Maximum Big Game Species Richness: Southeast

This EnviroAtlas national map displays the maximum number of big game species with 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 big game species important?

The term big game refers to large animals that may be hunted for food or sport, including, in the Southeast, elk, white-tailed deer, bear, feral hog, and turkey. Individual state fish and wildlife agencies determine a species' designation as a game species. Elk, hunted to local extinction in the eastern U.S. in the 19th century, have been reintroduced in Great Smoky Mountains National Park and several southeastern states with suitable habitat.

Big game species richness estimates the number of big game 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.[1]

Within a food chain, big game animals function as primary and secondary consumers or as a food source for other wildlife. Grazers and browsers, such as elk and white-tailed deer, directly modify the species composition and condition of grassland and forest habitats. Top predators, by regulating herbivore numbers, indirectly influence habitat condition by reducing grazing pressure on plant production. A predator-prey balance, now lost in many ecosystems in the Southeast, helps to maintain plant and animal species diversity.[2] In the absence of large predatory species, such as red wolves, the harvesting of large and small game by humans becomes a substitute for natural predator control.

In addition to their roles in ecosystems, game species serve as an important food source, and they are appreciated for providing aesthetic value and recreational opportunities. The chance to see elk, deer, or bear attracts visitors to parks and other wildlife management areas. Big game hunting has a long tradition in the U.S.; in 2011, approximately 85% of hunters pursued big game.[3] Beyond its recreational value, hunting provides an economic vehicle for conservation,


Photo: Elk, S. Theodorski, NPS

management, and restoration projects, the benefits of which extend beyond big game species. Revenue collected from a federal excise tax and from state hunting licenses must be spent to support wildlife and conservation programs.

How can I use this information?

The map, Maximum Big Game Species Richness: Southeast, is one of three EnviroAtlas maps that illustrate indicators of big game species richness for the Southeast. Other EnviroAtlas maps show the mean big game species richness and a Normalized Index of Biodiversity (NIB) for each 12-digit HUC.[4] Used together or independently, these maps can help identify areas of potentially low or high big game 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. Connectivity planning and estimation of species' minimum area requirements are important considerations for mobile big game species with large territories.

After learning the big game 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).

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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 7 big game species that reside, breed, or use the habitat within 9 southeastern states for a significant portion of their life history. Big game species richness was calculated by combining predicted habitat for all GAP individual big game species by pixel across the 9 states. The number of big game species in each pixel was summarized by 12-digit HUC and the maximum value noted 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. The data, based on models and large national geospatial databases, are estimations of reality that may overestimate actual big game 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. [5]

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 big game 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.

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Selected Publications

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2. Miller, B., B. Dugelby, D. Foreman, C. Martinez del Rio, R. Noss, M. Phillips, R. Reading, M. E. Soulé, J. Terborgh, and L. Wilcox. 2001. The importance of large carnivores to healthy ecosystems. *Endangered Species Update* 18(5):202–210.

3. U.S. Department of the Interior, U.S. Fish and Wildlife Service, U.S. Department of Commerce, and U.S. Census Bureau. 2013. 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, FHW/11-NAT (RV), Washington, D.C.

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.