# Update: Single transition maps were updated on March 20, 2025 after we realized there was an error in how those maps were exported. This does not change the results in Hasler et al. 2024, but if you are using the single transition maps **please ensure you have the most recent copy**.

# Overview

All input data are publicly available except the Restor data which we acquired under a non-disclosure agreement. All of the derived spatial products generated in Hasler et al. 2024 have been deposited. This includes (1) the 24 ‘single land cover transition maps’ (median, minimum and maximum versions of each), (2) the most likely forest and most likely open maps (Fig. S1), (3) the potential albedo change map (Fig. S2a), as well as the minimum and maximum version, (4) the net climate impact and albedo offset map (Fig. 1), as well as an alternative net climate impact map based on a modified carbon map (Fig. S6). Source data for Figure S3 and S8 are also provided with this paper.

**1. Specific land-cover transitions**

Each of the specific land-cover transition global albedo change-induced radiative forcing files are saved in GeoTIFF format based on the MODIS Climate Modeling Grid (CMG) at 0.05 degrees latitude-longitude (~ 5 km resolution at the equator). The geographic coordinates of the upper-left corner of the upper-left pixel of a MODIS CMG image are -180.00 degrees longitude, 90.00 degrees latitude. The geographic coordinates of the lower-right corner of the lower right pixel are 180.00 degrees longitude, -90.00 degrees latitude. All files have a 16bits pixel depth with a no-data value of -32768. The files have the following names:

[*LC1*]2[*LC2*]\_[*ST*].tif

Where *LC1* and *LC2* are the acronyms of the initial and final land cover (“LC”) types, respectively (see Table S1). For example, ENF2CRO displays the radiative forcing due to a change from evergreen needleleaf forests to cropland, assuming evergreen needleleaf trees as the starting condition and croplands as the end condition for every land pixel outside Antarctica, regardless of current land cover or suitability for crops. *ST* is the kernel statistic and is either the median, maximum, or minimum. All values are given in Mg CO2e ha-1. In these files, negative values indicate an equivalent CO2 release or emission to the atmosphere (a “warming”), while positive values are CO2 uptake (a “cooling”). Note that values represent the transition described in the file name and can correspond to a loss or gain of tree cover. For example, ENF2CRO represents forest loss so to estimate a transition from cropland to evergreen needleleaf forest, the sign should be reversed.

In addition to the initial 24 land cover transitions between four open land and six forest land cover, we added transitions to/from savannas (SAV – 9) as a forest class as well as transitions to urban (URB – 13: urban and built-up lands, land covered by buildings and other man-made structures) from forests or from closed shrublands (CSH – 6: lands with woody vegetation less than 2 m tall and with shrub canopy cover >60%; the shrub foliage can be either evergreen or deciduous) to forests, hence a total of 35 transitions.

**2. Most likely land cover**

Both most likely open land and most likely woody/savanna forest files are saved in GeoTIFF format, signed 8-bits integer with a no-data value of 255, based on a WGS-84 grid of 0.005 degrees latitude-longitude (~500 m resolution at the equator). The geographic coordinates of the upper-left corner of the upper-left pixel are -180.00 degrees longitude, 90.00 degrees latitude. The geographic coordinates of the lower-right corner of the lower right pixel are 180.00 degrees longitude, -60.00 degrees latitude. All number values correspond to the IGBP land-cover classification (see Table S1).

In addition to the maps, values used for Figure S8 are given in file “Data FigS8.xlsx”. They are classified by biome-types as defined in Dinerstein, E. *et al.* An Ecoregion-Based Approach to Protecting Half the Terrestrial Realm. *Bioscience* **67**, 534–545 (2017).

**3. Potential albedo change map**

The potential albedo change maps are saved in GeoTIFF format, based on a WGS-84 grid of 0.005 degrees latitude-longitude (~500 m resolution at the equator). The geographic coordinates of the upper-left corner of the upper-left pixel are -180.00 degrees longitude, 90.00 degrees latitude. The geographic coordinates of the lower-right corner of the lower right pixel are 180.00 degrees longitude, -60.00 degrees latitude. All values are given in Mg CO2e ha-1. Negative values indicate an equivalent CO2 release or emission to the atmosphere (a “warming”), while positive values are of CO2 uptake (a “cooling”). File names are in the form “AlbedoRadiativeForcing\_[ST],tif, where ST is the kernel statistic, namely median, min (minimal effect) and max (maximum effect). All maps are calculated for restoration of tree cover, i.e. transitions from open lands to forests or woody savannas, so for deforestation purposes, signs need to be inverted.

**4. Net Climate Impact**

Both original net climate impact and modified-carbon net climate impact maps are saved in GeoTIFF format, based on a WGS-84 grid of 0.005 degrees latitude-longitude (~500 m resolution at the equator). The geographic coordinates of the upper-left corner of the upper-left pixel are -180.00 degrees longitude, 90.00 degrees latitude. The geographic coordinates of the lower-right corner of the lower right pixel are 180.00 degrees longitude, -60.00 degrees latitude. All values are given in Mg CO2e ha-1. Negative values indicate an equivalent CO2 release or emission to the atmosphere (a “warming”), while positive values are of CO2 uptake (a “cooling”). File names are “NetClimateImpact.tif” (Fig.1c) for the original Walker et. al potential carbon layer, and “ESATruncNetClimateImpact.tif” for the version of Walker et al. where the high values are truncated at the 85% value observed in a current biomass map (ESA-CCI) (Fig S7).

**5. Albedo Offset**

Albedo offset is saved in GeoTIFF format, based on a WGS-84 grid of 0.005 degrees latitude-longitude (~500 m resolution at the equator). The geographic coordinates of the upper-left corner of the upper-left pixel are -180.00 degrees longitude, 90.00 degrees latitude. The geographic coordinates of the lower-right corner of the lower right pixel are 180.00 degrees longitude, -60.00 degrees latitude. All values are given in % and are capped at +/- 10,000 to avoid +/- infinity.