



Total Number of At-Risk Wetland Species

This EnviroAtlas national map displays the total number of at-risk wetland plant and animal species that may appear within each 12-digit hydrologic unit ([HUC](#)). The plant and animal species are ranked as [Imperiled \(G1/G2\)](#) by NatureServe or listed as threatened or endangered under the U.S. Endangered Species Act.

Why are at-risk wetland species important?

Wetlands are land areas that are permanently or periodically saturated with water. 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.¹ EnviroAtlas offers maps and information about the benefits produced by wetland ecosystems. Wetlands provide aesthetic values and also more tangible ecosystem services such as wildlife habitat, biological diversity, soil retention, [groundwater recharge](#), nutrient and toxics filtration, [carbon sequestration](#), and flood water storage.² Wetlands support [biodiversity](#) by providing habitat for fish, amphibians, reptiles, birds, and semi-aquatic mammals. Coastal marshes and estuaries and the backwaters of streams and rivers serve as nurseries for young fish. Migratory waterfowl use coastal and inland wetlands for resting, feeding, breeding, and nesting.

An endangered species is one that is in danger of extinction through all or much of its range while a threatened species is one that is likely to become endangered. At-risk wetland plant and animal species are in danger of extinction from energy development, habitat loss, pollution, disease, over-exploitation, and competition from invasive species. The loss of these species could negatively affect many benefits that we derive from wetland ecosystems. Many species provide recreational, cultural, or aesthetic value and contribute to an area's ability to attract tourism and associated jobs.

Each species plays an important role within its [ecosystem](#). The removal of one or more species can potentially have cascading effects throughout an entire ecosystem. Because wetlands have high moisture availability and productivity, they are especially vulnerable to invasive plant species that tend to spread rapidly, reduce biodiversity, and alter habitat structure. For example, in California, a perennial invasive grass from Australia is invading and altering rare vernal pools by displacing endangered plant and animal species.³ The four main groups of vulnerable vernal pool wildflowers



Photo: Western prairie fringed orchid, National Park Service

each have one or more species of [native bee pollinators](#) that specialize in collecting pollen only from them.

In 1991, 43% of the 595 plant and animal species listed as threatened and endangered by the U.S. Fish and Wildlife Service were wetland dependent.⁴ Niering (1988), in a detailed survey, found 17 endangered and 12 threatened wetland-associated plant species nationwide.⁵ He also recorded 80 endangered wetland-associated animal species. [NatureServe](#) has developed a global system of conservation status ranking that ranks species according to their imperilment status. G1 and G2 species are those species that have been deemed to be critically imperiled (G1) or imperiled (G2) across their entire ranges. Species with these rankings are believed to be at high risk of extinction. The [Endangered Species Act \(ESA\)](#) provides some protections for listed species. These include protections from federal activities, restrictions on taking or selling threatened species, creation of recovery plans, and authority to acquire important habitat. For a species to be protected under the Endangered Species Act, it must be added to the List of Endangered and Threatened Wildlife or the List of Endangered and Threatened Plants.

How can I use this information?

The map, Total Number of At-Risk Wetland Species, provides information about the number of observed wetland plant and animal species at risk of extinction summarized by 12-digit HUC. Users can identify HUCs nationwide with high concentrations of at-risk species or find the number of at-risk wetland plant and animal species that have been

observed in their own local HUC. This at-risk species information can inform decisions about habitat protection. This layer can be used in conjunction with other EnviroAtlas layers. For example, it could be compared with maps showing land cover, population, road density, atmospheric pollution deposition, and protected areas to analyze the relationship between habitat and at-risk species and to identify potential threats.

How were the data for this map created?

This map was created by NatureServe based on records of species occurrences derived from the State Heritage programs. NatureServe maintains records of all G1 and G2 plants and animals as well as those that are on the lists of Endangered and Threatened Wildlife and Plants.

To create this map, occurrences of G1/G2 and ESA species were selected and mapped. These were joined with a map of 12-digit HUCs to create a list of each species in each HUC. Species were flagged as aquatic, wetland, or terrestrial, though these three categories are not mutually exclusive given that species can spend parts of their lives in multiple habitats. The total number of wetland plant and animal species was recorded for each 12-digit HUC.

What are the limitations of these data?

EnviroAtlas uses the best data available, but there are still limitations associated with the data. These data are based on models and large national geospatial databases. Calculations based on the data are estimations of the truth founded on the best available science. Modeled data can be complementary to field data, but the information is not meant to replace monitoring data.

Even if no at-risk species appear in a 12-digit HUC, this does not necessarily mean they are not present; it could mean that no one has searched for or recorded them. Many

areas have not been thoroughly surveyed for at-risk species, and new species are still being discovered. NatureServe has more data on some species than others; better local data may be available. Less data is available on invertebrates, non-vascular plants such as lichens and mosses, and marine species. Data may be incomplete or unavailable for tribal lands. This dataset does not currently include data for Delaware, Massachusetts, or Pennsylvania. Data on plants, but not animals, is included for Washington State.

How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. Current state heritage data and contact information are available at the [NatureServe Network](#) website under the Organizations tab.

Where can I get more information?

There are numerous resources on at-risk species; a selection of these resources is listed below. Information about [NatureServe](#) and additional data sets can be found at their website. Information about State Heritage data can be accessed through the individual State Heritage programs. Information about the [Endangered Species Act](#) can be found at the U.S. Fish and Wildlife Service's website. 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](#).

Acknowledgments

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Selected Publications

1. Zedler, J. B. 2004. [Compensating for wetland losses in the United States](#). *Ibis* 146: 92–100.
 2. 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.
 3. Zedler, J.B., and S. Kercher. 2004. [Causes and consequences of invasive plants in wetlands: Opportunities, opportunists, and outcomes](#). *Critical Reviews in Plant Sciences* 23(5):431–452.
 4. Flynn, K. 1996. [Understanding wetlands and endangered species: Definitions and relationships](#). Extension Publication ANR-979, Alabama Cooperative Extension System.
 5. Niering, W.A. 1988. [Endangered, threatened, and rare wetland plants and animals of the continental United States](#). Pages 227–238 in Hook, D.D., Jr., et al. (Eds.), *The ecology and management of wetlands: Volume 1, The ecology of wetlands*, Timber Press, Portland, Oregon.
- Dobson, A.P., J.P. Rodriguez, W.M. Roberts, and D.S. Wilcove. 1997. [Geographic distribution of endangered species in the United States](#). *Science* 275:550–553.