



## Total Number of At-Risk Terrestrial Species

This map displays the number of at-risk terrestrial species that have been observed within each 12-digit hydrologic unit (HUC). It includes both animal and plant 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 terrestrial species important?

At-risk terrestrial 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 terrestrial ecosystems. For example, many terrestrial plant species contribute to a clean and plentiful supply of water by filtering out pollution, reducing erosion, facilitating groundwater recharge, and providing resilience against invasive species. These species can also help mitigate the effects of hazardous events such as flooding, hurricanes, and forest fires. Many terrestrial species also serve as overall indicators of environmental quality.

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. Thus, the removal of even one species from an ecosystem could potentially have cascading effects throughout the system.

Preserving at-risk species also has scientific value; each species has unique genetic material that helps it survive. This has implications for human health, since many medicines use chemicals that were first discovered in plants and animals. Vast majorities of plants and animals have not been assessed for their medicinal value. There may be undiscovered potential in terrestrial species for future pharmaceuticals. The genetic material making up plants has the potential to contribute to future food sources, as desirable traits such as drought tolerance and protein content can be cross-bred into other plant species.

Many terrestrial species, including those that are at-risk, provide recreational, cultural, or aesthetic value to their environment and contribute to an area's ability to attract tourism and tourism-related jobs. People who are interested in viewing wildlife, such as avid birdwatchers, may visit



Photo: John and Karen Hollingsworth/USFWS

areas for the purpose of viewing wildlife like the threatened northern spotted owl or the endangered whooping crane.

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 the List of Endangered and Threatened Plants. An endangered species is one that is in danger of extinction through all or much of its range. A threatened species is one that is likely to become endangered.

### How can I use this information?

The map, Total Number of At-Risk Terrestrial Species, provides information about the number of observed terrestrial 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 plant and 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, population, road density, atmospheric pollution deposition, and protected areas to analyze the relationship among habitats 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 terrestrial 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,

### Selected Publications

Chivian, E., and A. Bernstein (Eds.). 2008. [\*Sustaining life: How human health depends on biodiversity\*](#). Oxford University Press, New York. 568 p.

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.

Master, L.L., D. Faber-Langendoen, R. Bittman, G.A. Hammerson, B. Heidel, L. Ramsay, K. Snow, A. Teucher, and A. Tomaino. 2012. [NatureServe conservation status assessments: Factors for evaluating species and ecosystem risk](#). NatureServe, Arlington, Virginia.

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.

U.S. Fish and Wildlife Service. 2005. [Why save endangered species?](#) U.S. Fish and Wildlife Service, Endangered Species Program, Arlington, Virginia.

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.

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. Accuracy information for the source data sets can be found on their respective web sites.

### 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 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'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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