Percent Wetlands

This EnviroAtlas community map illustrates the percentage of total land area within each U.S. Census block group that is covered by woody or emergent herbaceous wetlands.

Why are wetlands important?

Wetlands are land areas that are often or periodically saturated with water. Three main components used to define wetlands are the presence of wetland hydrology, hydric soils, and hydrophytic (water-adapted) vegetation.[1] A depression that carries water during wet periods may be temporary and may not possess one or more of the required components. Wetlands are found adjacent to rivers, lakes, and streams, in tidal areas, or as isolated systems.

Major regional wetland losses have occurred across the conterminous U.S. over the last 200+ years with expanding coastal development, agricultural land conversion, and urbanization.[2] The pace of wetland conversions has slowed more recently with recognition of the values they provide and the passage of some disincentives to conversion. EnviroAtlas offers information about the benefits produced by wetland ecosystems. Wetlands provide aesthetic value in addition to more tangible ecosystem services such as wildlife habitat, biological diversity, soil retention, groundwater recharge, nutrient and toxics filtration, carbon sequestration, and flood water storage.[3] Wetlands support biodiversity by providing habitat for fish, amphibians, reptiles, birds, and semi-aquatic mammals. Coastal marshes and 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.

Communities benefit from the conservation of regional wetlands. Under natural conditions, water percolates slowly through the soil to enter streams and rivers. Wetlands reduce flooding and drought by storing rainwater and slowly releasing it to surface- and groundwater sources. The expansion of development into wet areas increases the coverage of impervious surfaces (e.g., rooftops and roadways) and reduces the residence time of water on the landscape, sending precipitation and polluted overland flow from nonpoint pollution sources directly through drains to streams and rivers.[4]

The proportions of wetlands and vegetative cover relative to impervious surfaces in community neighborhoods influence

the quantity and speed of urban stormwater runoff entering waterways. By slowing the passage of water, wetlands can prevent sediment, nutrients, harmful bacteria, pesticides, and metals from entering other waterbodies and degrading water quality. Nutrients enter waterbodies from fertilizer use and in runoff from industry and wastewater treatment plants. Wetlands can remove both phosphorus and nitrogen from runoff and groundwater, reducing eutrophication and algal blooms in connected waterbodies. Wetland sediments are major sites for denitrification, a process in which bacteria in saturated soil transform dissolved nitrates into gaseous nitrogen compounds that escape to the atmosphere.[3]

Current wetland research efforts focus on quantifying the benefits of wetlands and wetland restoration. Recent studies have estimated the amount of carbon sequestered by functioning wetlands[5] and the increased water storage provided by wetlands to alleviate flooding.[6] Knowing the relative value of wetland benefits is important for locating and prioritizing candidate areas for wetland conservation and restoration. Multiple wetland functions may be ranked by local needs for water quality, wildlife habitat, flood protection, nutrient filtration, or groundwater recharge.

How can I use this information?

This community map illustrates the percent land area of U.S. Census block groups covered by wetlands. This map can be used by citizens, planners, and public health professionals to identify block groups that may have problems associated with impervious surfaces. The

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wetlands data layer can serve as a planning tool for mitigating flooding, drought, and pollutant load in receiving waterbodies. This map may be used along with other community maps covering 15 and 50 meter riparian buffers and annual changes in sediments, nutrients, oxygen demand, metals, and runoff to evaluate where wetland restoration may improve nonpoint source pollution or flood protection.

Users might also overlay EnviroAtlas impervious surface maps or green space maps and National Hydrography Dataset (NHDPlus) flowline data (available under the boundaries icon) to explore where wetland conservation and restoration would have the greatest return in terms of improving water quality in nearby waterbodies. Wetland maps may be compared with EPA impaired waters data to maximize 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.

How were the data for this map created?

This map is based on the land cover data derived for each EnviroAtlas community. The land cover data was created from one-meter aerial photography through remote-sensing methods. Wetland land cover includes all woody or emergent herbaceous wetlands. The wetland cover was summarized by 2010 U.S. Census block group boundaries.

What are the limitations of these data?

All of the EnviroAtlas community maps that are based on land cover use remotely-sensed data. Remotely-sensed data in EnviroAtlas have been derived from imagery and have not been verified. Human classification of different landcover types that have a similar spectral signature can result in classification errors. The land cover maps used in the community component of EnviroAtlas typically have an overall accuracy of between 80 and 90 percent. This level of accuracy means that there is a probability of at least 80 percent that the land cover reported at any given point on the map is correct.

The land cover maps will be updated over time; updates may have improved accuracy as data and classification methods improve.

How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. To find the EnviroAtlas 1-meter land cover grids created for each community, enter *land cover community* in the interactive map search box.

Where can I get more information?

A selection of references relating to wetlands and the ecosystem services they provide is listed below. 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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3. Nyman, J.A. 2011. Ecological functions of wetlands. Pages 115–128 *in* LePage, B.A. (ed.), *Wetlands: Integrating multidisciplinary concepts*. Springer Science + Business Media, Dordrecht, The Netherlands. 261 p.

4. D'Ambrosio, J.D., T. Lawrence, and L.C. Brown. 2004. A basic primer on nonpoint source pollution and impervious surface. Fact Sheet AEX-444-04. Ohio State University Extension, Food, Agricultural and Biological Engineering, Columbus, Ohio.

5. 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.

6. Gleason, R.A., B.A. Tangen, M.K. Laubhan, K.E. Kermes, and N.H. Euliss, Jr. 2007. Estimating water storage capacity of existing and potentially restorable wetland depressions in a subbasin of the Red River of the North. USGS Open File Report 2007-1159, U.S. Geological Survey, Reston, Virginia. 36 p.