Percent Wetlands

This EnviroAtlas national map depicts the percent of land comprised of woody and emergent herbaceous wetlands in each 12-digit hydrologic unit (HUC) using wetland definitions from the EnviroAtlas hybrid 2011 Cropland Data Layer (CDL) - 2011 National Land Cover Dataset (NLCD).

Why are wetlands important?

Wetlands, generally defined, are lands often or periodically saturated with water. The saturation level in these areas influences the soils, plants, and animals that thrive under these conditions, creating unique ecological communities. Wetlands can be found adjacent to rivers, lakes, streams, in tidal areas, or as isolated systems. Often located at the interface of upland terrestrial systems and aquatic systems, wetlands provide critical services, including nutrient retention, flood control, storm-surge mitigation, carbon sequestration, nurseries for fisheries, habitat, and opportunities for recreation.

In 2011, the U.S. Fish and Wildlife Service estimated that wetlands comprised 5.5 percent of land within the contiguous U.S.[1] While over 100 million acres of wetlands remain, significant losses of wetlands have occurred over time. Wetlands are protected under federal regulations, and activities that impact wetlands areas often require a permit. In addition to loss of wetland area, changes in the water regime, water quality, and invasive species may also impact wetland services.

Wetland plants, microbes, and soils promote water quality by removing excess nutrients (e.g., nitrogen and phosphorus), sediment, and toxic chemicals. Wetlands may intercept surface-water runoff from higher dry land before the runoff reaches open water, often reducing eutrophication in downstream waters and preventing contaminants from reaching groundwater and other sources of drinking water.

By buffering the effects of coastal storms and mitigating floods, wetlands help prevent loss during storm events. Wetlands reduce flooding by storing rainwater, slowly releasing it after storms to surface- and groundwater resources. Trees, root mats, and other wetland vegetation slow the speed of flood waters and distribute them more slowly over a floodplain. The presence of vegetation in wetlands decreases the area of open water and increases drag on water motion, thereby dispersing energy and decreasing the amplitude of waves or storm surges. Unfortunately, the value of wetlands to reduce the impacts of floods and storms has often been retrospective, based on the estimated costs of damage or loss after a flood or storm has occurred.


Photo: Lynn Betts, NRCS

In addition to their natural hazard mitigation benefits, wetlands can be significant carbon reservoirs. Carbon is contained in the standing crops of vegetation, litter, and in organic soil/sediments. The magnitude of storage depends upon wetland size, vegetation, depth of wetland soils, ground water, nutrient levels, pH, biogeochemical conditions, and the potential offsets from methane and nitrous oxide production, necessitating analyses of such factors.

Wetlands support biodiversity by providing habitat. Many of the nation's fishing and shell fishing industries harvest wetland-dependent species. Fish, such as flounder, sea trout, croaker, and others, breed and raise their young in coastal marshes and estuaries. Wetlands provide shelter, breeding areas, and food for shrimp, crabs, oysters, and clams.

Various birds, amphibians, and mammals also depend on wetlands to survive. Ducks, geese, woodpeckers, hawks, wading birds, and many song-birds depend on wetlands to feed, nest, reproduce, and raise their young. Migratory waterfowl use coastal and inland wetlands as resting, feeding, breeding, or nesting grounds for at least part of the year. The prominence of wildlife in wetland areas makes them ideal locations for bird-watching, hunting, and kayaking. As vibrant natural communities, wetlands can also provide aesthetic value for surrounding towns and communities.

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How can I use this information?

The map, Percent Wetlands, which has been summarized by 12-digit HUCs, can be used in conjunction with other data to study the importance of wetlands for nutrient retention, flood control, storm-surge mitigation, carbon sequestration, fish and waterfowl production, and recreation. For example, it can help inform investigations into water quality issues such as sedimentation, nutrients, pesticides, or biological impairment. After finding out the total wetland percentage of a particular 12-digit HUC, potential restoration areas can be more intensively investigated by adding streams and rivers from the EnviroAtlas supplemental maps, and reducing the transparency to view the aerial imagery base map underneath.

How were the data for this map created?

These data were generated by using an EnviroAtlas hybrid 2011 Cropland Data Layer (CDL) - 2011 National Land Cover Dataset (NLCD) in the ATtILA tool. ATtILA is a tool created by EPA to calculate landscape metrics. Through ATtILA, the landcover data was summarized by 12-digit HUC boundaries taken from the Watershed Boundary Dataset. Only Woody Wetland and Emergent Herbaceous Wetland categories from the NLCD were included in the calculation. EnviroAtlas uses the NLCD definition of these wetland categories for the purposes of this map. For more information on the metric calculation, please see the ATtILA User's Manual.

What are the limitations of these data?

All national data layers are inherently imperfect; they are an estimation of the truth based on the best available science. Calculations based on these data are therefore also estimations. The user needs to be aware that the mapped data are not perfect and should be used to inform further investigation. Periodic updates to EnviroAtlas will reflect improvements to nationally available data. For more technical details about the limitations of these data, refer to the metadata. Accuracy information for the NLCD can be found on its website.

How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded.

Where can I get more information?

There are many resources on wetlands; a selection of these resources is below. For additional information on how the data were created, access the metadata for the data layer from the drop down menu on the interactive map table of contents and click again on metadata at the bottom of the metadata summary page for more details. To ask specific questions about this data layer, please contact the EnviroAtlas Team.

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Selected Publications

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