

Terrestrial and Aquatic Biodiversity data describing fauna were developed for the 2020 Resources Planning Act (RPA) Assessment^{1,2} and related efforts. These data can be used for numerous applications by private and public land management and research constituents. These data can help to understand current biodiversity, historic trends, and potential stressors into the future. They also help identify human-caused impacts on observed biodiversity. Biodiversity information provides an indicator of ecosystem health and resilience while also identifying areas to potentially prioritize for management, conservation, and preservation work. All datasets are available as GIS raster, CSV, or Excel files.

DATA DESCRIPTION	UNITS	SPATIAL EXTENT	SPATIAL RESOLUTION	TEMPORAL DOMAIN	POTENTIAL USE*
<u>Current and Recent Past</u>					
Freshwater Fish-Crayfish-Mussels	Number of species	Conterminous U.S.	8-digit HUC Watersheds	2020 <i>Static</i>	National-level to Broad-level applications. Identifies all species of freshwater fish, crayfish, and mussels located in each HUC8 watershed (species richness).
Listed and Imperiled Species³	Number of species	United States	Systematic equal area (250 mi ²) polygon feature	2020 <i>Static</i>	National-level to Broad-level applications. Provides a snapshot of the number of listed species in an area and in surrounding areas to provide context for the area of interest. Total count of all species and their conservations ranks (NatureServe) are also available. Listed species include species formally listed as threatened and endangered under the 1973 Endangered Species Act (ESA), and those listed as imperiled (G1, G2) according to NatureServe Conservation Rank criteria.
Total Threatened and Endangered Species	Number of species	United States	National summary by taxonomic group	2020 <i>Static</i>	National-level applications. Total number of species by broad taxonomic groups ⁴ , from July 1 st , 1976 to December 20 th , 2020. Provides a temporal snapshot of Federal listings of threatened and endangered (T&E) species made under the ESA.
Watershed Condition Analysis^{5,6}	Anthropogenic stress indices from 1 to 5 (lowest to highest risk)	Conterminous U.S.	10-digit HUC Watersheds 15,000 watersheds	Current <i>Last updated in 2020</i>	National-level to Base-level applications. Anthropogenic stress can be evaluated based on individual indices, or with a combined stress index to understand the influence of human-caused stressors on watersheds. Stress factors include human population growth and urban development; agriculture; and energy development and mining.

DATA DESCRIPTION	UNITS	SPATIAL EXTENT	SPATIAL RESOLUTION	TEMPORAL DOMAIN	POTENTIAL USE*
<u>Future Projections</u>					
Projected Terrestrial Climate Stress Index⁷	Unitless index	Conterminous U.S.	1/24 degree <i>approximately 4 km equal area grid</i>	Change from the average of the historic (1951-2000) to future (2050-2099) periods <i>Static</i>	National-level to Broad-level applications. The terrestrial climate stress index estimates the change in wildlife habitat and ecosystem productivity under future climate ⁸ (temperature, precipitation). Identifies areas of potential high stress (future more different than present) and low stress (future more similar to present) to wildlife habitat. Can help inform management decisions intended to conserve threatened and endangered species.

* A description of FS business applications by spatial scales is available in Table 1-1 of the [Existing Vegetation Classification, Mapping, and Inventory Technical Guide, v2.0](#)

References and Footnotes:

- ¹ Flitcroft, Rebecca L.; Bury, Gwendolynn W.; Joyce, Linda A.; Kay, Shannon L.; Knowles, Michael S.; Nelson, Mark D.; Warziniack, Travis. 2023. Biodiversity: Wildlife and Aquatic Biota. In: U.S. Department of Agriculture, Forest Service. 2023. Future of America's Forest and Rangelands: Forest Service 2020 Resources Planning Act Assessment. Gen. Tech. Rep. WO-102. Washington, DC: xxx-xxx. Chapter 10. <https://doi.org/10.2737/WO-GTR-102-Chap10>
- ² The RPA website provides links to current and past RPA Assessments, as well as supporting data, technical reports, and webinars: <https://www.fs.usda.gov/research/inventory/rpaa>
- ³ Cumulative numbers (USFWS) and geographic distributions (NatureServe) for threatened and endangered (T&E) species are available in Flitcroft et al. (2023), above. The approach used to develop this product was the same approach described in the following references: USDA Forest Service. 2016. Future of America's Forests and Rangelands: Update to the 2010 Resources Planning Act Assessment. Gen. Tech. Report WO-GTR-94. Washington, DC: U.S. Department of Agriculture, Forest Service. p. 11-1 – 11-16. <https://doi.org/10.2737/WO-GTR-WO-GTR-94> AND Howard, C., Flather, C.H. & Stephens, P.A. A global assessment of the drivers of threatened terrestrial species richness. *Nat Commun* 11, 993 (2020). <https://doi.org/10.1038/s41467-020-14771-6>
- ⁴ Taxonomic groups include: Amphibians, Arachnids, Birds, Clams, Corals, Crustaceans, Fishes, Insects, Mammals, Reptiles, Snails, Total Plants, Grand Total. Data provided by the U.S. Fish and Wildlife Service (USFWS) Listed Species Summary (Boxscore): <https://ecos.fws.gov/ecp/report/boxscore>
- ⁵ Brown, Thomas C.; Froemke, Pamela. 2012. [Nationwide assessment of nonpoint source threats to water quality](#). BioScience. 62(2): 136-146.
- ⁶ Brown, Thomas C.; Froemke, Pamela. [Risk of impaired condition of watersheds containing National Forest lands](#). Gen. Tech. Rep. RMRS-GTR-251. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 57 p.
- ⁷ For questions or concerns related to the Terrestrial Climate Stress Index, please contact Linda Joyce or Shannon Kay (shannon.kay@usda.gov).
- ⁸ Projections were developed on different management scenarios (fire suppression and no fire suppression) and climate futures. Climate futures are based on Representation Concentration Pathways 4.5 and 8.5 and five climate projections selected by RPA to incorporate the range of projected future temperature and precipitation across the conterminous U.S. (least warm, hot, dry, wet, and middle). The MC2 model was used to project climate change impacts to ecosystem productivity. Information on RPA scenarios can be found here: Langner, Linda L.; Joyce, Linda A.; Wear, David N.; Prestemon, Jeffrey P.; Coulson, David; O'Dea, Claire B. 2020. Future scenarios: A technical document supporting the USDA Forest Service 2020 RPA Assessment. Gen. Tech. Rep. RMRS-GTR-412. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 34 p. <https://doi.org/10.2737/RMRS-GTR-412>