



Percent Natural Land Cover

This EnviroAtlas national map portrays the percentage of land within each 12-digit hydrologic unit (HUC) that is classified as natural land cover. Natural land cover for the conterminous U.S. is defined using the EnviroAtlas hybrid 2016 Cropland Data Layer (CDL) - 2016 National Land Cover Dataset (NLCD). Alaska is based on the 2016 NLCD; Hawaii is derived from the 2005–2011 National Oceanic and Atmospheric Administration’s (NOAA) Coastal Change Analysis Program (C-CAP) data, Puerto Rico from 2010 C-CAP, and the U.S. Virgin Islands from 2012 C-CAP data.

Why is natural land cover important?

EnviroAtlas defines natural land cover as forest, shrubland, grassland, barren land, and wetland cover classes, while it excludes agriculture and developed land. For Alaska, natural land cover also includes perennial ice and snow, lichens, moss, and sedges and forbs. The term *natural* in natural land cover does not imply good quality or lack of human disturbance but rather vegetative cover that is not typically intensively managed. For example, natural land cover includes range but not pasture, which is included under agriculture.

Natural land cover can provide a range of ecosystem services. For instance, forest lands contribute to climate regulation, water quality protection, air quality maintenance, biodiversity conservation, erosion control, timber production, and recreational, cultural, and aesthetic values.¹ Wetlands also aid in climate regulation, and they are well known for their ability to promote water quality by removing excess nutrients, sediment, and toxic chemicals, and to buffer communities from coastal storms. Natural land cover also supports biodiversity by serving as habitat for plants and animals that provide critical benefits like pollination, natural pest control, and food.

Natural land cover data at various scales are essential attributes of habitat suitability and species distribution models. The U.S. Geological Survey GAP Analysis program uses [natural land cover data](#) and other key habitat parameters from the literature to model vertebrate species distributions for biodiversity assessment and conservation planning.^{1,2}

Studies designed to detect and interpret land cover changes over time examine aspects of climate change, habitat loss, and patterns of urban growth. Regional land cover change detection is a valuable tool to focus planning and conservation

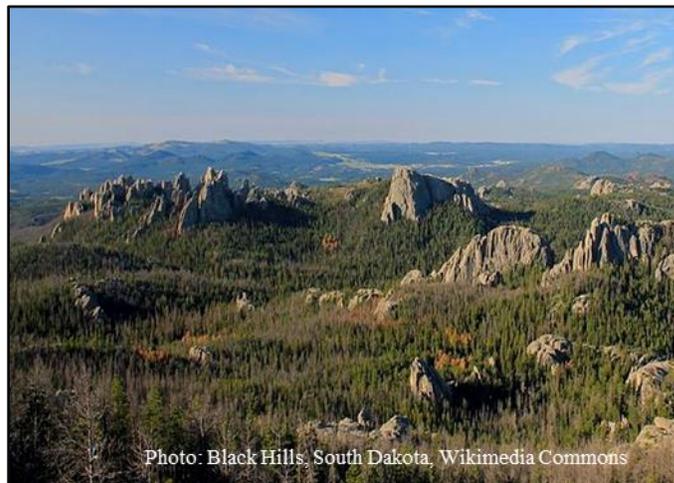


Photo: Black Hills, South Dakota, Wikimedia Commons

efforts. Monitoring past changes in natural land cover may suggest future changes in management focus that better protect the resource. For example, a Great Lakes study found that a higher than expected area of near-lake wetlands had been lost to development in the 1990s, even during a time of heightened awareness of wetland values, suggesting that greater effort may be needed in the future to protect shoreline wetlands.³

The amount of natural land cover in a watershed affects both terrestrial and aquatic habitat quality. In a stream study conducted in coastal Maryland streams, aquatic insect assemblage composition changed significantly (i.e., sensitive species were lost) when between 21% and 32% of whole watershed natural land cover was developed.⁴ The same study found that the thresholds for assemblage changes were even lower when development occurred closer to the stream.

Natural land cover adjacent to streams and rivers, sometimes called the [riparian](#) area (or [riparian buffer](#)), helps protect terrestrial wildlife habitat, aquatic habitat, and water quality especially in agricultural or urbanized areas where upland natural land cover may be lacking. For more information on riparian cover, see EnviroAtlas national and community data layers covering stream and lake buffers.

How can I use this information?

This map is one of a series of EnviroAtlas data layers that depict national land cover. The map estimates the percent land area of 12-digit HUCs with natural land cover. Continuous nationwide land cover data allows the assessment of national

and regional environmental issues. Land cover, together with other EnviroAtlas data, can be used to estimate risks from natural hazards and to prioritize areas for conservation.

For example, the natural land cover map may be compared with maps depicting protected status ([PADUS](#), [GAP](#), or [IUCN](#)) to assess the distribution of existing protected areas and the need for additional protected lands in the remaining areas of natural land cover. Natural land cover may also be associated with major stressors such as national patterns of impervious area or nutrient sources such as manure or nitrogen fertilizer application.

How were these data created?

These data were generated from the EnviroAtlas hybrid 2016 CDL-NLCD for the conterminous U.S., the 2016 NLCD for Alaska, the NOAA 2005–2011 C-CAP data for Hawaii, 2010 C-CAP data for Puerto Rico, and 2012 C-CAP data for the U.S. Virgin Islands. The land cover data were used in the landscape assessment tool, Analytical Tools Interface for Landscape Assessments (ATtILA). [ATtILA](#) is a tool created by EPA to calculate landscape metrics. This map uses NLCD classes 12 Perennial Ice-Snow, 31 Barren, 41 Deciduous, 42 Evergreen, 43 Mixed Forest, 51 Dwarf Scrub, 52 Shrub/Scrub, 71 Grassland-Herbaceous, 72 Sedge-Herbaceous, 73 Lichens, 74 Moss, 90 Woody Wetlands, and 95 Emergent Herbaceous Wetlands and C-CAP classes 8 Grassland, 9 Deciduous, 10 Evergreen, 11 Upland Forest, 12 Shrub/Scrub, 13 Palustrine Forested Wetland, 14 Palustrine Scrub/Shrub Wetland, 15 Palustrine Emergent Wetland, 16 Estuarine Forested Wetland, 17 Estuarine Shrub/Scrub Wetland, 18 Estuarine Emergent Wetland, 19 Unconsolidated Shore, and 20 Bare Land. Landcover data were summarized by 12-digit HUC boundaries taken from the [NHDPlusV2](#) Watershed Boundary Dataset (WBD Snapshot) for the conterminous U.S., Hawaii, Puerto Rico, and the U.S. Virgin

Selected Publications

1. Stohlgren, T.J., and T. Holcombe. 2013. [Impacts of land use change to ecosystem services](#). Pages 13–22 in Pielke, Sr., R.A. (Ed.), *Climate Vulnerability: Understanding and Addressing Threats to Essential Resources*, Academic Press, Cambridge, Massachusetts. 1570 p.
 2. Aycrigg, J. 2010. [Mapping species ranges and distribution models across the United States](#). *Gap Analysis Bulletin* 18:12–20.
 3. Wolter, P.T., C.A. Johnston, and G.J. Niemi. 2006. [Land use land cover change in the U.S. Great Lakes basin 1992 to 2001](#). *Journal of Great Lakes Research* 32:607–628.
 4. King, R.S., M.E. Baker, D.F. Whigham, D.E. Weller, T.E. Jordan, P.F. Kazyak, and M.K. Hurd. 2005. [Spatial considerations for linking watershed land cover to ecological indicators in streams](#). *Ecological Applications* 15(1):137–153.
- Homer, C.G., J.A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Xian, J. Coulston, N. D. Herold, J.D. Wickham, and K. Megown. 2015. [Completion of the 2011 National Land Cover Database for the conterminous United States: Representing a decade of land cover change information](#). *Photogrammetric Engineering and Remote Sensing* 81(5):345–354.
- Marshall, C.H., R.A. Pielke, Sr., L.T. Steyaert, and D.A. Willard. 2004. [The impact of anthropogenic land-cover change on the Florida peninsula sea breezes and warm season sensible weather](#). *American Meteorological Society Monthly Weather Review* 132:28–52.

Islands, and the November 24, 2016 version of the WBD for Alaska. For more information on the metric calculation, see the [ATtILA](#) User’s Manual.

What are the limitations of these data?

Though EnviroAtlas uses the best data available, there are limitations associated with the data. The landcover classes found in NLCD and C-CAP were created through the classification of satellite imagery. Classification of landcover types that have a similar spectral signature can result in classification errors. As a result, NLCD and C-CAP are a best estimate of actual landcover. Periodic updates to EnviroAtlas will reflect improvements to nationally available data.

How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. The [NLCD](#), [CDL](#), C-CAP, and [NHDPlusV2](#) data are accessible through their respective websites. NLCD data are updated every 5 years to enable change detection research; a land cover change data layer is also available that contains only the pixels identified as changed from 2001 to 2016 at 2–3-year intervals.

Where can I get more information?

A selection of resources related to the utility of natural land cover data is listed below. For additional information on how the data were created, access the [metadata](#) for the data layer from the layer list drop down menu on the interactive map. To ask specific questions about this data layer, please contact the [EnviroAtlas Team](#).

Acknowledgments

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