



Number of At-Risk Aquatic Animal Species

This EnviroAtlas national map displays the number of at-risk aquatic animal species observed within each 12-digit hydrologic unit (HUC). It includes animal species that 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 aquatic animals important?

At-risk aquatic animal species are in danger of extinction from habitat loss, pollution, disease, over-exploitation, and competition from invasive species. The loss of these species could affect many benefits that we derive from aquatic ecosystems. For example, many aquatic animal species contribute to a clean and plentiful supply of water by filtering out pollution, preventing overgrowths of algae, or acting as water quality indicators. Some aquatic species also provide recreational, cultural, or aesthetic value.

Each species plays an important role within its [ecosystem](#). Ecosystems are highly interconnected, with numerous [food chains](#) that form a [food web](#), where all species have a vital function. Each species depends on other species for some aspect of their survival, whether it is to provide habitat, serve as food, decompose matter, or control pest species. The removal of even one species from an ecosystem could potentially have cascading effects throughout the system.

NatureServe and others have 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 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 Endangered and Threatened Plants. An endangered species is one that is in danger of extinction throughout all or much of its range. A threatened species is one that is likely to become endangered.



Photo: Keith Ramos, USFWS

Mussel species demonstrate the importance of and services provided by threatened aquatic animal species. Mussels provide an important service by filtering toxic substances from streams. However, this makes them especially vulnerable to pollution. As a result, many mussel species are threatened or endangered.

Threatened and endangered aquatic animal species, such as the endangered Florida manatee pictured above, also provide opportunities for wildlife watching and tourism.

How can I use this information?

The map, Number of At-Risk Aquatic Animal Species, provides information about the number of observed aquatic animal species that are at risk of extinction. The data are summarized by 12-digit HUC. Users can identify HUCs nationwide with high concentrations of at-risk species or find the number of at-risk animal species that have been observed in their own local HUC. This information could 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, stream length, impaired waters, dams, or lake and stream buffers to analyze the relationships between habitat and at-risk species and to determine potential threats. Users may find additional opportunities to restore aquatic habitats by comparing this map to the layers describing potentially restorable wetlands.

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 species by 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 aquatic animal species was recorded for each 12-digit HUC. For detailed information on the processes through which this data was generated, see the metadata.

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 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. 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.

Where can I get more information?

There are numerous resources on at-risk species; a selection of these publications 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 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

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Helfrich, L.A., Neves, R.J. and J. Parkhurst. 2009. [Sustaining America's aquatic biodiversity: What is aquatic biodiversity? Why is it important?](#) Virginia Cooperative Extension, publication 420-520.

U.S. Fish and Wildlife Service. 2011. [Listing a species as threatened or endangered: Section 4 of the Endangered Species Act](#). U.S. Fish and Wildlife Service, Arlington, Virginia, USA.

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Wenger, S.J., M.C. Freeman, L.A. Fowler, B.J. Freeman, and J.T. Peterson. 2010. [Conservation planning for imperiled aquatic species in an urbanizing environment](#). *Landscape and Urban Planning* 97:11–21.

Wilcove, D.S., D. Rothstein, J. Dubow, A. Phillips, and E. Losos. 1998. [Quantifying threats to imperiled species in the United States](#). *BioScience* 48:607–615.