

Oklahoma Gap Analysis Project

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The Oklahoma Gap Analysis Project (OK-GAP) was completed and published in 2005. It provides the first comprehensive GIS database of information on land cover types, ranges and predicted distributions of terrestrial vertebrates, and stewardship lands in Oklahoma. The objectives of the project were (1) to prepare a map of the current distribution of land cover types; (2) to estimate terrestrial vertebrate species distributions relative to land cover types; (3) to classify land stewardship by categories of conservation status; and (4) to identify and analyze gaps in the conservation of biological diversity from within the network of protected areas. Information from OK-GAP should benefit long-term planning efforts for biodiversity conservation in Oklahoma.

The land cover map identifies 46 land cover types based on the interpretation of thematic mapper (TM) imagery and field reconnaissance. The minimum mapping unit (MMU) is 0.81 hectares for all land cover types. Twenty-three scenes of TM data for 1991–93 obtained from the Multi-Resolution Land Characteristics (MRLC) Consortium were used to create the map. We used airborne videography from 17 flight lines flown over Oklahoma to help classify the TM scenes. Field reconnaissance was conducted to verify video classification of land cover types and verify Universal Transverse Mercator (UTM) coordinates of the flight lines. We conducted an accuracy assessment of the land cover map using data from three independent sources: field reconnaissance, an existing database, and a previous land cover map of Oklahoma. Forest and other (barren, agriculture, urban, and water) land cover types had the highest overall accuracy (78 and 85 percent, respectively), shrublands and herbaceous lands were intermediate (53 and 56 percent, respectively), and woodlands had the lowest accuracy (22 percent). Woodlands were most often misclassified as forests or other land cover types, and shrublands were typically misclassified as herbaceous types. These misclassifications most likely were the result of structural differences (i.e., vegetation height and crown density) between the land cover types, the small MMU, and the simple random sampling design we used.

Distributions of 411 terrestrial vertebrate species were mapped. Using habitat (land cover type) associations, we predicted the potential distributions of 382 species, including 75 mammals, 178 birds, 81 reptiles, and 48 amphibians. In addition, we mapped the distributions of 29 imperiled species (state and federal threatened or endangered species and species of special concern). Range

limits of each species were delineated on maps from scientific literature sources and then were reviewed by experts. The range maps were eventually converted to a presence/absence grid map consisting of 337 hexagons (635 sq km) to cover Oklahoma. Wildlife habitat relation models were developed for each of the 410 species based on their associations with individual land cover types. Accuracy of the predicted distributions was assessed for 20 species of birds; we did not assess the accuracy of any other group. Mean accuracy for the 20 species was 71 percent and ranged from 45 to 92 percent. No occurrence data were available for assessing the accuracy of mammals, reptiles, or amphibians.

The stewardship map of Oklahoma was developed from original maps of 379 public and private managed land units. We identified 14 land stewards, including eight federal agencies, five state and city agencies, and one private organization. All stewardship land areas were categorized based on management for biodiversity maintenance on a scale of 1 through 4, with 1 being the highest, most comprehensive level of management for conservation and 4 being the lowest. Ninety-three percent of the total land area of Oklahoma is composed of private, unrestricted status 4 lands. Of the remaining 7 percent of total land area, 28 percent was classified as status 1 and 2 stewardship lands, 21 percent as status 3 lands, and the remainder was either status 4 public lands (federal, state, municipal) or water.

Gap analysis was conducted on all land cover types and predicted animal distributions with representation on status 1 and 2 stewardship lands. Nine land cover types had less than 1 percent representation, 32 types had between 1 percent and 10 percent representation, and two types had between 11 percent and 20 percent representation on status 1 and 2 lands. Of these, shinnery oak shrubland in west-central Oklahoma, gypsum grasslands in western Oklahoma, and dwarf white oak forests in southeastern Oklahoma were among the vegetation alliances in need of further study and possible protection. Habitats for 19 mammals, 14 birds, 8 reptiles, and 10 amphibians merit increased conservation and management attention in Oklahoma. These 51 species are designated as federal and state threatened or endangered or candidate or special concern species and, except for the small-footed myotis (mammal) and red-cockaded woodpecker (bird), have less than 20 percent of their predicted distribution on status 1 and 2 lands. Six areas distributed throughout the state support either high numbers of species or unique vegetation alliances. Our analysis revealed that the majority of gaps for biodiversity conservation occur on private lands. Therefore, conservation efforts in Oklahoma will have to focus on educating and working with private landowners.

An Oklahoma biodiversity plan was published in 1996 under the direction of the Oklahoma Department of Wildlife Conservation. The purpose of the plan was to provide information about Oklahoma's biodiversity and make recommendations on how biodiversity conservation could be included in a variety of economic and other activities. Information generated from the OK-GAP specifically addresses one of the biological recommendations of the plan: continued research to address information needs for biodiversity conservation. Although there was no immediate implementation of the Oklahoma biodiversity plan, OK-GAP data has been used for a variety of conservation

planning efforts and projects, including the Oklahoma Wildlife Conservation Strategy, waterfowl management plans, bobwhite quail management, conservation reserve land use, and a variety of other projects that have used the land cover data. The OK-GAP final report and data are available in a five-CD set distributed through the Oklahoma Biological Survey <<http://www.biosurvey.ou.edu/gap-ok.html>> and through the national Gap Analysis Program <<http://gapanalysis.nbi.gov>>. We hope that future researchers and managers will build on the information developed by the OK-GAP to help make biodiversity conservation a reality in Oklahoma.