NIB Total Harvestable Species Richness: Southwest

This EnviroAtlas national map displays the Normalized Index of Biodiversity (NIB), an index value for total harvestable species richness based on potential habitat within each 12-digit hydrologic unit (HUC) in the southwestern United States (Arizona, Colorado, Nevada, New Mexico, and Utah). The category harvestable species encompasses big game, small game, waterfowl, and fur-bearer species. 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 harvestable species important?

Harvestable species richness estimates how many different wildlife species that may be hunted or trapped may inhabit an area based on existing potential habitat. These species include elk, deer, bison, grouse, rabbits, turkeys, ducks, and geese. Harvestable species provide a valuable food source, recreational opportunities, and aesthetic and cultural 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. Harvestable species, which may serve as both predators and prey in a food chain, are important to maintaining balanced ecosystems. In the absence of major predators, such as wolves, the harvesting of elk and deer by humans becomes a substitute for controlling populations.

Harvestable species are a valuable food source and are also appreciated for the recreational opportunities and aesthetic experiences they provide. The U.S. Fish and Wildlife Service estimated that hunters spent $33.7 billion in 2011, one-third of which went towards accommodations, transportation, and other tourism-related activities.

The harvesting of these species also provides an economic vehicle for conservation, management, and restoration projects, the benefits of which extend far beyond game species. In 2013, the U.S. Fish and Wildlife Service appropriated over $522 million for states and territories to use for wildlife conservation and restoration purposes. This revenue is collected from a federal excise tax placed on hunting equipment and is given to states to support conservation efforts, land acquisition, hunter education, and wildlife restoration projects.

The fees that states collect from hunting licenses and permits are also required to be used to support wildlife and conservation programs. These combined funds have supported restoration projects for elk, deer, wood ducks, big-horn sheep, and non-game species such as bald eagles. The income generated by the presence of harvestable species helps protect lands, maintain wildlife populations, and conserve biodiversity.

How can I use this information?

The map, NIB Harvestable Species Richness: Southwest, is one of three EnviroAtlas maps that illustrate indicators of harvestable species richness for the Southwest. Additional EnviroAtlas maps show the maximum and mean total harvestable species richness for each 12-digit HUC. Used together or independently, these maps can help identify areas of potentially low or high harvestable species richness to help inform decisions about resource restoration, use, and conservation.

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 highlighted for recreational or aesthetic reasons. This information can help identify areas that may be vulnerable to development. After learning the harvestable species richness values for a particular 12-digit HUC, an area can be more intensively investigated 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 93 harvestable species that reside, breed, or use the habitat within the 5-state southwest study area for a significant portion of their life history. Total harvestable species richness was calculated by combining predicted habitat for all GAP individual harvestable species by pixel across the southwestern United States. The number of harvestable species in each pixel was then summarized by 12-digit HUC and the mean value calculated for each HUC. The NIB was calculated by dividing the mean 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 are based on models and large national geospatial databases. Calculations based on these 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. 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.

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 game species and on biodiversity in general; a selection of these resources is below. Additional information on the models and data used in the USGS GAP and SWReGAP projects are 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

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Selected Publications

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Kepner, W.G., K.G. Boykin, D.F. Bradford, A.C. Neale, A.K. Leimer, and K.J. Gergely. 2011. Biodiversity Metrics Fact Sheet. U.S. Environmental Protection Agency, Washington, DC, EPA/600/F-11/006.

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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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