



## NIB Furbearer Species Richness: Southeast

This EnviroAtlas national map displays the Normalized Index of Biodiversity (NIB) for furbearer species richness based on potential habitat within each 12-digit hydrologic unit (HUC) in 9 southeastern states. These data are based on habitat models rather than wildlife counts. Potential habitat may be specific to wintering, breeding, or year-round activities depending on the species.

### Why are furbearer species important?

The term furbearer refers to animals that have been traditionally trapped or hunted for their fur. Furbearer species in the Southeast are a diverse group of mammals that include beaver, fox, raccoon, coyote, skunk, mink, and weasel. The furbearer designation varies by state depending on species populations and management.

Furbearer species richness estimates the number of furbearing species that may inhabit an area based on potential habitat. Species richness is frequently used as a surrogate for measuring [biodiversity](#) and as a measure of the relative conservation value of a particular area. Many scientists believe that biodiversity, because it represents all forms of life on earth, provides or supports the core benefits that humans derive from their environment. Many organizations consider managing areas for biodiversity as a means to achieve an acceptable balance among competing demands for various ecosystem services.<sup>1</sup>

Though some furbearer species such as skunks, raccoons, beavers, and coyotes can be perceived as pests or threats, each species plays an important role within its [ecosystem](#). Herbivorous species disperse plant seeds, which can influence the distribution and diversity of plant species. Skunks help control insect populations, and coyotes, foxes, mink, and weasels are important predators. The removal of even one species from an ecosystem can create a [trophic cascade](#) that can affect the entire [food chain](#).

Beavers are furbearers that are influential within their ecosystems as [ecosystem engineers](#). They are able to change the landscape and hydrology of an area through felling trees and creating dams and ponds. Beaver have been reintroduced to streams in the Southeast to restore natural functions to degraded stream ecosystems. Beaver ponds retain sediment and floodwater, raise local ground water tables, and create transitional wetland zones. Beaver can be viewed as agents



of stream restoration or as a public nuisance if their work impinges on human development.<sup>2</sup>

Fur trapping has a long tradition in the U.S. and it is considered by wildlife managers to be a necessary tool for managing furbearer populations. Data from 1998 show that the top ten furbearing species harvested in the U.S. had a total value of \$60 million.<sup>3</sup> In addition to the market value of fur, trapping contributes to the economy through the sale of permits and equipment—revenue that is re-invested into wildlife management and conservation programs.

### How can I use this information?

The map, NIB Furbearer Species Richness: Southeast, is one of three EnviroAtlas maps that illustrate indicators of furbearer species richness for the Southeast. Other EnviroAtlas maps show the maximum and mean furbearer species richness for each 12-digit HUC.<sup>4</sup> Used together or independently, these maps help identify areas of potentially low or high furbearer species richness to help inform decisions about resource restoration, use, and conservation.

These maps can be used in conjunction with other maps in EnviroAtlas such as protected areas (PADUS), connectivity, or GAP ecological systems to help identify areas with high ecological or recreational value for inclusion in conservation, recreation, or restoration planning. After learning the furbearer species richness values for a particular 12-digit HUC, users can investigate an area more intensively by using higher resolution individual species models available through the Southeast Regional Gap Analysis Project ([SEGAP](#)).

## How were the data for this map created?

This data layer is based on data generated by the U.S. Geological Survey (USGS) National Gap Analysis Program ([GAP](#)). The GAP program maps the distribution of natural vegetation communities and potential habitat for individual terrestrial vertebrate species. These models utilize predictive environmental variables (e.g., GAP land cover, elevation, distance to water) to derive deductive habitat models for each species.

Southeast GAP modeled habitat for 17 furbearer species that reside, breed, or use the habitat within 9 southeastern states for a significant portion of their life history. Furbearer species richness was calculated by combining predicted habitat for all GAP individual furbearer species by pixel across the 9 states. The number of furbearer species in each pixel was summarized by 12-digit HUC and the mean value calculated for each HUC. The NIB was calculated by dividing the mean species richness value by the maximum value for each 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, based on models and large national geospatial databases, are estimations of reality that may overestimate actual furbearer species presence. Modeled data are intended to complement rather than replace monitoring data. Habitat models do not predict the actual occurrence of species, but rather their potential occurrence based on their known associations with certain habitat types. Habitat is only one factor that determines the actual presence of a species. Other factors include habitat quality, predators, prey, competing species, and fine scale habitat features.

Other essential species information in addition to species richness includes the types of species and their [functional groups](#), whether they are rare or common, native or non-native, tolerant or intolerant of disturbance. It is also important to consider that species numbers (at a landscape

scale) tend to increase with moderate disturbance, meaning that moderately human-altered or disturbed habitats have higher numbers of species than either minimally disturbed or highly disturbed sites.<sup>5</sup>

## How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. Metric values for individual pixels may be obtained from the [New Mexico State University Center for Applied Spatial Ecology](#). Individual species data may be obtained from the [SEGAP](#) geo-data server.

## Where can I get more information?

A selection of resources related to furbearers and biodiversity is listed below. Information on the models and data used in the USGS [GAP](#) and [SEGAP](#) projects is available on their respective websites. 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

The data for Furbearer Species Richness were created through a collaborative effort between the USGS GAP and EPA. Kenneth Boykin and graduate students from New Mexico State University generated the data. The data used to derive southeastern furbearer species richness came from SEGAP and the Biodiversity and Spatial Information Center ([BaSIC](#)) at North Carolina State University. The fact sheet was written by Kenneth Boykin, New Mexico State University, Anne Neale and William Kepner, EPA, Jessica Jahre, EPA Student Services Contractor, and Sandra Bryce, Innovate!, Inc.

## Selected Publications

1. Boykin, K.G., W.G. Kepner, D.F. Bradford, R.K. Guy, D.A. Kopp, A. Leimer, E. Samson, F. East, A. Neale, and K. Gergely. 2013. [A national approach for mapping and quantifying habitat-based biodiversity metrics across multiple spatial scales](#). *Ecological Indicators* 33:139–147.
2. Lewis, M.E., and T. Tricot. 2003. [The return of beavers to southern Piedmont streams: Stream restoration or disruption?](#) *The North Carolina Geographer* 11:1–9.
3. Southwick, R., A. Woolley, D. Leonard, and S. Rushton. 2005. [Potential costs of losing hunting and trapping as wildlife management methods](#). International Association of Fish and Wildlife Agencies, Washington, D.C. 52 p.
4. Kepner, W.G., K.G. Boykin, D.F. Bradford, A.C. Neale, A.K. Leimer, and K.J. Gergely. 2011. [Biodiversity metrics fact sheet](#), EPA/600/F-11/006, U.S. Environmental Protection Agency, Washington, D.C.
5. Marzluff, J.M. 2008. [Island biogeography for an urbanizing world: How extinction and colonization may determine biological diversity in human-dominated landscapes](#). *Urban Ecosystems* 8:155–177.