

Data on forest cover, loss, and fragmentation in landscapes surrounding CTFS-ForestGEO sites

Source: Anderson-Teixeira *et al.* (2015)

Last updated: July 22, 2017

Data set description:

To evaluate forest degradation, loss, and fragmentation surrounding CTFS-ForestGEO plots, we performed a spatial and temporal analysis using global data on deforestation and forest cover and change with 30m resolution (Hansen *et al.* 2013, data downloaded February 2014 from <http://earthenginepartners.appspot.com/science-2013-global-forest>). Raw raster data was downloaded for: (a) Tree canopy cover, defined as ‘canopy closure for all vegetation taller than 5 m in height’, in the year 2000 (%); (b) pixels converted from forest to other land uses between 2000 and 2012; and (c) areas of no data, mapped land surface, and permanent water bodies. A separate raster of forest area was calculated from the tree canopy cover raster using a threshold function that defined terrestrial land surface pixels having greater than 10% canopy cover as forest, following the definition used by FAO (2000). To define areas of original forest cover surrounding each site, a global raster map of original pre-human modification forest cover produced by UNEP-WCMC was downloaded April 2014 from http://www.unep-wcmc.org/generalised-original-and-current-forests-1998_718.html. Only four sites had less than 100% original forest coverage within 50km. All spatial statistics were limited to terrestrial land areas of original forest cover.

Spatial analyses were performed in R (R Core Team, 2013) using the raster, geosphere, and rgdal packages using parallel processing via the foreach and dosnow packages. The land surrounding each CTFS-ForestGEO plot was buffered into five distinct spatial zones: (i) within the plot (but not including the entire plot; calculated as a circle originating at the plot center with a radius of half the smaller plot dimension); (ii) from the plot to 1 km distance; (iii) from 1-5 km; (iv) from 5-25 km; and (v) from 25-50 km. Three core metrics were calculated: (a) percentage tree cover in 2012; (b) percentage of tree cover present in 2000 that was lost by 2012, and (c)

forest fragmentation, defined as the length of forest edge adjacent to a deforested area (i.e., an area of original forest no longer forest) per unit forest area (units: km km⁻²).

Copies of R scripts used in the above analyses are available for download from the Harvard Dataverse Network at: <http://thedata.harvard.edu/dvn/dv/EbenBroadbent>.

Important Note:

The Hansen *et al.* (2013) dataset does not distinguish between natural forest and agroforestry areas; agroforestry areas with greater than 10% canopy cover and vegetation taller than 5 m in height are included in this definition of “forest”. Thus, “forest cover” in the surrounding landscapes is not necessarily primary or natural forest, and “forest loss” may include cutting of agroforestry plantations (i.e., as part of a rotation cycle). For example, at Pasoh (Malaysia), oil palm and rubber plantations are a feature of the landscape around the reserve, and “forest loss” from 2000-2012 adjacent to the reserve is attributable to the oil palm rotation, not to original forest loss. Moreover, the dataset does not distinguish between natural disturbance and deforestation; rather, “forest loss” implies either a stand-clearing disturbance or deforestation.

Data files:

CTFS-ForestGEO_landscape_data.csv

Data file contents:

| Column | Description | Units |
|-------------------------|--|-------|
| Id | Site ID number in Anderson-Teixeira et al. (2014) | - |
| Site | Site name | - |
| Latitude | Site latitude (sign convention: + for N; - for S) | |
| Longitude | Site longitude (sign convention: + for E; - for W) | |
| UTM_Zone | UTM zone for plot center coordinates | |
| UTM_X | UTM X coordinate | |
| UTM_Y | UTM Y coordinate | |
| per_land_0_1km | Percent land area within 0-1km of the plot center. | % |
| per_land_1_5km | Percent land area within 1-5km of the plot center. | % |
| per_land_5_25km | Percent land area within 5-25km of the plot center. | % |
| per_land_25_50km | Percent land area within 25-50km of the plot center. | % |
| orig_forest_cover_plot | Original forest cover within the plot | % |
| orig_forest_cover_0_1km | Original forest cover within 0-1km of the plot center. | % |

| | | |
|---------------------------|---|--------------------------------|
| orig_forest_cover_1_5km | Original forest cover within 1-5km of the plot center. | % |
| orig_forest_cover_5_25km | Original forest cover within 5-25km of the plot center. | % |
| orig_forest_cover_25_50km | Original forest cover within 25-50km of the plot center. | % |
| tree_cover_plot | Percent tree cover of originally forested land area within the plot in 2012 | % |
| tree_cover_0_1km | Percent tree cover of originally forested land area within 0-1km of the plot center in 2012 | % |
| tree_cover_1_5km | Percent tree cover of originally forested land area within 1-5km of the plot center in 2012 | % |
| tree_cover_5_25km | Percent tree cover of originally forested land area within 5-25km of the plot center in 2012 | % |
| tree_cover_25_50km | Percent tree cover of originally forested land area within 25-50km of the plot center in 2012 | % |
| forest_loss_plot | Percent of forest present in year 2000 that was lost by 2012 – within the plot. | % |
| forest_loss_0_1km | Percent of forest present in year 2000 that was lost by 2012 – within 0-1 km of the plot center. | % |
| forest_loss_1_5km | Percent of forest present in year 2000 that was lost by 2012 – within 1-5 km of the plot center. | % |
| forest_loss_5_25km | Percent of forest present in year 2000 that was lost by 2012 – within 5-25 km of the plot center. | % |
| forest_loss_25_50km | Percent of forest present in year 2000 that was lost by 2012 – within 25-50 km of the plot center. | % |
| forest_frag_plot | Forest fragmentation index (length of forest edge adjacent to an area of original forest no longer forest per unit forest area) in the year 2012– within the plot | edge km / area km ² |
| forest_frag_0_1km | Forest fragmentation index (length of forest edge adjacent to an area of original forest no longer forest per unit forest area) in the year 2012– within 0-1 km of the plot center. | edge km / area km ² |
| forest_frag_1_5km | Forest fragmentation index (length of forest edge adjacent to an area of original forest no longer forest per unit forest area) in the year 2012– within 1-5 km of the plot center. | edge km / area km ² |
| forest_frag_5_25km | Forest fragmentation index (length of forest edge adjacent to an area of original forest no longer forest per unit forest area) in the year 2012– within 5-25 km of the plot center. | edge km / area km ² |
| forest_frag_25_50km | Forest fragmentation index (length of forest edge adjacent to an area of original forest no longer forest per unit forest area) in the year 2012– within 25-50 km of the plot center. | edge km / area km ² |

How to cite:

Publications using these data should cite Anderson-Teixeira et al. (2015) and Hansen *et al.* (2013).

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Citations:

Anderson-Teixeira KJ, Davies SJ, Bennett AC, Gonzalez-Akre EB, Muller-Landau HC, Wright SJ, et al. (2014) CTFS-ForestGEO: A worldwide network monitoring forests in an era of global change. *Global Change Biology*, 21 (2), 528-549. DOI: 10.1111/gcb.12712

FAO (2000) On Definitions of Forest and Forest Change. Forest Resources Assessment Programme. Working Paper No. 33. Rome, Italy.

Hansen MC, Potapov PV, Moore R et al. (2013) High-Resolution Global Maps of 21st-Century Forest Cover Change. *Science*, **342**, 850–853.

R Core Team (2013) R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <http://www.R-project.org/>.