

Ecoregions of the Southwest (Arizona, California, Nevada)

Ecoregions are areas where ecosystems (and the type, quality, and quantity of environmental resources) are generally similar. They are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components. These Level III and IV ecoregions, compiled at a scale of 1:250,000, revise and subdivide an earlier, smaller-scale national ecoregion map (Omernik, 1987). The ecoregions were identified by analyzing the spatial patterns and the composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity (Omernik, 1987, 1995). These phenomena include geology, landforms, soils, vegetation, climate, land use, wildlife, and hydrology. The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level. An ecoregion framework is critical for structuring and implementing ecosystem management strategies across federal agencies, state agencies, and nongovernment organizations that are responsible for different types of resources within the same geographic areas (McMahon and others, 2001; Omernik and Griffith, 2014).

A Roman numeral hierarchical scheme has been adopted for different levels of ecological regions. Level I is the most general level, dividing North America into 15 ecological regions. Level II divides the continent into 50 regions (Commission for Environmental Cooperation, 1997, 2006). At level III, the continent contains 183 ecological regions of which 105 occur in the continental United States (United States Environmental Protection Agency [U.S. EPA], 2013; Wiken and others, 2011).

The Level III and IV ecoregions of the Southwest were mapped in state-level projects in Arizona (Griffith and others, 2014), California (Griffith and others, 2016) and Nevada (Bryce and others, 2003). These projects were conducted primarily by the U.S. EPA National Health and Environmental Effects Research Laboratory (Corvallis, Oregon) in collaboration with U.S. EPA Region 9, state resource management agencies, and other federal agencies, such as the U.S. Geological Survey, U.S. Department of Agriculture (USDA)-Natural Resources Conservation Service, USDA-Forest Service, and the Bureau of Land Management. The mapping was associated with an interagency effort to develop a common framework of ecological regions (McMahon and others, 2001). Although there are differences in the conceptual approaches and mapping methodologies used by the different federal agencies for developing their own regional frameworks, these collaborative ecoregion projects were a step toward attaining consensus and consistency in ecoregion frameworks for the entire nation.

Explanations of the methods used to define these ecoregions are given in Omernik (1995, 2004) and Omernik and Griffith (2014). Additional

maps, publications, and GIS data for U.S. and North American ecoregions can be obtained at www.epa.gov/eco-research/ecoregions.

REFERENCES

- Bryce, S.A., Woods, A.J., Morefield, J.D., Omernik, J.M., McKay, T.R., Brackley, G.K., Hall, R.K., Higgins, D.K., McMoran, D.C., Vargas, K.E., Petersen, E.B., Zamudio, D.C., and Comstock, J.A., 2003. Ecoregions of Nevada: Reston, Virginia, U.S. Geological Survey (map scale 1:1,350,000). Commission for Environmental Cooperation, 1997. Ecological regions of North America – toward a common perspective: Montreal, Quebec, Canada. Commission for Environmental Cooperation, 71 p. (map revised 2006). www.epa.gov/eco-research/ecoregions-north-america.
- Griffith, G.E., Omernik, J.M., Johnson, C.B., and Turner, D.S., 2014. Ecoregions of Arizona: U.S. Geological Survey Open-File Report 2014-1141, with map, scale 1:1,325,000, <http://dx.doi.org/10.3133/ofr20141141>
- Griffith, G.E., Omernik, J.M., Smith, D.W., Cook, T.D., Tallyn, E., Moseley, K., and Johnson, C.B., 2016. Ecoregions of California (poster): U.S. Geological Survey Open-File Report 2016-1021, with map, scale 1:1,100,000, <http://dx.doi.org/10.3133/ofr20161021>.
- McMahon, G., Gregonis, S.M., Waltman, S.W., Omernik, J.M., Thorson, T.D., Freecot, J.A., Rorick, A.H., and Keys, J.E., 2001. Developing a spatial framework of common ecological regions for the conterminous United States: Environmental Management, v. 28, no. 3, p. 293-316.
- Omernik, J.M., 1987. Ecoregions of the conterminous United States (map supplement): Annals of the Association of American Geographers, v. 77, no. 1, p. 118-125, scale 1:7,500,000.
- Omernik, J.M., 1995. Ecoregions – a framework for environmental management, in Davis, W.S. and Simon, T.P., eds., Biological assessment and criteria-tools for water resource planning and decision making: Boca Raton, Florida, Lewis Publishers, p. 49-62.
- Omernik, J.M., 2004. Perspectives on the nature and definition of ecological regions: Environmental Management, v. 34, Supplement 1, p. s27-s38.
- Omernik, J.M., and Griffith, G.E., 2014. Ecoregions of the conterminous United States – evolution of a hierarchical spatial framework: Environmental Management, v. 54, no. 6, p. 1249-1266, <http://dx.doi.org/10.1007/s00267-014-0364-1>
- U.S. Environmental Protection Agency, 2013. Level III ecoregions of the conterminous United States: Corvallis, Oregon, USEPA – National Health and Environmental Effects Research Laboratory, www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states.
- Wiken, E., Jiménez Nava, F., and Griffith, G., 2011. North American Terrestrial Ecoregions – Level III, Commission for Environmental Cooperation, Montreal, Canada. 149 p. http://ecologicalregions.info/html/pubs/NA_TerrestrialEcoregionsLevel3_Final2june11_CEC.pdf

