the total €26m project is in the Saâne Valley in Quiberville, Normandy.

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Published 18 March 2022

**Load-Date:** March 18, 2022

**End of Document**



[***Tide Gauge Network***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:652D-W8X1-DYDW-737G-00000-00&context=1516831)

Indian Government News

March 23, 2022 Wednesday

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**Length:** 214 words

**Dateline:** New Delhi, 2022-03-23 08:54:38

**Body**

March 23 -- Recently the Cabinet has approved a mission mode programme "Deep Ocean Mission" to be implemented by the Ministry of Earth Sciences, Govt. of India. One of the objectives of this Mission, among other things, is to provide projections of ***sea*** ***level*** ***rise*** along the coast of India under the various climate change scenarios. As an outcome of this project, a suite of interactive GIS maps identifying vulnerable areas and possible inundation scenarios will be prepared.

INCOIS, an autonomous institute of MoES has acquired the baseline Airborne Lidar Terrain Mapping (ALTM) elevation data from National Remote Sensing Centre (NRSC), under ISRO for the Tsunami Inundation modelling and vulnerability mapping. This data is available for the main land Indian coast up to two kilometres from the coast and would be used for predicting the ***sea***-***level*** ***rise***.

As part of Indian Tsunami Early Warning System, INCOIS has established a real-time network of 36 tide gauges at different locations along the Indian coast to monitor the tsunami waves and provide timely advisories. It has established 4 tide gauges in Andhra Pradesh at below locations.

S.No.Station NameLatitude (°N)Longitude (°E)1Visakhapatnam17.68383.2832Kakinada16.93382.253Machilipatnam16.14581.1784Krishnapatnam14.2580.133

**Load-Date:** March 23, 2022

**End of Document**



[***Lower Otter Restoration Project saves rare plants from sea level rise***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651J-FT81-F0YC-N0TP-00000-00&context=1516831)

Impact News Service

March 18, 2022 Friday

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**Length:** 376 words

**Body**

London: UK Government has issued the following news release:

Some of Devon ’ s rarest plants are to be moved to new sites in the county as work continues on the Lower Otter Restoration Project (LORP).

The Lower Otter is currently the only known place in Devon where the divided sedge (Carex divisa) is found and is one of only a few sites in the South West where it grows – it is deemed nationally scarce.

The survival of these plants is threatened by ***rising*** ***sea*** ***levels*** and the deterioration of embankments at the Lower Otter. Volunteers will be helping to move the yellow-tipped grass-like plant to new sites nearby on 22 March 2022.

Also being moved are some populations of galingale (Cyperus longus), which is also scarce nationally, though less so in Devon than the divided sedge. Unlike the divided sedge, the galingale will be able to continue to survive in some areas of the lower Otter valley.

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The Environment Agency-led LORP project is one of two schemes under the ERDF ’ s Interreg France Channel England funded Promoting Adaptation to Changing Coasts project. The second site of the total €26m project is in the Saâne Valley in Quiberville, Normandy.

**Load-Date:** March 19, 2022

**End of Document**



[***-MIT - QA, Climate Grand Challenges finalists on using data and science to forecast climate-related risk***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655V-WXY1-F0K1-N2M0-00000-00&context=1516831)

M2 PressWIRE

April 8, 2022 Friday

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**Length:** 1849 words

**Body**

April 8, 2022

Release date- 07042022 - This is the final article in a four-part interview series featuring the work of the 27 MIT Climate Grand Challenges finalist teams, which received a total of $ 2.7 million in startup funding to advance their projects.

This month, the Institute will name a subset of the finalists as multiyear flagship projects.

Advances in computation, artificial intelligence, robotics, and data science are enabling a new generation of observational tools and scientific modeling with the potential to produce timely, reliable, and quantitative analysis of future climate risks at a local scale. These projections can increase the accuracy and efficacy of early warning systems, improve emergency planning, and provide actionable information for climate mitigation and adaptation efforts, as human actions continue to change planetary conditions.

In conversations prepared for MIT News, faculty from four Climate Grand Challenges teams with projects in the competition's 'Using data and science to forecast climate-related risk' category describe the promising new technologies that can help scientists understand the Earth's climate system on a finer scale than ever before. (The other Climate Grand Challenges research themes include building equity and fairness into climate solutions, removing, managing, and storing greenhouse gases, and decarbonizing complex industries and processes.) The following responses have been edited for length and clarity.

An observational system that can initiate a climate risk forecasting revolution

Despite recent technological advances and massive volumes of data, climate forecasts remain highly uncertain. Gaps in observational capabilities create substantial challenges to predicting extreme weather events and establishing effective mitigation and adaptation strategies. R. John Hansman, the T. Wilson Professor of Aeronautics and Astronautics and director of the MIT International Center for Air Transportation, discusses the Stratospheric Airborne Climate Observatory System (SACOS) being developed together with Brent Minchew, the Cecil and Ida Green Career Development Professor in the Department of Earth, Atmospheric and Planetary Sciences (EAPS), and a team that includes researchers from MIT Lincoln Laboratory and Harvard University.

How does SACOS reduce uncertainty in climate risk forecasting

There is a critical need for higher spatial and temporal resolution observations of the climate system than are currently available through remote (satellite or airborne) and surface (in-situ) sensing. We are developing an ensemble of high-endurance, solar-powered aircraft with instrument systems capable of performing months-long climate observing missions that satellites or aircraft alone cannot fulfill. Summer months are ideal for SACOS operations, as many key climate phenomena are active and short night periods reduce the battery mass, vehicle size, and technical risks. These observations hold the potential to inform and predict, allowing emergency planners, policymakers, and the rest of society to better prepare for the changes to come.

Describe the types of observing missions where SACOS could provide critical improvements.

The demise of the Antarctic Ice Sheet, which is leading to ***rising*** ***sea*** ***levels*** around the world and threatening the displacement of millions of people, is one example. Current ***sea*** ***level*** forecasts struggle to account for giant fissures that create massive icebergs and cause the Antarctic Ice Sheet to flow more rapidly into the ocean. SACOS can track these fissures to accurately forecast ice slippage and give impacted populations enough time to prepare or evacuate. Elsewhere, widespread droughts cause rampant wildfires and water shortages. SACOS has the ability to monitor soil moisture and humidity in critically dry regions to identify where and when wildfires and droughts are imminent. SACOS also offers the most effective method to measure, track, and predict local ozone depletion over North America, which has resulted in increasingly severe summer thunderstorms.

Quantifying and managing the risks of ***sea***-***level*** ***rise***

Prevailing estimates of ***sea***-***level*** ***rise*** range from approximately 20 centimeters to 2 meters by the end of the century, with the associated costs on the order of trillions of dollars. The instability of certain portions of the world's ice sheets creates vast uncertainties, complicating how the world prepares for and responds to these potential changes. EAPS Professor Brent Minchew is leading another Climate Grand Challenges finalist team working on an integrated, multidisciplinary effort to improve the scientific understanding of ***sea***-***level*** ***rise*** and provide actionable information and tools to manage the risks it poses.

What have been the most significant challenges to understanding the potential rates of ***sea***-***level*** ***rise***

West Antarctica is one of the most remote, inaccessible, and hostile places on Earth - to people and equipment. Thus, opportunities to observe the collapse of the West Antarctic Ice Sheet, which contains enough ice to raise global ***sea*** ***levels*** by about 3 meters, are limited and current observations crudely resolved. It is essential that we understand how the floating edge of the ice sheets, often called ice shelves, fracture and collapse because they provide critical forces that govern the rate of ice mass loss and can stabilize the West Antarctic Ice Sheet.

How will your project advance what is currently known about ***sea***-***level*** ***rise***

We aim to advance global-scale projections of ***sea***-***level*** ***rise*** through novel observational technologies and computational models of ice sheet change and to link those predictions to region- to neighborhood-scale estimates of costs and adaptation strategies. To do this, we propose two novel instruments: a first-of-its-kind drone that can fly for months at a time over Antarctica making continuous observations of critical areas and an airdropped seismometer and GPS bundle that can be deployed to vulnerable and hard-to-reach areas of the ice sheet. This technology will provide greater data quality and density and will observe the ice sheet at frequencies that are currently inaccessible - elements that are essential for understanding the physics governing the evolution of the ice sheet and ***sea***-***level*** ***rise***.

Changing flood risk for coastal communities in the developing world

Globally, more than 600 million people live in low-elevation coastal areas that face an increasing risk of flooding from ***sea***-***level*** ***rise***. This includes two-thirds of cities with populations of more than 5 million and regions that conduct the vast majority of global trade. Dara Entekhabi, the Bacardi and Stockholm Water Foundations Professor in the Department of Civil and Environmental Engineering and professor in the Department of Earth, Atmospheric, and Planetary Sciences, outlines an interdisciplinary partnership that leverages data and technology to guide short-term and chart long-term adaptation pathways with Miho Mazereeuw, associate professor of architecture and urbanism and director of the Urban Risk Lab in the School of Architecture and Planning, and Danielle Wood, assistant professor in the Program in Media Arts and Sciences and the Department of Aeronautics and Astronautics.

What is the key problem this program seeks to address

The accumulated heating of the Earth system due to fossil burning is largely absorbed by the oceans, and the stored heat expands the ocean volume leading to increased base height for tides. When the high tides inundate a city, the condition is referred to as 'sunny day' flooding, but the saline waters corrode infrastructure and wreak havoc on daily routines. The danger ahead for many coastal cities in the developing world is the combination of increasing high tide intrusions, coupled with heavy precipitation storm events.

How will your proposed solutions impact flood risk management

We are producing detailed risk maps for coastal cities in developing countries using newly available, very high-resolution remote-sensing data from space-borne instruments, as well as historical tides records and regional storm characteristics. Using these datasets, we aim to produce street-by-street risk maps that provide local decision-makers and stakeholders with a way to estimate present and future flood risks. With the model of future tides and probabilistic precipitation events, we can forecast future inundation by a flooding event, decadal changes with various climate-change and ***sea***-***level*** ***rise*** projections, and an increase in the likelihood of sunny-day flooding. Working closely with local partners, we will develop toolkits to explore short-term emergency response, as well as long-term mitigation and adaptation techniques in six pilot locations in South and Southeast Asia, Africa, and South America.

Ocean vital signs

On average, every person on Earth generates fossil fuel emissions equivalent to an 8-pound bag of carbon, every day. Much of this is absorbed by the ocean, but there is wide variability in the estimates of oceanic absorption, which translates into differences of trillions of dollars in the required cost of mitigation. In the Department of Earth, Atmospheric and Planetary Sciences, Christopher Hill, a principal research engineer specializing in Earth and planetary computational science, works with Ryan Woosley, a principal research scientist focusing on the carbon cycle and ocean acidification. Hill explains that they hope to use artificial intelligence and machine learning to help resolve this uncertainty.

What is the current state of knowledge on air-sea interactions

Obtaining specific, accurate field measurements of critical physical, chemical, and biological exchanges between the ocean and the planet have historically entailed expensive science missions with large ship-based infrastructure that leave gaps in real-time data about significant ocean climate processes. Recent advances in highly scalable in-situ autonomous observing and navigation combined with airborne, remote sensing, and machine learning innovations have the potential to transform data gathering, provide more accurate information, and address fundamental scientific questions around air-sea interaction.

How will your approach accelerate real-time, autonomous surface ocean observing from an experimental research endeavor to a permanent and impactful solution

Our project seeks to demonstrate how a scalable surface ocean observing network can be launched and operated, and to illustrate how this can reduce uncertainties in estimates of air-sea carbon dioxide exchange. With an initial high-impact goal of substantially eliminating the vast uncertainties that plague our understanding of ocean uptake of carbon dioxide, we will gather critical measurements for improving extended weather and climate forecast models and reducing climate impact uncertainty. The results have the potential to more accurately identify trillions of dollars worth of economic activity.

Contact:

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

**Load-Date:** April 8, 2022

**End of Document**



[***QANDA: CLIMATE GRAND CHALLENGES FINALISTS ON USING DATA AND SCIENCE TO FORECAST CLIMATE-RELATED RISK***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:655W-WJP1-DYTH-G2WT-00000-00&context=1516831)

States News Service

April 8, 2022 Friday

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**Length:** 1875 words

**Byline:** States News Service

**Dateline:** CAMBRIDGE, Mass.

**Body**

The following information was released by the Massachusetts Institute of Technology (MIT):

Faculty leaders highlight innovations that can close longstanding knowledge gaps and reimagine how the world responds to the climate crisis.

MIT News Office

Note: This is the final article in a four-part interview series featuring the work of the 27 MIT Climate Grand Challenges finalist teams, which received a total of $2.7 million in startup funding to advance their projects. This month, the Institute will name a subset of the finalists as multiyear flagship projects.

Advances in computation, artificial intelligence, robotics, and data science are enabling a new generation of observational tools and scientific modeling with the potential to produce timely, reliable, and quantitative analysis of future climate risks at a local scale. These projections can increase the accuracy and efficacy of early warning systems, improve emergency planning, and provide actionable information for climate mitigation and adaptation efforts, as human actions continue to change planetary conditions.

In conversations prepared for MIT News, faculty from four Climate Grand Challenges teams with projects in the competition's "Using data and science to forecast climate-related risk" category describe the promising new technologies that can help scientists understand the Earth's climate system on a finer scale than ever before. (The other Climate Grand Challenges research themes include building equity and fairness into climate solutions, removing, managing, and storing greenhouse gases, and decarbonizing complex industries and processes.) The following responses have been edited for length and clarity.

An observational system that can initiate a climate risk forecasting revolution

Despite recent technological advances and massive volumes of data, climate forecasts remain highly uncertain. Gaps in observational capabilities create substantial challenges to predicting extreme weather events and establishing effective mitigation and adaptation strategies. R. John Hansman, the T. Wilson Professor of Aeronautics and Astronautics and director of the MIT International Center for Air Transportation, discusses the Stratospheric Airborne Climate Observatory System (SACOS) being developed together with Brent Minchew, the Cecil and Ida Green Career Development Professor in the Department of Earth, Atmospheric and Planetary Sciences (EAPS), and a team that includes researchers from MIT Lincoln Laboratory and Harvard University.

Q: How does SACOS reduce uncertainty in climate risk forecasting?

A: There is a critical need for higher spatial and temporal resolution observations of the climate system than are currently available through remote (satellite or airborne) and surface (in-situ) sensing. We are developing an ensemble of high-endurance, solar-powered aircraft with instrument systems capable of performing months-long climate observing missions that satellites or aircraft alone cannot fulfill. Summer months are ideal for SACOS operations, as many key climate phenomena are active and short night periods reduce the battery mass, vehicle size, and technical risks. These observations hold the potential to inform and predict, allowing emergency planners, policymakers, and the rest of society to better prepare for the changes to come.

Q: Describe the types of observing missions where SACOS could provide critical improvements.

A: The demise of the Antarctic Ice Sheet, which is leading to ***rising*** ***sea*** ***levels*** around the world and threatening the displacement of millions of people, is one example. Current ***sea*** ***level*** forecasts struggle to account for giant fissures that create massive icebergs and cause the Antarctic Ice Sheet to flow more rapidly into the ocean. SACOS can track these fissures to accurately forecast ice slippage and give impacted populations enough time to prepare or evacuate. Elsewhere, widespread droughts cause rampant wildfires and water shortages. SACOS has the ability to monitor soil moisture and humidity in critically dry regions to identify where and when wildfires and droughts are imminent. SACOS also offers the most effective method to measure, track, and predict local ozone depletion over North America, which has resulted in increasingly severe summer thunderstorms.

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**Load-Date:** April 8, 2022

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[***Antarctic ice shelf the size of New York City finally crumbles after heatwave***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:653H-7FB1-DY47-50MC-00000-00&context=1516831)

ABC Premium News (Australia)

March 28, 2022 Monday

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**Length:** 819 words

**Byline:** By environment reporter Nick Kilvert

**Highlight:** A huge ice shelf has collapsed in Antarctica, coinciding with a period of intense and unseasonal heat which may have been "the straw that broke the camel's back".

**Body**

A massive ice shelf the size of New York City or Rome has completely collapsed in East Antarctica.

Satellite images posted to social media late last week show the 1,200-square-kilometre Conger ice shelf collapsed on or around March 15.

The collapse seems to have [*coincided with an extreme heatwave*](https://www.abc.net.au/news/science/2022-03-22/antarctic-arctic-heat-records/100926908) that saw parts of Antarctica experience temperatures 40 degrees Celsius above their monthly averages and records broken at several locations earlier this month.

NASA earth scientist Catherine Colello Walker tweeted images of the collapse on March 25, and said it was one of the most significant events in Antarctica since the Larsen B ice shelf collapsed in 2002.

The Larsen B ice shelf off the Antarctic Peninsula in West Antarctica covered around 3,250 square kilometres.

"[It's] possible it hit its tipping point following the Antarctic atmospheric river and heatwave too?" Dr Colello Walker said alongside the post.

More research will be needed to determine whether the recent heatwave was directly related to the collapse, but Matt King, who is the director of the Australian Centre for Excellence in Antarctic Science at the University of Tasmania, says it could have been one factor.

"We don't know [what impact the heatwave had] and that's something to dig into further," Professor King said.

"What is clear is that this area had been retreating since the 1970s.

"Whether that heatwave was the straw that broke the camel's back, it's certainly plausible."

**Ice shelf collapse like releasing handbrake**

Attached to land ice sheets and glaciers, ice shelves are the floating protrusion of ice that extends seaward from the coast.

The collapse of ice shelves themselves has little direct impact in terms of ***sea***-***level*** ***rise***, Professor King said.

"[Ice shelves] are already floating, so their break-up doesn't do anything much other than cool the ocean down," he said.

But it's the destabilisation of land ice following a collapse where scientists focus their attention.

Ice shelves are described as the "safety belts" on the oceanic margins of Antarctica.

They work to hold back the advance of glaciers toward the ocean, according to Ben Galton-Fenzi, a glaciologist and senior scientist with the Australian Antarctic Division.

"Ice shelves play what's called a buttressing role," Dr Galton-Fenzi said.

"What that means is that there's friction between the glacier and the side walls, and the glacier and the bed."

When an ice shelf goes, that can act like releasing the handbrake on that land ice, allowing it to accelerate towards the ocean.

"The Larsen ice shelf is a classic example [where] there was a 4 per cent increase in ***sea*** ***level*** ***rise*** in the year after it collapsed," Dr Galton-Fenzi said.

***Sea*** ***level*** ***rise*** will not be as much of an issue if the Conger ice shelf collapses, Professor King said.

"That's not as big a deal here because there's not as much ice sitting behind it on the land," he said.

"It will still be scientifically interesting to watch and we'll learn new things from it, but it's not going to flood New York City any time soon."

**Antarctica melting still unpredictable**

But the event is a worrying sign as East Antarctica is considered the "highest, driest, coldest region" on the continent, glaciologist and climate scientist Peter Neff explained in a video posted to TikTok.

"We really did not anticipate seeing ice shelf collapse here," he said.

The event is a reminder of the unknowns in predicting how fast ***sea***-***level*** may ***rise*** in future, according to Professor King.

Large punctuated events like this, especially if they happen in parts of Antarctica where an ice shelf is helping hold back large amounts of ice, can throw out projections.

"This is the first time we've seen an [East Antarctic] ice shelf disintegrate away," he said.

"It's a good reminder that the East Antarctic could change dramatically and quickly, and there are key areas we need to understand better."

One of those factors is called gravitational self-attraction, according to Dr Galton-Fenzi.

In short, everything with mass has gravity, and the greater the mass, the greater the gravitational force.

The shrinking of the Greenland and Antarctic ice sheets will see their masses greatly diminished.

"When they start to shrink, they don't pull the water up to them as much as they did before," Dr Galton-Fenzi said.

Instead, that ***sea***-***level*** ***rise*** will push further away from the poles, he said.

"The estimated ***sea***-***level*** ***rise*** in the latest IPCC report is[as much as 1.1 metres] by 2100, but we'd expect double that around Australia and the Pacific islands."

Professor King says we're yet to see warming really ramp up the rate of melting in Antarctica, but it's only a matter of time before we start seeing it.

"If you look in the Arctic, you see degrees of warming and dramatic sea ice retreat," he said.

"Antarctica hasn't seen that yet, but it's going to come to us. The question of how much and how soon is down to how well we can mitigate carbon emissions."

**Load-Date:** March 28, 2022

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[***Christianborg Castle, others will be eroded by the sea***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:654C-XDP1-F11P-X13T-00000-00&context=1516831)

Ghana News Agency (GNA)

April 1, 2022 Friday

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**Length:** 511 words

**Byline:** Jesse Ampah Owusu

**Body**

Accra, April 01, GNA &ndash; Professor Kwasi Appeaning Addo, Director, Institute for Environment and Sanitation Studies, says Ghana will lose landmark buildings such as Christianborg Castle, Kwame Nkrumah Mausoleum and Independence Square to sea erosion in future.

&ldquo;Under IPCC projected ***sea***-***level*** ***rise*** scenarios, landmark features such as Christianborg Castle, Kwame Nkrumah Mausoleum and Independence Square located in Accra will erode between 50 and 150 years&rsquo; time with 2002 as the baseline year,&rdquo; he said.

Professor Appeaning Addo said this at his inaugural lecture on &ldquo;The Continuous Struggle for Space &ndash; Coastal Erosion in Ghana,&rdquo; at the University of Ghana, Legon.

The Professor sought to initiate discussion on the coastal activities that resulted in erosion, and how the continuous struggle for space between human activities and shoreline evolution had increased coastal erosion problems in Ghana.

He said future projections again suggested that between approximately 4.7&times;106 meter square and 8.2&times;106 meter square of coastal land would be eroded in Accra alone by the year 2252 over an estimated length of 40 kilometers.

He added that twenty-five coastal erosion hot spots had been identified along the coast of Ghana that were eroding at varying rates and intensity due to the terrain changes.

The Professor said the impact of ***sea***-***level*** ***rise*** on coastal infrastructure would be high since it had not been factored into the design and maintenance of several coastal infrastructures.

He called for the development of an integrated policy on coastal erosion management, which would contain guidelines and measures to protect the country&rsquo;s coastal areas.

He said the policy would be a proactive measure against natural and human activities that threatened the coastal zone.

Professor Appeaning Addo said government and policy makers should change their coastal erosion mitigation strategy and adopt a more natural approach to safeguard the environment.

He said though ***sea***-***level*** ***rise*** was a natural response to climate change, human actions such as drainage of wetlands and over drawing of groundwater also contributed to the ***rise*** in ***sea*** ***levels***.

&ldquo;The increasing human development and encroachment on the strip of land that separates human activities from the shoreline&rsquo;s dynamic processes is denying the shoreline the much-needed space for it to naturally evolve.&rdquo;

&ldquo;The continuous struggle for space between humans and the shoreline disturbs the equilibrium state of the coastal environment and accelerates changes in the coastal zones, which results in terrible consequences with environmental and economic implications,&rdquo; he stressed.

Professor Nana Aba Appiah Amfo, Vice Chancellor, University of Ghana, called for a better management and preservation of the country&rsquo;s coastal zone for unborn generations.

She called on stakeholders to sensitise coastal communities and engage them in the fight against activities that posed a threat to the coastal zones.

GNA

2022 Ghana News Agency (GNA)

**Load-Date:** April 1, 2022

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[***South China Sea level has risen by 150 mm since 1900: Study***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:653G-PSH1-F11P-X06G-00000-00&context=1516831)

Asian News International (ANI)

March 28, 2022 Monday

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**Length:** 262 words

**Byline:** ANI

**Body**

Beijing [China], March 28 (ANI): South China Sea's ***sea*** ***level*** has risen by 150 mm since 1900, according to researchers from the South China Sea Institute of Oceanology.

The study, carried out by the researchers under the Chinese Academy of Sciences (CAS) and other institutions in the country, focused on Porites coral, a wide-spread coral in the South China Sea with a high growth rate, clear annual growth layer and sensitive response to the change of seawater environment, Xinhua News Agency reported.

The researchers analyzed the correlation mechanism between the oxygen stable isotopes of Porites coral and ***sea*** ***level***, sea surface salinity, sea surface temperature and rainfall of the South China Sea, and reconstructed the ***sea*** ***level*** record at an annual resolution.

The study showed that the ***sea*** ***level*** fell by 0.73 mm per year from 1850 to 1900, and then rose by 1.31 mm per year from 1900 to 2015. The ***sea***-***level*** ***rise*** in the South China Sea has accelerated, ***rising*** by 3.75 mm per year since 1993, Xinhua reported.

The study found that the ***sea***-***level*** changes in the South China Sea may be the result of a combination of solar activity and greenhouse gases from 1850 to 1950, and greenhouse gases may have been the dominant factor behind the rapid ***rise*** of ***sea*** ***level*** since 1950.

The study was published in the journal Palaeogeography, Palaeoclimatology, Palaeoecology, the news agency added.

The SCS is not important only for China, but also for other countries of the region and the world as about USD 4 trillion or one-third of the global maritime trade passes through it. (ANI)

**Load-Date:** April 13, 2022

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[***Coastal home buyers are ignoring rising flood risks, despite clear warnings and rising insurancepremiums***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:657B-KT31-JCMN-Y0W0-00000-00&context=1516831)

Newstex Blogs

Phil's Stock World

April 15, 2022 Friday 5:45 AM EST

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**Length:** 2083 words

**Byline:** ilene

**Body**

Apr 15, 2022( Phil's Stock World: [*http://www.philstockworld.com*](http://www.philstockworld.com) Delivered by Newstex)

Coastal home buyers are ignoring ***rising*** flood risks, despite clear warnings and ***rising*** insurancepremiums

Apollo Beach, Fla., averages 3 feet above ***sea*** ***level***, with many homes directly on the water. Google Earth[1]

Courtesy ofRisa Palm[2], Georgia State University[3] and Toby W. Bolsen[4], Georgia State University[5]

Apollo Beach, Florida, is a maze of canals lined with hundreds of houses perched right near the water's edge. The whole community, just south of Tampa, is only about 3 feet above ***sea*** ***level***, meaning it's at risk from storm surge as ***sea*** ***levels*** ***rise***.

Homebuyers along the U.S. coasts can check each property's flood risk as easily as they check the size of the bedrooms - most coastal real estate listings now include future flood risk details[6] that take climate change into account. In Apollo Beach, for example, many of the properties are at least 9 out of 10 on the flood risk scale.

That knowledge isn't stopping homebuyers, though.

Waterfront homes are selling within days[7] of going on the market, and the same story is playing out all along the South Florida coast[8] at a time when scientific[9] reports[10] are warning[11] about the ***rising*** risks of coastal flooding as the planet warms.

We are professors of urban geography[12] and American politics[13] who follow the real estate industry. To understand why people are ignoring a risk that could lead to expensive damage and eventually lower their property value, we talked to hundreds of Florida real estate agents about their clients' motivations and concerns.

Here's what we learned.

Nothing pushes buyers to consider long-term risk

We surveyed 680 licensed Florida Realtors in late 2020. Their responses suggest[14] that prospective homebuyers, by and large, are not taking elevation or flood vulnerability into account when searching for new homes, and the availability of detailed flood risk maps has had little or no impact on them.

Part of the problem may be that mortgage lenders and appraisers aren't accounting for properties' vulnerability to ***sea*** ***level*** ***rise***, so homebuyers aren't immediately feeling the risk in their pocketbooks. Wealthier buyers who don't need a mortgage aren't required[15] to purchase flood insurance, and Congress has a history of rolling back[16] flood insurance rate increases.

In short, nothing is forcing buyers to consider the long-term risks.

Many Florida beachfront homes and communities are at risk from ***sea*** ***level*** ***rise*** and storm surge. Jeffrey Greenberg/Universal Images Group via Getty Images[17]

At the same time, studies are clearly showing how risks translate into costs. One recent paper by scientists who create flood risk maps found that Hillsborough County, Florida, home to Apollo Beach and Tampa, is likely to see a 70% increase[18] in annual flood damage by 2050 because of climate change. That's less than a 30-year mortgage away.

What real estate agents are hearing

We reasoned when we started the survey in 2020[19] that if some segment of the population was avoiding property at risk of flooding, then demand should decline and prices should fall. Our previous survey in 2018[20], involving coastal Florida homeowners, had found that Republicans and Democrats alike believed that their future home values would not be affected by ***rising*** seas.

To test the theory that the market is largely ignoring flood risk, we asked real estate agents what they saw: To what extent had they observed house prices either falling or not ***rising*** as rapidly for properties at risk of flooding? Forty-five percent reported 'not at all.' Only 11 of the 680 agents indicated that house prices for properties at risk of flooding were 'very frequently' stagnating or falling.

We also asked if they had seen mortgage lenders declining loan applications or increasing charges for loans in flood-prone areas, in the form of points or mortgage insurance, for example. Sixty percent said, 'not at all,' and only 7% said 'somewhat frequently,' 'very frequently' or 'all the time.'

The vast majority of agents, almost 70%, said they expect little impact on the property market in the next five to 10 years.

Here's some of what they said.

'People are and will still buy in the coastal areas of Florida, and if they are buying, there will be no decrease in value. The largest pool of buyers driving market are retired or soon to be retired people and they have the belief that they will be long gone before there is any impact from climate change. They mainly are buying on emotion and not factoring in the long-term cost of ownership. They are also buying with cash and no mortgage.'

Even lenders currently have no real incentives to decline mortgage applications for properties at risk from future ***sea*** ***level*** ***rise***. Federal agencies that purchase conforming mortgages do not currently require[21] the collection of information about flood risk or likely ***sea*** ***level*** ***rise***. If these requirements were to change, then flood risk would be translated into lending decision.

'Buyers of coastal properties are financially able to be more risk-oblivious and can afford the higher rate for insurance or be self-insured. ***Sea***-***level*** ***rise*** is not currently top-of-mind in our local market.'

Federal flood insurance has been heavily subsidized by U.S. tax dollars for years. In fact, the National Flood Insurance Program owes the U.S. Treasury about $20 billion[22] for expenses exceeding the premiums homeowners pay. As of April 1, 2022, all of its new and renewed flood insurance policies[23] will be subject to a new pricing system termed Risk Rating 2.0[24] designed to take risk into account.

But the program faces political pressure from members of Congress[25] to ensure rates do not ***rise*** too quickly or get too high. Further, buyers who purchase houses for cash, a relatively large part of the market in South Florida, are not subject to flood insurance requirements.

'Wealthy people will still be enamored by the idea of living in front of the sea, but they will probably spend a lot of money making the property more resilient to the effects of ***sea***-***level*** ***rise***. This means that maybe the demand for high end properties will not weaken so much.'

A few agents suggested that wealthy homeowners are taking the risks seriously and plan to invest in structural changes such as elevating homes[26] that could make their properties safer from ***sea*** ***level*** ***rise*** and storm surge.

The market isn't integrating long-term risks

Because of ***rising*** ***sea*** ***levels*** and storm risks[27] resulting from climate change, we conclude that many of the houses currently being sold in south Florida will not outlast their 30-year mortgages without damage or expensive adaptations, and that the resale of houses vulnerable to ***sea*** ***level*** ***rise*** is very likely to become increasingly difficult[28].

Florida isn't the only state dealing with coastal flooding. Businesses in Annapolis, Md., face increasingly frequent high tide and storm surge flooding, as do homeowners in parts of Virginia, South Carolina and other states. Jim Watson/AFP via Getty Images[29]

Florida policymakers to date have either ignored the risk or have taken only limited measures to patch weaknesses, sometimes increasing the risks elsewhere. For example, when sea walls[30] are erected, they can change how sand washes in, increasing erosion in neighboring areas.

Many people believe 'the market' will take care of this issue: that homebuyers, recognizing the looming risks, will discount prices on vulnerable properties, eventually reducing their attractiveness and value. But what we heard from Florida real estate agents casts doubt on the assumption that the market has yet integrated this risk.

[Read The Conversation daily by subscribing to our newsletter[31].]

Risa Palm[32], Professor of Urban Studies and Public Health, Georgia State University[33] and Toby W. Bolsen[34], Associate Professor of Political Science, Georgia State University[35]

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[***Don't Look Up!***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:656X-8P21-JCG7-83JH-00000-00&context=1516831)

Heartland Institute

April 12, 2022 Tuesday

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**Length:** 1391 words

**Byline:** Paul Driessen

**Body**

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Fossil fuels to extract and process trillions of tons of raw materials, too, and manufacture the millions of wind turbines, billions of solar panels, billions of battery modules and millions of transmission line towers that would blanket our croplands, scenic areas and wildlife habitats if we didn't have fossil fuels.

In fact, far worse than a warmer planet with more airborne plant-fertilizing carbon dioxide would be a colder planet with less CO2. That would mean less arable land, shorter growing seasons and much lower crop yields, on top of losses from a devastated Ukraine and sanctioned Russian wheat crops.

(Why is it that Twitter twits never cancel, suppress or even fact-check climate fear porn? Why is it never just climate change, but always climate cataclysms? Why always manmade climate change, as though past natural climate changes never happened? Why do Guterres, Gore, Kerry, Biden and AOC always have to top his, her, hir, ver, zir fellow alarmists in hysteria? Why is the fear-mongering always based on computer models, never on actual data and evidence? Why does it always ignore China's massive fossil fuel use and greenhouse gas emissions?)

One of the prevalent climate alarm themes is ***sea*** ***level*** ***rise***.

Back on real Earth, if the DC Swamp inhabitants of 35 million years ago had looked up, they'd have been transfixed in their last moments by a non-special-effects meteor hurtling into what is now Cape Charles, Virginia on the Chesapeake Bay. The 2-mile-wide meteor obliterated and pulverized sediments and bedrock, vaporized plants and animals, sent rock fragments hundreds of miles in every direction, and launched tsunamis into West Virginia's eastern mountain slopes.

Shattered rock settled back into a crater 4,300 feet deep and 53 miles in diameter. Over the ensuing millennia, river and ocean sediments poured into the crater - and mile-high glaciers pulled 10-million cubic miles of water out of the oceans, burying half of North America, Europe and Asia under trillions of tons of ice. Land under the ice was pressed down, while land outside the glacial zones was lifted up. Then, some 12,000 years ago, the last Pleistocene glaciers began melting.

Oceans slowly rose - some 400 feet! Land masses underwent "isostatic rebound." Areas that had been under the ice began ***rising***; those that had bulged upward began sinking. In much of the Chesapeake Bay region, post-glacial subsidence is compounded by continued compression of pulverized crater rock - and by the ongoing withdrawal of groundwater from sedimentary aquifers beneath urban and agricultural areas that depend on groundwater.

The aquifers include layers of porous sandstone (with water between sand grains) interspersed among layers of impermeable but water-soaked shale and clay. As water is pumped out of the sandy layers, the shale-clay layers get squeezed by hundreds of feet of overlying rock and sediment, and their water is forced into the sandstones, and then into pumps. The overlying land steadily subsides.

In the Chesapeake Bay area, subsidence averages nearly 3 mm/year; 11.5 inches per century. That's in addition to almost 4.5 inches per century in isostatic subsidence, plus 7 to 9 inches per century in actual ***sea*** ***level*** ***rise***. The total perceived ***sea*** ***level*** ***rise*** can be 24 inches per century - although two-thirds of that total has nothing to do with actual ***sea*** ***level*** ***rise***. Indeed, the Norfolk Naval Station tide gauge at Sewell's Point shows that the rate of actual ***sea*** ***level*** ***rise*** has not changed since the gauge was installed in 1927.

The situation in Houston-Galveston, Texas, Santa Clara Valley, California, and other places around the globe is similarly complicated, even without post-glaciation issues. To single out actual ***sea*** ***level*** ***rise*** - and blame the ***rise*** on humans and fossil fuels - is simply disingenuous.

However, salt-water intrusion and coastal flooding are serious, recurrent, growing problems, especially during hurricanes and as more expensive homes are built along coasts. Some communities have slowed subsidence by relocating groundwater pumping stations away from the coast, reducing withdrawal rates, increasing aquifer recharge, or substituting surface water for groundwater. Others have installed sea walls, improved drainage systems, and pipelines to bring water from nearby lakes and rivers. Other options include desalination plants to create more fresh water, recycling household "gray water" to agricultural use, and switching to less water-intensive irrigation methods, as Israel does.

These approaches are far more practical and cost-effective than trying to stop seas from ***rising*** any further, like a modern King Canute, by banning fossil fuels, especially if it's done only in some Western nations.

Meanwhile, inhabitants of Tuvalu, the Maldives and other Pacific islands and coral atolls worry about ***rising*** seas due to fossil fuels. However, most of them are increasing in land area, not decreasing - as corals grow, sediments are laid down off their coasts, and volcanic lava flows expand land masses.

Moreover, few of these islands and coral reefs even existed 12,000 years ago, when the Wisconsin Glaciation extracted 400 feet of seawater from the world's oceans. The islands and atolls began growing as the seas rose. They've continued growing with every additional foot of ***sea*** ***level*** ***rise*** since the last Ice Age and the Little Ice Age (1350-1850) - and show no signs of stopping.

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[***Don't Look Up – OpEd***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:656G-9MH1-JDJN-6165-00000-00&context=1516831)

Eurasia Review

April 11, 2022 Monday

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**Length:** 1392 words

**Byline:** Paul Driessen

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[***DON'T LOOK UP!***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:656R-S9J1-DYTH-G3D2-00000-00&context=1516831)

States News Service

April 12, 2022 Tuesday

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**Length:** 1403 words

**Byline:** States News Service

**Dateline:** CHICAGO, IL

**Body**

The following information was released by the Heartland Institute:

By Paul Driessen

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**Load-Date:** April 12, 2022

**End of Document**



[***CLIMATE CHANGE IMPACT: IPCC PAINTS GRIM PICTURE FOR BANGLADESH***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:653P-WHG1-JCH9-G36N-00000-00&context=1516831)

Energy & Power

March 31, 2022 Thursday

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**Length:** 315 words

**Body**

Bangladesh would face serious challenges due to climate change and the national economy might bear the burnt, suggested a report of the United Nations' Intergovernmental Panel on Climate Change (IPCC).

According to the report, the continuous greenhouse emission in the country would result in the displacement of millions of people, reduced agricultural production and weather with extreme heat and humidity.

IPCC Working Group II AR6, in its recently released report, also predicted that the agricultural production would reduce between 31 and 40 percent by this century as the ***sea*** ***level*** would ***rise***.

The country's power plants may also need to be relocated over the next decade to avoid floods caused by the ***rise*** of ***sea*** ***level***.

Rawshan Ara Begum, one of the lead authors of the report, said the ***rise*** of ***sea*** ***level*** could eat up between 2 and 9 percent of annual GDP by the middle and end of the century.

Citing the report, she said the climate change could displace 1 to 2 million people living in the south by mid-century.

The overall impact will further worsen the country's current challenges including extreme poverty, income inequality, economic and non-economic losses and damages and low adaptive capacity.

Rawshan also said that urgent and accelerated actions are required for rapid and deep cuts in greenhouse gas emissions in the country to avoid increasing losses and adapt to climate change.

"As a result of climate change and increasing demand for water, about 25 percent of people in Bangladesh will live with water scarcity by 2050, compared with about 10 percent now. Both the Ganges and the Brahmaputra river basins will also see increased flooding," she said.

Climate change will hit international supply chains, markets, finance, and trade, reducing the availability of goods in Bangladesh, and increasing their price, as well as damaging markets for Bangladeshi exports, she said.

**Load-Date:** March 29, 2022

**End of Document**



[***Don't Look Up!***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:656P-R111-F03R-N2CF-00000-00&context=1516831)

Newstex Blogs

PA Pundits

April 12, 2022 Tuesday 4:06 AM EST

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**Length:** 1920 words

**Byline:** PA Pundits - International

**Body**

Apr 12, 2022( PA Pundits: [*http://papundits.wordpress.com*](http://papundits.wordpress.com)/ Delivered by Newstex)

By Paul Driessen ~

In the Netflix movie, Washington politicians 'Don't Look Up' because they prefer to remain oblivious to a special effects meteor that's about to obliterate Planet Earth. Not surprisingly, the film is really about our refusal to recognize the 'existential threat' of 'manmade climate change.'

Director Adam McKay[1] recently tweeted, 'We've got 6-8 years before the climate is so chaotic we [will] live in a permanent state of biblical catastrophe.'

Not to be outdone, UN Secretary General Antonio Guterres[2] called the latest UN climate report 'a file of shame, cataloguing the empty pledges that put us firmly on track toward an unlivable world.' Drilling for more oil and gas is 'moral and economic madness,' he insisted. If humanity doesn't stop using fossil fuels, we will be overwhelmed by devastating floods, heat waves, droughts, fires[3] and crop failures.

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Paul Driessen[19] is senior policy advisor for the Committee For A Constructive Tomorrow (CFACT)[20]. He is also the author of Cracking Big Green and Eco-Imperialism: Green Power - Black Death.

Read more excellent articles at CFACT[21] [*http://www.cfact.org*](http://www.cfact.org)/[22]

[ 1]: [*https://www.washingtonexaminer.com/opinion/word-of-the-week-petromasculinity*](https://www.washingtonexaminer.com/opinion/word-of-the-week-petromasculinity) [ 2]: [*https://www.cbc.ca/news/science/climate-warnings-bay-du-nord-1.6408649*](https://www.cbc.ca/news/science/climate-warnings-bay-du-nord-1.6408649) [ 3]: [*https://wattsupwiththat.com/2020/09/20/climate-arson-and-other-wildfire-nonsense/*](https://wattsupwiththat.com/2020/09/20/climate-arson-and-other-wildfire-nonsense/) [ 4]: [*https://co2coalition.org/facts/water-vapor-is-the-primary-greenhouse-gas-2/*](https://co2coalition.org/facts/water-vapor-is-the-primary-greenhouse-gas-2/) [ 5]: [*https://townhall.com/columnists/derekhunter/2022/04/05/hey-elon-dont-stop-now-n2605482*](https://townhall.com/columnists/derekhunter/2022/04/05/hey-elon-dont-stop-now-n2605482) [ 6]: [*https://lgbtqia.ucdavis.edu/educated/pronouns-inclusive-language*](https://lgbtqia.ucdavis.edu/educated/pronouns-inclusive-language) [ 7]: [*https://www.livescience.com/chesapeake-bay-meteor-impact-crater.html%20*](https://www.livescience.com/chesapeake-bay-meteor-impact-crater.html%20)\*\*%20good%20images,%20explanation [ 8]: [*https://www.youtube.com/watch?v=sZoPhaD-6eI*](https://www.youtube.com/watch?v=sZoPhaD-6eI) [ 9]: [*https://humanoriginproject.com/evidence-global-warming-end-of-last-ice-age*](https://humanoriginproject.com/evidence-global-warming-end-of-last-ice-age)/ [ 10]: [*https://www.britannica.com/science/Wisconsin-Glacial-Stage*](https://www.britannica.com/science/Wisconsin-Glacial-Stage) [ 11]: [*https://www.heartland.org/\_template-assets/documents/policy-documents/Bezdek%20Sea%20Level%20Chesapeake%20Bay.pdf*](https://www.heartland.org/_template-assets/documents/policy-documents/Bezdek%20Sea%20Level%20Chesapeake%20Bay.pdf) [ 12]: [*https://www.masterresource.org/****sea****-****level****-****rise****-climate-change/npr-****sea****-****level****-****rise****-bungling/*](https://www.masterresource.org/sea-level-rise-climate-change/npr-sea-level-rise-bungling/) [ 13]: [*https://www.jnf.org/our-work/water-solutions*](https://www.jnf.org/our-work/water-solutions) [ 14]: [*https://cnsnews.com/news/article/maldives-islands-leaders-hold-global-warming-meeting-underwater-literally*](https://cnsnews.com/news/article/maldives-islands-leaders-hold-global-warming-meeting-underwater-literally) [ 15]: [*https://www.heartland.org/\_template-assets/documents/publications/SeaLevelRiseCCRII.pdf*](https://www.heartland.org/_template-assets/documents/publications/SeaLevelRiseCCRII.pdf) [ 16]: [*https://www.bradshawfoundation.com/cosquer*](https://www.bradshawfoundation.com/cosquer)/ [ 17]: [*https://freerepublic.com/focus/f-news/789935/posts*](https://freerepublic.com/focus/f-news/789935/posts) [ 18]: [*https://townhall.com/columnists/pauldriessen/2021/09/04/woke-companies-must-wake-up-on-esg-n2595308*](https://townhall.com/columnists/pauldriessen/2021/09/04/woke-companies-must-wake-up-on-esg-n2595308) [ 19]: [*http://www.cfact.org/author/paul3/*](http://www.cfact.org/author/paul3/) [ 20]: [*http://www.cfact.org*](http://www.cfact.org)/ [ 21]: [*http://www.cfact.org*](http://www.cfact.org)/ [ 22]: [*http://www.cfact.org*](http://www.cfact.org)/

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**Load-Date:** April 12, 2022

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[***Coastal home buyers are ignoring rising flood risks, despite clear warnings and rising insurancepremiums***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6533-5YD1-F03R-N27X-00000-00&context=1516831)

Newstex Blogs

Phil's Stock World

March 26, 2022 Saturday 4:55 AM EST

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**Length:** 2083 words

**Byline:** ilene

**Body**

Mar 26, 2022( Phil's Stock World: [*http://www.philstockworld.com*](http://www.philstockworld.com) Delivered by Newstex)

Coastal home buyers are ignoring ***rising*** flood risks, despite clear warnings and ***rising*** insurancepremiums

Apollo Beach, Fla., averages 3 feet above ***sea*** ***level***, with many homes directly on the water. Google Earth[1]

Courtesy ofRisa Palm[2], Georgia State University[3] and Toby W. Bolsen[4], Georgia State University[5]

Apollo Beach, Florida, is a maze of canals lined with hundreds of houses perched right near the water's edge. The whole community, just south of Tampa, is only about 3 feet above ***sea*** ***level***, meaning it's at risk from storm surge as ***sea*** ***levels*** ***rise***.

Homebuyers along the U.S. coasts can check each property's flood risk as easily as they check the size of the bedrooms - most coastal real estate listings now include future flood risk details[6] that take climate change into account. In Apollo Beach, for example, many of the properties are at least 9 out of 10 on the flood risk scale.

That knowledge isn't stopping homebuyers, though.

Waterfront homes are selling within days[7] of going on the market, and the same story is playing out all along the South Florida coast[8] at a time when scientific[9] reports[10] are warning[11] about the ***rising*** risks of coastal flooding as the planet warms.

We are professors of urban geography[12] and American politics[13] who follow the real estate industry. To understand why people are ignoring a risk that could lead to expensive damage and eventually lower their property value, we talked to hundreds of Florida real estate agents about their clients' motivations and concerns.

Here's what we learned.

Nothing pushes buyers to consider long-term risk

We surveyed 680 licensed Florida Realtors in late 2020. Their responses suggest[14] that prospective homebuyers, by and large, are not taking elevation or flood vulnerability into account when searching for new homes, and the availability of detailed flood risk maps has had little or no impact on them.

Part of the problem may be that mortgage lenders and appraisers aren't accounting for properties' vulnerability to ***sea*** ***level*** ***rise***, so homebuyers aren't immediately feeling the risk in their pocketbooks. Wealthier buyers who don't need a mortgage aren't required[15] to purchase flood insurance, and Congress has a history of rolling back[16] flood insurance rate increases.

In short, nothing is forcing buyers to consider the long-term risks.

Many Florida beachfront homes and communities are at risk from ***sea*** ***level*** ***rise*** and storm surge. Jeffrey Greenberg/Universal Images Group via Getty Images[17]

At the same time, studies are clearly showing how risks translate into costs. One recent paper by scientists who create flood risk maps found that Hillsborough County, Florida, home to Apollo Beach and Tampa, is likely to see a 70% increase[18] in annual flood damage by 2050 because of climate change. That's less than a 30-year mortgage away.

What real estate agents are hearing

We reasoned when we started the survey in 2020[19] that if some segment of the population was avoiding property at risk of flooding, then demand should decline and prices should fall. Our previous survey in 2018[20], involving coastal Florida homeowners, had found that Republicans and Democrats alike believed that their future home values would not be affected by ***rising*** seas.

To test the theory that the market is largely ignoring flood risk, we asked real estate agents what they saw: To what extent had they observed house prices either falling or not ***rising*** as rapidly for properties at risk of flooding? Forty-five percent reported 'not at all.' Only 11 of the 680 agents indicated that house prices for properties at risk of flooding were 'very frequently' stagnating or falling.

We also asked if they had seen mortgage lenders declining loan applications or increasing charges for loans in flood-prone areas, in the form of points or mortgage insurance, for example. Sixty percent said, 'not at all,' and only 7% said 'somewhat frequently,' 'very frequently' or 'all the time.'

The vast majority of agents, almost 70%, said they expect little impact on the property market in the next five to 10 years.

Here's some of what they said.

'People are and will still buy in the coastal areas of Florida, and if they are buying, there will be no decrease in value. The largest pool of buyers driving market are retired or soon to be retired people and they have the belief that they will be long gone before there is any impact from climate change. They mainly are buying on emotion and not factoring in the long-term cost of ownership. They are also buying with cash and no mortgage.'

Even lenders currently have no real incentives to decline mortgage applications for properties at risk from future ***sea*** ***level*** ***rise***. Federal agencies that purchase conforming mortgages do not currently require[21] the collection of information about flood risk or likely ***sea*** ***level*** ***rise***. If these requirements were to change, then flood risk would be translated into lending decision.

'Buyers of coastal properties are financially able to be more risk-oblivious and can afford the higher rate for insurance or be self-insured. ***Sea***-***level*** ***rise*** is not currently top-of-mind in our local market.'

Federal flood insurance has been heavily subsidized by U.S. tax dollars for years. In fact, the National Flood Insurance Program owes the U.S. Treasury about $20 billion[22] for expenses exceeding the premiums homeowners pay. As of April 1, 2022, all of its new and renewed flood insurance policies[23] will be subject to a new pricing system termed Risk Rating 2.0[24] designed to take risk into account.

But the program faces political pressure from members of Congress[25] to ensure rates do not ***rise*** too quickly or get too high. Further, buyers who purchase houses for cash, a relatively large part of the market in South Florida, are not subject to flood insurance requirements.

'Wealthy people will still be enamored by the idea of living in front of the sea, but they will probably spend a lot of money making the property more resilient to the effects of ***sea***-***level*** ***rise***. This means that maybe the demand for high end properties will not weaken so much.'

A few agents suggested that wealthy homeowners are taking the risks seriously and plan to invest in structural changes such as elevating homes[26] that could make their properties safer from ***sea*** ***level*** ***rise*** and storm surge.

The market isn't integrating long-term risks

Because of ***rising*** ***sea*** ***levels*** and storm risks[27] resulting from climate change, we conclude that many of the houses currently being sold in south Florida will not outlast their 30-year mortgages without damage or expensive adaptations, and that the resale of houses vulnerable to ***sea*** ***level*** ***rise*** is very likely to become increasingly difficult[28].

Florida isn't the only state dealing with coastal flooding. Businesses in Annapolis, Md., face increasingly frequent high tide and storm surge flooding, as do homeowners in parts of Virginia, South Carolina and other states. Jim Watson/AFP via Getty Images[29]

Florida policymakers to date have either ignored the risk or have taken only limited measures to patch weaknesses, sometimes increasing the risks elsewhere. For example, when sea walls[30] are erected, they can change how sand washes in, increasing erosion in neighboring areas.

Many people believe 'the market' will take care of this issue: that homebuyers, recognizing the looming risks, will discount prices on vulnerable properties, eventually reducing their attractiveness and value. But what we heard from Florida real estate agents casts doubt on the assumption that the market has yet integrated this risk.

[Read The Conversation daily by subscribing to our newsletter[31].]

Risa Palm[32], Professor of Urban Studies and Public Health, Georgia State University[33] and Toby W. Bolsen[34], Associate Professor of Political Science, Georgia State University[35]

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[***Don't Look Up!***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:656S-3NB1-F03R-N1PB-00000-00&context=1516831)

Newstex Blogs

The Heartlander

April 12, 2022 Tuesday 4:50 PM EST

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**Length:** 1946 words

**Body**

Apr 12, 2022( The Heartlander: [*https://www.heartland.org/news-opinion/news*](https://www.heartland.org/news-opinion/news) Delivered by Newstex)

In the Netflix movie, Washington politicians 'Don't Look Up' because they prefer to remain oblivious to a special effects meteor that's about to obliterate Planet Earth. Not surprisingly, the film is really about our refusal to recognize the 'existential threat' of 'manmade climate change.'

Director Adam McKay[1] recently tweeted, 'We've got 6-8 years before the climate is so chaotic we [will] live in a permanent state of biblical catastrophe.'

Not to be outdone, UN Secretary General Antonio Guterres[2] called the latest UN climate report 'a file of shame, cataloguing the empty pledges that put us firmly on track toward an unlivable world.' Drilling for more oil and gas is 'moral and economic madness,' he insisted. If humanity doesn't stop using fossil fuels, we will be overwhelmed by devastating floods, heat waves, droughts, fires[3] and crop failures.

Global ***sea*** ***levels*** have already risen 'a shocking nine inches,' the PurpleOrange PR Agency proclaimed, promoting a client's Climate Neutral Certified label, which is designed to channel more money to 'authentic, immediate climate action.'

Back on the non-parallel-universe Planet Earth, a truly unlivable world would be one without fossil fuels. Not just to generate electricity, cook food, heat homes and water, and power cars, boats, trains and planes - but for fertilizers and insecticides to grow more food on less land, and for plastics, pharmaceuticals, paints, cosmetics, clothing and other essential products. For us today; for billions more tomorrow.

Fossil fuels to extract and process trillions of tons of raw materials, too, and manufacture the millions of wind turbines, billions of solar panels, billions of battery modules and millions of transmission line towers that would blanket our croplands, scenic areas and wildlife habitats if we didn't have fossil fuels.

In fact, far worse than a warmer planet with more airborne plant-fertilizing carbon dioxide[4] would be a colder planet with less CO2. That would mean less arable land, shorter growing seasons and much lower crop yields, on top of losses from a devastated Ukraine and sanctioned Russian wheat crops.

(Why is it that Twitter twits[5] never cancel, suppress or even fact-check climate fear porn? Why is it never just climatechange, but always climate cataclysms? Why always manmade climate change, as though past natural climate changes never happened? Why do Guterres, Gore, Kerry, Biden and AOC always have to top his, her, hir, ver, zir[6] fellow alarmists in hysteria? Why is the fear-mongering always based on computer models, never on actual data and evidence? Why does it always ignore China's massive fossil fuel use and greenhouse gas emissions?)

One of the prevalent climate alarm themes is ***sea*** ***level*** ***rise***.

Back on real Earth, if the DC Swamp inhabitants of 35 million years ago had looked up, they'd have been transfixed in their last moments by a non-special-effects meteor[7] hurtling into what is now Cape Charles, Virginia on the Chesapeake Bay. The 2-mile-wide meteor obliterated and pulverized sediments and bedrock, vaporized plants and animals, sent rock fragments hundreds of miles in every direction, and launched tsunamis into West Virginia's eastern mountain slopes.

Shattered rock settled back into a crater[8] 4,300 feet deep and 53 miles in diameter. Over the ensuing millennia, river and ocean sediments poured into the crater - and mile-high glaciers pulled 10-million cubic miles of water[9] out of the oceans, burying half of North America, Europe and Asia under trillions of tons of ice. Land under the ice was pressed down, while land outside the glacial zones was lifted up. Then, some 12,000 years ago, the last Pleistocene glaciers began melting.

Oceans slowly rose - some 400 feet! Land masses underwent 'isostatic rebound.' Areas that had been under the ice began ***rising***; those that had bulged upward began sinking. In much of the Chesapeake Bay region, post-glacial subsidence[10] is compounded by continued compression of pulverized crater rock - and by the ongoing withdrawal of groundwater from sedimentary aquifers beneath urban and agricultural areas that depend on groundwater.

The aquifers include layers of porous sandstone (with water between sand grains) interspersed among layers of impermeable but water-soaked shale and clay. As water is pumped out of the sandy layers, the shale-clay layers get squeezed by hundreds of feet of overlying rock and sediment, and their water is forced into the sandstones, and then into pumps. The overlying land steadily subsides.

In the Chesapeake Bay area, subsidence averages[11] nearly 3 mm/year; 11.5 inches per century. That's in addition to almost 4.5 inches per century in isostatic subsidence, plus 7 to 9 inches per century in actual ***sea*** ***level*** ***rise***. The total perceived ***sea*** ***level*** ***rise*** can be 24 inches per century - although two-thirds of that total has nothing to do with actual ***sea*** ***level*** ***rise***. Indeed, the Norfolk Naval Station tide gauge at Sewell's Point shows that the rate of actual ***sea*** ***level*** ***rise***[12] has not changed since the gauge was installed in 1927.

The situation in Houston-Galveston, Texas, Santa Clara Valley, California, and other places around the globe is similarly complicated, even without post-glaciation issues. To single out actual ***sea*** ***level*** ***rise*** - and blame the ***rise*** on humans and fossil fuels - is simply disingenuous.

However, salt-water intrusion and coastal flooding are serious, recurrent, growing problems, especially during hurricanes and as more expensive homes are built along coasts. Some communities have slowed subsidence by relocating groundwater pumping stations away from the coast, reducing withdrawal rates, increasing aquifer recharge, or substituting surface water for groundwater. Others have installed sea walls, improved drainage systems, and pipelines to bring water from nearby lakes and rivers. Other options include desalination plants to create more fresh water, recycling household 'gray water' to agricultural use, and switching to less water-intensive irrigation methods, as Israel does[13].

These approaches are far more practical and cost-effective than trying to stop seas from ***rising*** any further, like a modern King Canute, by banning fossil fuels, especially if it's done only in some Western nations.

Meanwhile, inhabitants of Tuvalu, the Maldives[14] and other Pacific islands and coral atolls worry about ***rising*** seas due to fossil fuels. However, most of them are increasing in land area[15], not decreasing - as corals grow, sediments are laid down off their coasts, and volcanic lava flows expand land masses.

Moreover, few of these islands and coral reefs even existed 12,000 years ago, when the Wisconsin Glaciation extracted 400 feet of seawater from the world's oceans. The islands and atolls began growing as the seas rose. They've continued growing with every additional foot of ***sea*** ***level*** ***rise*** since the last Ice Age and the Little Ice Age (1350-1850) - and show no signs of stopping.

Cosquer Cave's Paleolithic paintings[16] near Marseille, France (the entrance is 115 feet below current ***sea*** ***level***) and a Mel Fisher dive team's discovery ofcharred tree branches and pine cones from aforest fire8,400 years ago[17] in 40 feet of water off the Florida coast further attest to steadily ***rising*** seas.

Yet, experts tell us. (1) 'Snows are less frequent and less deep. The rivers scarcely ever freeze over now. There is an unfortunate fluctuation between heat and cold in the spring, which is very fatal to fruits.' (2) 'We were astonished by the total absence of ice in Barrow Strait. I was here at this time [six years ago] - still frozen up - and doubts were entertained as to the possibility of escape.' (3) 'The Arctic Ocean is warming up, icebergs are growing scarcer, and in some places the seals are finding the water too hot.'

It behooves to take action. Or perhaps not. Quotation (1) is from Thomas Jefferson's diary, 1799; (2) from Sir Francis McClintock's ship's log, 1860; (3) from a Washington Post article, November 2, 1922.

Instead of parroting scare stories - and demanding that fossil fuels be replaced by pseudo-clean, pseudo-renewable energy[18] - it really behooves us to think, analyze, ponder the many ways fossil fuels improve our lives, and demand real evidence instead of GIGO computer models for any supposed climate crisis.

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[***Don't Look Up!***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:656B-3ND1-JCMN-Y3H2-00000-00&context=1516831)

Newstex Blogs

Watts Up With That?

April 10, 2022 Sunday 1:06 PM EST

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**Length:** 1908 words

**Byline:** Guest Blogger

**Body**

Apr 10, 2022( Watts Up With That?: [*http://wattsupwiththat.com*](http://wattsupwiththat.com) Delivered by Newstex)

A real rock from outer space (not manmade climate change) is causing perceived ***rising*** seas

Paul Driessen

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Shattered rock settled back into a crater[8] 4,300 feet deep and 53 miles in diameter. Over the ensuing millennia, river and ocean sediments poured into the crater - and mile-high glaciers pulled 10-million cubic miles of water[9] out of the oceans, burying half of North America, Europe and Asia under trillions of tons of ice. Land under the ice was pressed down, while land outside the glacial zones was lifted up. Then, some 12,000 years ago, the last Pleistocene glaciers began melting.

Oceans slowly rose - some 400 feet! Land masses underwent 'isostatic rebound.' Areas that had been under the ice began ***rising***; those that had bulged upward began sinking. In much of the Chesapeake Bay region, post-glacial subsidence[10] is compounded by continued compression of pulverized crater rock - and by the ongoing withdrawal of groundwater from sedimentary aquifers beneath urban and agricultural areas that depend on groundwater.

The aquifers include layers of porous sandstone (with water between sand grains) interspersed among layers of impermeable but water-soaked shale and clay. As water is pumped out of the sandy layers, the shale-clay layers get squeezed by hundreds of feet of overlying rock and sediment, and their water is forced into the sandstones, and then into pumps. The overlying land steadily subsides.

In the Chesapeake Bay area, subsidence averages[11] nearly 3 mm/year; 11.5 inches per century. That's in addition to almost 4.5 inches per century in isostatic subsidence, plus 7 to 9 inches per century in actual ***sea*** ***level*** ***rise***. The total perceived ***sea*** ***level*** ***rise*** can be 24 inches per century - although two-thirds of that total has nothing to do with actual ***sea*** ***level*** ***rise***. Indeed, the Norfolk Naval Station tide gauge at Sewell's Point shows that the rate of actual ***sea*** ***level*** ***rise***[12] has not changed since the gauge was installed in 1927.

The situation in Houston-Galveston, Texas, Santa Clara Valley, California, and other places around the globe is similarly complicated, even without post-glaciation issues. To single out actual ***sea*** ***level*** ***rise*** - and blame the ***rise*** on humans and fossil fuels - is simply disingenuous.

However, salt-water intrusion and coastal flooding are serious, recurrent, growing problems, especially during hurricanes and as more expensive homes are built along coasts. Some communities have slowed subsidence by relocating groundwater pumping stations away from the coast, reducing withdrawal rates, increasing aquifer recharge, or substituting surface water for groundwater. Others have installed sea walls, improved drainage systems, and pipelines to bring water from nearby lakes and rivers. Other options include desalination plants to create more fresh water, recycling household 'gray water' to agricultural use, and switching to less water-intensive irrigation methods, as Israel does[13].

These approaches re far more practical and cost-effective than trying to stop seas from ***rising*** any further, like a modern King Canute, by banning fossil fuels, especially if it's done only in some Western nations.

Meanwhile, inhabitants of Tuvalu, the Maldives[14] and other Pacific islands and coral atolls worry about ***rising*** seas due to fossil fuels. However, most of them are increasing in land area[15], not decreasing - as corals grow, sediments are laid down off their coasts, and volcanic lava flows expand land masses.

Moreover, few of these islands and coral reefs even existed 12,000 years ago, when the Wisconsin Glaciation extracted 400 feet of seawater from the world's oceans. The islands and atolls began growing as the seas rose. They've continued growing with every additional foot of ***sea*** ***level*** ***rise***, and show no signs of stopping.

Cosquer Cave's Paleolithic paintings[16] near Marseille, France (the entrance is 115 feet below current ***sea*** ***level***) and a Mel Fisher dive team's discovery ofcharred tree branches and pine cones from aforest fire8,400 years ago[17] in 40 feet of water off the Florida coast further attest to steadily ***rising*** seas.

Yet, experts tell us. (1) 'Snows are less frequent and less deep. The rivers scarcely ever freeze over now. There is an unfortunate fluctuation between heat and cold in the spring, which is very fatal to fruits.' (2) 'We were astonished by the total absence of ice in Barrow Strait. I was here at this time [six years ago] - still frozen up - and doubts were entertained as to the possibility of escape.' (3) 'The Arctic Ocean is warming up, icebergs are growing scarcer, and in some places the seals are finding the water too hot.'

It behooves to take action. Or perhaps not. Quotation (1) is from Thomas Jefferson's diary, 1799; (2) from Sir Francis McClintock's ship's log, 1860; (3) from a Washington Post article, November 2, 1922.

Instead of parroting scare stories - and demanding that fossil fuels be replaced by pseudo-clean, pseudo-renewable energy[18] - it really behooves us to think, analyze, ponder the many ways fossil fuels improve our lives, and demand real evidence instead of GIGO computer models for any supposed climate crisis.

Paul Driessen is senior policy analyst for the Committee For A Constructive Tomorrow ([*www.CFACT.org*](http://www.cfact.org)), and author of Eco-Imperialism: Green power - Black death and articles on energy, climate and other issues.

Article Rating

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**Load-Date:** April 10, 2022

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[***Miami's top official on climate change is resigning. She was the third in 3 years***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6552-9GK1-DYJM-M118-00000-00&context=1516831)

The Miami Herald

April 4, 2022 Monday

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**Section:** naked\_politics

**Length:** 395 words

**Byline:**  Joey Flechas and Alex Harris

Miami Herald

**Body**

The top official in the city of Miami responsible for preparations for climate change is stepping down, leaving the job empty for the third time in three years.

Multiple City Hall sources confirmed to the Miami Herald that Chief Resilience Officer Shelby Busó, who was hired in January, has resigned from her position with the city of Miami, citing family issues. She previously served as the chief sustainability officer with the city of Atlanta. Busó declined to comment.

Busó's departure comes less than a year after former CRO Alan Dodd resigned. He is now director of public works at the city of Fort Lauderdale, where he worked before joining Miami's staff in 2018. Dodd did not publicly comment on any reason for his departure.

A year before Dodd's resignation, the city's first-ever CRO, Jane Gilbert, also resigned. She said she wanted to spend more time with her family. A few months later, she accepted a job with Miami-Dade County as its first chief heat officer.

The city's chief resilience officer is tasked with advising municipal leaders on how to prepare Miami for the impacts of climate change. The issues include changing building regulations to upgrading drainage systems to addressing the city's energy use. It is supposed to be a key position in a city that faces significant threats from ***sea*** ***level*** ***rise***, hotter temperatures and stronger storms.

In addition to the series of changes at the top, the small troubled resilience department has seen its budget and staffing slashed in recent years before climate action advocates successfully lobbied the city to restore the department's funding and staff levels.

'Activism works': Miami plans to increase funding, hires for climate change department

Busó's exit marks the latest in a string of high-level departures in City Hall. Several department directors and deputies have left City Manager Art Noriega's administration, including former chief innovation officer Michael Sarasti, former Miami Forever bond manager Sylejman Ujkani, former planning director Cesar Garcia-Pons and others.

How ***sea*** ***level*** ***rise*** is pushing up groundwater in South Florida and making flooding more commonHow is ***sea*** ***level*** ***rise*** pushing up groundwater in South Florida and making flooding more common? Research associate professor at the Institute of Environment at Florida International University Randall Parkinson explains the issue.

**Load-Date:** April 5, 2022

**End of Document**



[***United Kingdom : Lower Otter Restoration Project saves rare plants from sea level rise***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651T-S951-JDJN-633T-00000-00&context=1516831)

TendersInfo

March 19, 2022 Saturday

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**Length:** 364 words

**Body**

Some of Devons rarest plants are to be moved to new sites in the county as work continues on the Lower Otter Restoration Project (LORP).

The Lower Otter is currently the only known place in Devon where the divided sedge (Carex divisa) is found and is one of only a few sites in the South West where it grows it is deemed nationally scarce.

The survival of these plants is threatened by ***rising*** ***sea*** ***levels*** and the deterioration of embankments at the Lower Otter. Volunteers will be helping to move the yellow-tipped grass-like plant to new sites nearby on 22 March 2022.

Also being moved are some populations of galingale (Cyperus longus), which is also scarce nationally, though less so in Devon than the divided sedge. Unlike the divided sedge, the galingale will be able to continue to survive in some areas of the lower Otter valley.

Three sites with similar ecological characteristics have been chosen to replant these rare species and their progress will be monitored over the next 12 months. One of the chosen sites is grazing marsh associated with the Axe estuary, where divided sedge had been known to grow but was last recorded as present in 1934.

Moving the rare plants follows on from 400 southern marsh orchids that grew on the Lower Otter being relocated elsewhere last year.

Dr Sam Bridgewater, Head of Wildlife and Conservation for landowners, Clinton Devon Estates, said:

The divided sedge is an unassuming little plant which you could be forgiven for overlooking, but its the rarest living thing that the LORP scheme will provide help to.

We hope it will thrive in the new sites it is to be moved to.

New hedgerow planting, using biodegradable protection tubes

This week also saw planting of hedgerows to the north of Little Bank begin. Native species, including hawthorn, blackthorn and dog rose, have been planted in among gaps to existing hedgerows. The LORP project will see a net gain of 1.5km of hedgerow when completed.

The Environment Agency-led LORP project is one of two schemes under the ERDFs Interreg France Channel England funded Promoting Adaptation to Changing Coasts project. The second site of the total 26m project is in the Sane Valley in Quiberville, Normandy.

**Load-Date:** March 20, 2022

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[***Powerful 'rivers in the sky' could cause Antarctic Peninsula's biggest ice shelf to collapse***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:6575-7VB1-JBSS-S203-00000-00&context=1516831)

CNN Wire

April 14, 2022 Thursday 2:59 PM GMT

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**Length:** 961 words

**Byline:** By Angela Dewan, CNN

**Dateline:** (CNN)

**Body**

When [*temperatures in Antarctica soared*](https://www.cnn.com/2022/03/28/weather/antarctica-world-record-high-temperature-anomaly-climate/index.html) to 38 degrees Celsius above normal -- around 70 Fahrenheit -- in March, a teetering ice shelf [*the size of Los Angeles collapsed*](https://www.cnn.com/2022/03/25/world/antarctic-conger-ice-shelf-collapse-climate/index.html). Scientists don't know what role the extreme temperatures may have played in the event, but the heat rushed in through what's known as an atmospheric river, a long plume of moisture that transports warm air and water vapor from the tropics to other parts of the Earth.

A new study published Thursday shows that these [*"rivers in the sky"*](http://www.cnn.com/2022/04/11/weather/weather-news-severe-blizzard-atmospheric-river-wxn/index.html) -- which dump rain and snow when they make landfall -- are also causing extreme temperatures, surface melt, sea-ice disintegration and large ocean swells which are destabilizing ice shelves on the Antarctic Peninsula, a long, spindly mountain chain that points northwards to the tip of South America.

These conditions were observed during the collapse of two of the peninsula's ice shelves -- Larsen A and B -- in the summers of 1995 and 2002, respectively. And now, as the climate crisis is projected to warm the Earth further, the biggest remaining ice shelf, Larsen C, is also at risk of total collapse, the study says.

The authors of the study, published in the [*Nature journal Communications Earth & Environment*](https://www.nature.com/articles/s43247-022-00422-9), used algorithms, climate models and satellite observations to determine that 60% of the peninsula's calving events -- where an iceberg breaks off an ice shelf or glacier -- were triggered by atmospheric rivers between 2000 and 2020.

There are many ways these ice shelves can destabilize. For Larsen A, B and C, there has been evidence of foehn winds -- warm, dry air that streams down a mountain after cool, moist air had risen up the other side. These can cause sudden and dramatic changes in temperatures, and in Antarctica, it causes ice melt. That can have knock-on effects, including fracturing in ice shelves -- the portion of a land-based ice sheet that juts out over ocean water.

Melting sea ice also exposes ice shelves to ocean swell, which can cause further destabilization.

"What our study found was that all these different aspects are actually caused by atmospheric rivers, especially the intense ones," one of the study's lead authors, Jonathan Wille from the Universite Grenoble Alpes in France, told CNN.

"And we found that almost all the really extreme temperature events that happen in the Antarctic Peninsula where happening with atmospheric rivers."

What it means for ***sea*** ***level***

A collapse of Larsen C would spell bad news for the ***sea*** ***level*** around the planet.

Ice shelves breaking off and can cause ***sea*** ***level*** ***rise***, but they don't add a huge volume -- that's because they are already floating in the water. But ice shelves play a critical role in preventing much larger ***sea*** ***level*** ***rise***.

"Ice shelves keep the glaciers that are on land behind them from flowing into the ocean," Wille said. "And when these shelves disappear, there's nothing holding back those glaciers. Their velocity increases and starts flowing into the ocean. And that then directly contributes to ***sea*** ***level*** ***rise***."

Scientists don't yet know what link there may be between atmospheric rivers and climate change, but the recent heatwave and conditions in Antarctica at the time were were so extreme that experts are starting to hypothesize the crisis could be playing a role. That will only really become clearer if a similar event happens again in the future.

"The question is whether or not atmospheric rivers will happen more often as the climate changes," Julienne Stroeve told CNN. Stroeve, who was not involved in Thursday's study, is a professor of polar observation and modeling at University College London.

"I think it's too soon to say it will," she said, adding that different atmospheric analyses were giving differing results. "However, it's likely that the atmosphere will play an increasing role in ice shelf breakup by weakening them through surface melting."

While the future frequency of atmospheric rivers may be an unknown, Wille believes they will at the very least become more intense, and that could be enough to cause more destabilization.

"It's kind of simple -- as the atmosphere becomes warmer, it's able to hold more moisture, and since an atmospheric river is essentially the transport of moisture, that means there will be more moisture that can be transported to Antarctica," he said.

John Turner, a meteorologist at the British Antarctic Survey who was also not involved in the study, said that most of an ice shelf's instability was due to basal melt -- that's melting that happens from the bottom -- and warned against placing too much emphasis on the role of atmospheric rivers. The study published in Nature did not find a link between atmospheric rivers and basal melt.

"You have to be careful -- you do get extremes for other reasons which don't have a river. Sometimes you just get strong northerlies, which will generally give you a lot of snow and high temperatures, which may not be classified as a river," he told CNN.

Turner agrees, however, that the wind that atmospheric rivers bring may be "the nail in the coffin of some of these ice shelves."

To put in perspective what a ice loss in Antarctica could mean for the world, Turner explained there are 60 meters -- nearly 200 feet -- of potential ***sea*** ***level*** ***rise*** if the whole continent's ice melted. Western Antarctica, the broader region around the peninsula, represents 6 meters (20 feet) of ***rise***, which in itself would swallow entire islands and be catastrophic for millions of people living on coasts and beyond.

Most of the world's ice melt and ***sea*** ***level*** ***rise*** so far can be attributed to melting of the Greenland ice sheet in the Arctic.

By Angela Dewan, CNN

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**Load-Date:** April 14, 2022

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[***Lewes committee recommends resiliency fund; Real estate disclosure also to go before mayor and city council***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:657J-P591-JBCN-446Y-00000-00&context=1516831)

Cape Gazette (Lewes, DE)

15 April 2022

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**Section:** NEWS

**Length:** 449 words

**Byline:** Nick Roth

**Body**

The Lewes Executive Committee on Resiliency unanimously voted April 12 to recommend the city establish an emergency relief policy that addresses funding for storm recovery.

The committee has been working for several months gathering information from environmental experts, and learning how towns and cities throughout the country handle issues related to climate change and ***sea***-***level*** ***rise***.

The goal is to collect funds over a minimum of 25 years for the purpose of funding future projects and improvements that will help the city become more resilient to climate impacts. The committee's preference is the city collect a minimum of $500,000 per year, and any expenditure be carefully considered so as not to deplete the fund.

Intended projects include green infrastructure, open space acquisition, individual or bulk property buyouts and vulnerability assessments. Beach replenishment is not one of the intended uses of the funds.

The committee recommends requiring a supermajority four-fifths vote to access the funds.

To reach its fundraising goals, the committee recommends revenue come from multiple sources. Those could include a flat fee per residential property and a fee based on square footage of impervious surface for nonresidential lots. Other potential sources include an accommodations fee on rentals and lodging, property tax allocation or increase, building permit fee increase, developer impact fee increase, parking fee increase or seed money from the city.

Thanks to a grant, the Delaware Department of Natural Resources and Environmental Control's Resilient Community Partnership in collaboration with the University of Delaware's Institute for Public Administration worked with the Lewes committee to develop plans and preparation activities to address the challenges anticipated as a result of ***sea***-***level*** ***rise*** and climate change.

In addition to a resiliency fund, the committee also recommended mayor and city council require a real estate disclosure for all properties in the city. The disclosure, to be drafted by the city solicitor, would require sellers to report if any claims have been made for flooding. It would also require sellers to provide an elevation certificate if the property is located within the floodplain.

To ensure buyers are educated about potential risks, the disclosure would require a summary of the city's regulations on substantial damage and substantial improvement, and language to direct buyers to websites for more information about ***sea***-***level*** ***rise*** and climate impacts.

Lewes Mayor Ted Becker said both issues may go before mayor and city council as early as May, but no later than June. He expects considerable discussion and a public hearing.

**Load-Date:** April 16, 2022

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[***TIDE GAUGE NETWORK***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:651D-0PB1-JDKC-R3F7-00000-00&context=1516831)

IPR

March 16, 2022 Wednesday 7:40 PM EST

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**Length:** 223 words

**Body**

NEW DELHI, March 16 -- The government of India issued the following press release:

Recently the Cabinet has approved a mission mode programme "Deep Ocean Mission" to be implemented by the Ministry of Earth Sciences, Govt. of India. One of the objectives of this Mission, among other things, is to provide projections of ***sea*** ***level*** ***rise*** along the coast of India under the various climate change scenarios. As an outcome of this project, a suite of interactive GIS maps identifying vulnerable areas and possible inundation scenarios will be prepared.

INCOIS, an autonomous institute of MoES has acquired the baseline Airborne Lidar Terrain Mapping (ALTM) elevation data from National Remote Sensing Centre (NRSC), under ISRO for the Tsunami Inundation modelling and vulnerability mapping. This data is available for the main land Indian coast up to two kilometres from the coast and would be used for predicting the ***sea***-***level*** ***rise***.

As part of Indian Tsunami Early Warning System, INCOIS has established a real-time network of 36 tide gauges at different locations along the Indian coast to monitor the tsunami waves and provide timely advisories. It has established 4 tide gauges in Andhra Pradesh at below locations. For any query with respect to this article or any other content requirement, please contact Editor at [*contentservices@htlive.com*](mailto:contentservices@htlive.com)

**Load-Date:** March 18, 2022

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