EnviroAtlas

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Fact Sheet

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# Percent Emergent Herbaceous Wetlands

This EnviroAtlas national map estimates the percentage of emergent herbaceous wetlands within each 12-digit hydrologic unit (HUC). For the conterminous U.S., the map layer uses the EnviroAtlas hybrid 2016 Cropland Data Layer (CDL) - 2016 National Land Cover Dataset (NLCD) to define emergent herbaceous wetlands. Alaska is based on the 2016 NLCD; Hawaii is derived from the 2005–2011 National Oceanic and Atmospheric Administration's 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 are emergent herbaceous wetlands important?

Emergent herbaceous wetlands are dominated (>75%) by herbaceous plants that are hydrophytic or water-adapted. The vegetation is rooted below the water's surface and either stands erect above the water (e.g., cattails) or grows at the surface (e.g., lily pads). These wetlands may occur as isolated systems or associated with other waterbodies (e.g., rivers, streams, lakes, and intertidal channels and estuaries). Emergent herbaceous wetlands are represented in various ecosystems by a range of wetland types, including salt and brackish tidal wetlands, marshes, wet meadows, prairie potholes, vernal pools, and desert alkaline playas.

EnviroAtlas provides information about the benefits provided by wetland ecosystems for clean and plentiful water, natural hazard mitigation, and recreational and cultural values. Wetlands provide aesthetic value and tangible ecosystem services such as soil loss reduction, nutrient and toxics filtration, groundwater recharge, flood water storage, carbon sequestration, storm surge mitigation, wildlife habitat, biological diversity, and recreational opportunities.[1] By slowing the passage of water, wetlands can prevent sediment, nutrients, harmful bacteria, pesticides, and metals from entering waterways and degrading water quality.[1] Recent wetland research efforts focus on quantifying the benefits of wetlands and wetland restoration. For example, a model to simulate wetland water storage in a sub-basin of the Red River in Minnesota (a system that floods frequently) showed that restoring 25% of drained wetlands would increase water storage by 27–32% basin-wide to help alleviate flooding.[2]

Wetlands also have the ability to store atmospheric carbon (carbon sequestration) in standing vegetation, litter, and organic soil and sediments. Restored wetlands, by banking additional stored carbon, can make a significant contribution to climate change mitigation. Cultivated wetlands lose their stored soil organic carbon to the atmosphere, but soil organic carbon is rapidly restored when wetland function is restored.[3] A study in the Prairie Pothole region estimated that the 12.2 million acres of potentially restorable herbaceous wetlands in that area have the potential to sequester 122.6 million tons of soil organic carbon over a 10-year period.[3]


Photo: Great Blue Heron, NOAA

Coastal wetlands provide a valuable service by reducing the destructive power of wave damage from storm surges, tropical storms, and hurricanes. A recent study of U.S. hurricanes over the last 35 years estimated that coastal wetlands provide over $23 billion per year in storm protection services.[4] In Louisiana, for example, the state had lost an estimated 480,000 hectares (1,186,106 acres) of coastal wetlands, a cumulative loss that contributed to exposing New Orleans and its constructed levees to the Katrina storm surge in 2005.[4]

Wetlands support biodiversity by providing habitat for fish, amphibians, reptiles, birds, and semi-aquatic mammals. Coastal marshes, estuaries, and the wetland backwaters of streams and rivers serve as nurseries for young fish. Migratory waterfowl use coastal and inland wetlands for resting, feeding, breeding, and nesting. Wildlife in wetland areas attracts birdwatchers, photographers, and hunters, providing aesthetic and recreational value.

## How can I use this information?

This map is one of a series of EnviroAtlas data layers that depict national land cover. Continuous nationwide land cover

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data allows the assessment of national and regional environmental issues. The map estimates the percent land area of 12-digit HUCs covered by emergent herbaceous wetlands. Knowing the distribution of emergent herbaceous wetlands is important for locating and prioritizing candidate areas for wetland conservation or restoration. Multiple wetland functions may be ranked by regional needs for water quality improvement, wildlife habitat, flood protection, nutrient filtration, or groundwater recharge. Once candidate wetland areas are identified, detailed site analysis may be planned for restoring individual wetlands.

Land cover overlaid with other EnviroAtlas data can be used to evaluate areas for conservation and to estimate risks related to natural hazards. This map may be used with other EnviroAtlas data such as protected lands or National Wetland Inventory wetlands or other map layers such as Potentially Restorable Wetlands on Agricultural Land. Potential restoration areas may be compared with impaired waters data to assist in maximizing wetland filtration capabilities when implementing Total Maximum Daily Loads in streams. Wetlands restored alongside or upstream of impaired stream segments may help reduce sediment and nutrient loads to streams. Wetlands restored downstream of pollutant loads may help mitigate degraded water quality. Herbaceous wetlands may also be associated with stressors such as national patterns of impervious area or the application of agricultural nutrients such as manure or inorganic fertilizers.

## How were these data created?

These data were generated from the EnviroAtlas hybrid 2016 CDL-NLCD for the conterminous U.S. and the 2016 NLCD for Alaska. C-CAP data were used for Hawaii (2005–2011), Puerto Rico (2010), and the U.S. Virgin Islands (2012). The land cover data was used in the landscape assessment tool, Analytical Tools Interface for Landscape Assessments (ATtILA). ATtILA is an Esri ArcGIS extension created by EPA that calculates many commonly used landscape metrics. This map uses NLCD class 95 Emergent Herbaceous Wetlands and C-CAP classes 15 Palustrine Emergent Wetland and 18 Estuarine Scrub/Shrub Wetland. The 12-digit HUC boundaries were taken from the NHDPlusV2 Watershed Boundary Dataset (WBD Snapshot) for the conterminous U.S., Hawaii, Puerto Rico, and the U.S. Virgin Islands. The November 24, 2016 WBD was used for Alaska. For more information on the metric, see the ATtILA User's Manual.

## What are the limitations of these data?

The landcover classes found in NLCD and C-CAP were created through the classification of satellite imagery. Classification of land cover 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 land cover. Each version of NLCD is released several years after the date of the satellite imagery used in its creation, meaning that the land cover patterns are several years out of date when released.

## 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 WBD 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 references relating to wetlands and the ecosystem services they provide 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

EnviroAtlas is a collaborative effort led by EPA. This EnviroAtlas map was developed by Donald Ebert, EPA. The fact sheet was created by Sandra Bryce, Innovate!, Inc.

## Selected Publications

1. Natural Resources Conservation Service. 2012. Restoring America's wetlands: A private lands conservation success story. Natural Resources Conservation Service, Washington, DC. 16 p.

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3. Gleason, R.A., N.H. Euliss, Jr., R.L. McDougal, K.E. Kermes, E.N. Steadman, and J.A. Harju. 2005. Potential of restored prairie wetlands in the glaciated North American prairie to sequester atmospheric carbon. Paper 92, U.S. Geological Survey, Northern Prairie Wildlife Research Center, Jamestown, North Dakota.

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Dahl, T.E. 2011. Status and trends of wetlands in the conterminous United States 2004 to 2009. U.S. Fish and Wildlife Service, Washington, D.C. 108 p. (slow to open)