Mean Mammal Species Richness: Southwest

This EnviroAtlas national map displays the mean number of mammal species with potential habitat within each 12-digit hydrologic unit (HUC) in the southwestern United States (Arizona, Colorado, Nevada, New Mexico, and Utah). These data are based on habitat models, not wildlife counts. Potential habitat may be specific to wintering, breeding, or year-round activities depending on the species.

Why are mammal species important?

Mammal species richness estimates how many different mammal species may inhabit an area, based on potential habitat. Species richness, or diversity, is frequently used as a measure of the relative conservation value of a particular area. It has been used as a surrogate for measuring biodiversity. Many scientists believe biodiversity, as it represents all forms of life on earth, provides or supports the core benefits that humans derive from their environment. Thus, biodiversity helps sustain human culture throughout the world. Therefore, many organizations consider managing areas for biodiversity a means to achieve an acceptable balance among competing demands for various ecosystem services. Mammal species richness is one indicator of biodiversity within an area.

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 source, decompose matter, or control pest species. The removal of even one species from an ecosystem could potentially have cascading effects throughout the system.

Mammals are a diverse group of vertebrates that play important roles in ecosystems. Mammals can function as plant pollinators, seed dispersers, or even as keystone species in the environments that they inhabit.[1] For example, Prairie dogs are often viewed as keystone species in prairies since their presence is known to influence vegetation structure, diversity of species, and the functioning of that ecosystem. [2]

In addition to the roles that mammals play in ecosystems, they are also an important food source and appreciated for the recreational opportunities and aesthetic value that they provide. Elk, bison, wolves and deer attract visitors to parks and other wildlife areas. Big game hunting has a long tradition in the U.S. and is the most popular type of hunting; in 2011, approximately 85% of hunters went hunting for large mammals.[3]


Photo: Ron Singer/USFWS

How can I use this information?

The map, Mean Mammal Species Richness: Southwest, is one of three EnviroAtlas maps that illustrate indicators of mammal species richness for the southwest. Additional EnviroAtlas maps show the maximum species richness and an index of mammal species richness for each 12-digit HUC. Used together or independently, these maps can help identify areas of potentially low or high mammal species richness to help inform decisions about resource restoration, use, and conservation. Knowing the mammal species richness provides one aspect necessary to conserve biodiversity.

These maps can also be used in conjunction with other maps in EnviroAtlas to help identify areas with high ecological or recreational value for inclusion in conservation or restoration planning or protection from further development for recreational or aesthetic reasons. This information can help identify areas that may be vulnerable to development.

After learning the mammal species richness values for a particular 12-digit HUC, a user can more intensively investigate an area by using individual species models at a higher resolution. Individual species models are available through the Southwest Regional Gap Analysis Project (SWReGAP).

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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.

A component of GAP, SWReGAP modeled habitat for 215 mammal species that reside, breed, or use the habitat within the 5-state Southwest study area for a significant portion of their life history. Mammal species richness was calculated by combining predicted habitat for all GAP individual mammal species by pixel across the Southwestern United States. The number of mammal species in each pixel was then summarized by 12-digit HUC and the mean value for each HUC was calculated.

What are the limitations of these data?

EnviroAtlas uses the best data available, but there are still limitations associated with the data. The 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 are not meant to replace monitoring data. Habitat models do not predict the actual occurrence of species, but rather their predicted 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 such as woody debris.

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. SWReGAP and GAP data and accuracy information can be accessed through their respective websites.

Where can I get more information?

There are numerous resources about the importance of mammal species richness and biodiversity in general; a selection of these resources is listed below. 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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2. Miller, B., R. Reading, J. Hoogland, T. Clark, G. Ceballos, R. List, S. Forrest, L. Hanebury, P. Manzano, J. Pacheco, and D. Uresk. 2000. The role of prairie dogs as a keystone species: Response to Stapp. *Conservation Biology* 14:318–321.

3. U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2013. 2011 National survey of fishing, hunting, and wildlife-associated recreation, FHW/11-NAT (RV), Washington, D.C.

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