

FINAL PERFORMANCE REPORT



Federal Aid Grant No. F11AF00083 (T-62-R-1)

**Update and Revision of the Oklahoma
Comprehensive Wildlife Conservation Strategy**

Oklahoma Department of Wildlife Conservation

October 1, 2011 through September 30, 2015

FINAL PERFORMANCE REPORT

State: Oklahoma

Grant Number: T-62-R-1 (F11AF00083)

Grant Title: Update and Revision of the Oklahoma Comprehensive Wildlife Conservation Strategy

Grant Period: October 1, 2011 – September 30, 2015

Project Leader: Mark Howery, Wildlife Diversity Biologist, Oklahoma Department of Wildlife Conservation

A. ABSTRACT:

The Oklahoma Comprehensive Wildlife Conservation Strategy (OCWCS) provides broad, proactive guidance for the conservation of Oklahoma's rare and declining species, and meets the expectations of the congressionally authorized State and Tribal Wildlife Grants Program. The OCWCS is a strategic-level conservation plan that identifies Oklahoma's "species of greatest conservation need;" the conservation landscapes (key habitats) that these species require; the conservation challenges that they face; potential conservation actions that can be implemented to improve each species' population status, and the potential partnerships that can deliver proactive conservation - all within a framework that is based on Oklahoma's ecological regions.

The Oklahoma Comprehensive Wildlife Conservation Strategy is integrally connected to the congressional State and Tribal Wildlife Grants program and it serves as the guiding document for how State Wildlife Grants funding is used in Oklahoma. Oklahoma's first Comprehensive Wildlife Conservation Strategy was developed over a two-year period between late 2003 and mid 2005. In keeping with an adaptive management philosophy, Congress requires each state to perform a comprehensive review and revision of its Comprehensive Wildlife Conservation Strategy at least every ten years. This grant provided the financial resources needed by the Oklahoma Department of Wildlife Conservation to review and update this strategic conservation plan with new information and perspectives gained from technical experts, recent scientific literature, stakeholders and the general public. This report provides an overview of the revision and public participation processes. A revised edition of the OCWCS was completed and submitted to the Regional Review Team on September 24, 2015 and is provided as Appendix 2 to this report.

B. OBJECTIVE STATEMENT:

Conduct a comprehensive review and revision of the 2005 Oklahoma Comprehensive Wildlife Conservation Strategy.

C. BACKGROUND AND NEED:

The Oklahoma Comprehensive Wildlife Conservation Strategy is integrally connected to the congressional State and Tribal Wildlife Grants program and is a strategic-level plan that is focused on proactive conservation of rare and declining species that traditionally have not benefited from a dedicated funding source. Under the North American model for wildlife conservation, wildlife is a public trust resource and states hold the authority and responsibility for managing most fish and wildlife populations. During the twentieth century, Congress worked with stakeholders, state wildlife agencies and the U.S. Fish and Wildlife Service to conserve and strengthen populations of game and sport fish through long-term federal assistance programs with dedicated funding derived from federal excise taxes on hunting and fishing equipment (federal aid in Wildlife Restoration and federal aid in Sport Fish Restoration). Later, Congress established a funding program for the conservation and recovery of species that are federally-listed as threatened and endangered species. During the next thirty years, state and federal wildlife agencies worked in cooperation to improve the condition of threatened and endangered species and learned that recovery is often difficult and expensive when working with species that are poorly understood, have specialized ecological needs and have reach dangerously low population sizes. The State and Tribal Wildlife Grants program was developed in response to this realization to address the conservation needs of wildlife species before they decline to the point at which they are threatened with extinction.

As a requirement of the State and Tribal Wildlife Grants program, Congress directed each state and territory to develop a strategic conservation plan that identifies the species with the greatest need for additional conservation attention and outlines the actions that should be taken for the benefit of these species. The Oklahoma Comprehensive Wildlife Conservation Strategy (OCWCS) is that plan for Oklahoma and is the guiding document for how Oklahoma uses its apportionment of State and Tribal Wildlife Grants funding. The first OCWCS was completed in 2005. In keeping with an adaptive management philosophy, Congress requires each state to perform a comprehensive review and revision of its Comprehensive Wildlife Conservation Strategy at least every ten years through a process that encourages broad public involvement.

D. METHODS AND RESULTS:

The comprehensive review and revision of the OCWCS built upon the successes of the original version. The original version was used as a template and modifications were incorporated into it based upon new information and input from technical experts and the public. Although the formal revision and editing of the OCWCS didn't begin until 2011, the collection of new information began almost as soon as the original version was completed. The Oklahoma Department of Wildlife Conservation's (ODWC) Wildlife Diversity Program staff led the review and revision process with input that was solicited from a range of partners. They created an internal review team that coordinated with stakeholders, technical experts and other conservation agencies and that conducted the initial review and edit of each chapter before it was released for technical review. The membership of the internal review team changed over time, but it was comprised of representatives from three ODWC Divisions (Wildlife, Fisheries and Information & Education) and multiple programs including Mark Howery, Russ Horton, Jena Donnell, Curtis

Tackett, William Ray, Lesley Carson, Matt Fullerton, Rachel Bradley, Rich Fuller, Andrea Crews, Melynda Hickman, Kirk Kuklinski and Doug Schoeling.

Throughout the review and revision process, the focus was placed on communication with stakeholders and technical experts in the disciplines of biology and natural resource management. The first formal stakeholder meeting was held in January of 2010 when nearly 80 biologists from universities and conservation organizations were invited to provide comments on modifications to the OCWCS and to share their ideas about the activities that should be priorities for the State and Tribal Wildlife Grants program in Oklahoma. Following this meeting, individual meetings were held with long-term partners to solicit their suggestions for improving the OCWCS. Meetings were held with technical experts representing the Oklahoma Biological Survey, Oklahoma Natural Heritage Inventory, Tulsa Field Office of the U.S. Fish and Wildlife Service, The Nature Conservancy, Sutton Avian Research Center, Ouachita National Forest, Oklahoma Conservation Commission and Oklahoma Department of Transportation. In-reach meetings were conducted with other ODWC programs including, the private lands, streams, fisheries research, game management, and aquatic nuisance species programs, as well as with staff stationed at regional offices and wildlife management areas. These biologists provided information specific to their areas of expertise. An Ozark region planning partnership was developed between the ODWC, the Missouri Department of Conservation and the Arkansas Game and Fish Commission through which information was shared regarding each state's conservation strategy to identify shared species, conservation issues and conservation actions.

Coordination meetings were held with the biologists for the Oklahoma Natural Heritage Inventory (ONHI) to discuss the revision of the list of Oklahoma's species of greatest conservation need. The ONHI shares data with other state natural heritage programs and periodically revises their state and global rankings for the species that they track. Since 2008, they have revised the ranking for many of the invertebrate taxa and nearly 50 species of insects, crustaceans and gastropods in Oklahoma that did not have global heritage scores in 2005, now have scores that meet the criteria for inclusion on the Oklahoma SGCN list. One criterion that we use to assign species to the Oklahoma SGCN list is the species' global natural heritage score; species with a score of G3, G2 or G1 are added to the list provided that the heritage program believes that there is adequate certainty associated with the accuracy of the score (Table 1). Other invertebrate taxa were added to the list of species of greatest conservation need on the basis that they are regionally endemic to an area encompassed by Oklahoma (primarily crustaceans).

With this input in-hand, the internal review team reviewed every table and every section within the OCWCS and incorporated comments throughout. Specifically, the following changes were made:

- The list of species of greatest conservation need was reviewed and 69 new species (primarily invertebrates) were added, while seven of the original species were removed (Table 1).
- Recent survey data and ecological literature was compiled for approximately 2/3 of the species of greatest conservation need (primarily for invertebrates, fish and amphibians) in order to maintain the most complete information for evaluating their status and distribution.

- Modifications were made to the fourth and fifth ranking criteria for species of greatest conservation need and all of the species were re-evaluated and re-scored.
- Regionally-based narrative status descriptions were prepared for each species in each region. These were used to replace the less descriptive "low, medium, abundant and unknown" status labels that were used in the original OCWCS. Each of the species tables in each of the habitat sections was reformatted to accommodate the new narrative status descriptions.
- The population trends for all species were re-evaluated based on current information and changed where needed.
- Every habitat description was reviewed and revised as needed. Where appropriate, similar habitat sections were combined to reduce redundancy.
- A regional habitat map and summary table was created for and added to the introduction to each of the six terrestrial ecological region chapters. These were added to show the relative abundance and the geographic distribution of those habitat types that could be mapped at a regional scale.
- A new Large Rivers chapter was created to give greater emphasis to the species that are dependent upon these aquatic systems that cross the boundaries of the traditional terrestrial ecological regions.
- The habitat types within each region were re-evaluated and their rankings changed as needed based upon changes in the numbers of Tier I and Tier III species of greatest conservation need.
- The tables that list the species of greatest conservation need in each habitat section within each regional chapter were reviewed and edited to incorporate new species, to fix errors of omission and to remove those species for which that habitat type is not one of their primary habitats
- Within each habitat section, all of the conservation issues were re-evaluated and rewritten where necessary to provide greater clarity. Related conservation issues were organized into sets and each set of conservation issues within each habitat section was prioritized based upon the geographic footprint of those issues and the number of species that are affected.
- All of the recommended conservation actions were re-evaluated and rewritten to provide specific guidance to the greatest extent possible. New conservation actions were incorporated under the appropriate set(s) of conservation issues.
- New conservation issues and actions were incorporated into each chapter to address emerging issues such as emerging diseases (e.g. White Nose Syndrome), new invasive species (e.g. Emerald Ash Borer) and new development technologies (multi-well, horizontal drilling pads).
- Representative photos were added for all but five of the habitat types to provide the readers of the OCWCS with a physical example of the typical habitat condition.
- A cross-referencing table (Table IN2) was prepared to provide a breakdown of the species of greatest conservation need by region.
- A climate change adaptation section was added to the Introduction to stimulate discussion about long-term conservation planning.
- The Statewide Overview and Ecological Classification section was expanded and new maps of soils, rainfall, elevation and vegetation were added. A table was created to cross-walk the six terrestrial regions of the OCWCS with the Level III map for Omernick's

Ecoregion Classification System (Environmental Protection Agency) and the Section Level map for the Bailey's Ecological Regions (U.S. Forest Service).

- A list of relevant literature references was added (OCWCS Appendix C).
- OCWCS Appendix E was restructured to include the scientific names for all species of greatest conservation need.
- A list of the existing conservation areas was prepared for each of the six terrestrial regions and inserted into the potential partnerships section of each chapter.

A list of three hundred and sixteen (316) technical experts was developed and these individuals were invited to review the first draft of the revised OCWCS as technical reviewers. These technical reviewers included zoologists, biologists and ecologists from every university in Oklahoma and represented expertise with every vertebrate and invertebrate group that is regularly studied within Oklahoma. Other technical reviewers included biologists with each state and federal land management and water management agency in Oklahoma, biologists with non-profit conservation organizations (e.g. The Nature Conservancy and the Samuel Roberts Noble Foundation), biologists with the bird habitat Joint Ventures and the Landscape Conservation Cooperatives that operate in Oklahoma, and representatives from the environmental and/or natural resources programs from twenty-two of Oklahoma's Native American tribes. The draft OCWCS was sent to the technical reviewers in three separate segments, each of which was comprised of three to four chapters or appendices. The technical reviewers were provided with Word files for each chapter and appendix so that they could easily edit these files and return them with their comments.

When the technical review was nearly complete, the updated draft of the OCWCS was released for public review. A news release was prepared with a link to a .pdf file of the OCWCS. This was sent to every newspaper, television station and radio station on the ODWC's news release list. Additionally, nearly 70,000 Oklahomans receive ODWC's electronic news releases and they too were sent the news release and a link to a .pdf file of the OCWCS to review. To complement this public outreach effort, information about the OCWCS revision was printed in the Oklahoma Wildlife Diversity Program's monthly electronic newsletter. This newsletter has approximately 7,100 subscribers that serve as an important stakeholder group because they have demonstrated a continuing interest in nongame wildlife conservation. During the public review period, ODWC continued to solicit and accept comments from the technical reviewers.

Edits were incorporated weekly to the OCWCS as they were received during the public comment period. A public information meeting was held on September 3, 2015 at ODWC's Arcadia Conservation Education Area in Edmond, Oklahoma to provide a centrally-located opportunity for people to meet with ODWC staff in-person to ask questions and to provide information. The comment period was held open until September 18, 2015. Final edits were incorporated into the revised OCWCS, a road map to the eight required elements was prepared (Appendix 1) and the document was submitted to the U.S. Fish and Wildlife Service's Regional Review Team on September 24, 2015.

Table 1. Additions to the List of Oklahoma Species of Greatest Conservation Need (SGCN) based upon existing criteria.

Common Name	Scientific Name	Justification for Classification as SGCN
Yellow-faced Pocket Gopher	<i>(Cratogeomys castanops)</i>	regionally endemic species
Baird's Pocket Gopher	<i>(Geomys breviceps)</i>	regionally endemic species; recently elevated from subspecies to full species
Eastern White-throated Woodrat	<i>(Neotoma leucodon)</i>	regionally endemic species; recently recognized as a distinct species
Northern Rock Mouse	<i>(Peromyscus nasutus)</i>	regionally endemic species
White-ankled Mouse	<i>(Peromyscus pectoralis)</i>	regionally endemic species
Tri-colored Bat	<i>(Perimyotis subflavus)</i>	revised global score
Golden Eagle	<i>(Aquila chrysaetos)</i>	state species of special concern; inadvertently omitted during development of the first version
Red Knot	<i>(Calidris canutus)</i>	new federally-listed status
Hurter's Spadefoot	<i>(Scaphiopus hurterii)</i>	regionally endemic species; recently elevated from subspecies to full species
Green Toad	<i>(Bufo (Anaxyrus) debilis)</i>	regionally endemic species
Texas Toad	<i>(Bufo (Anaxyrus) speciosus)</i>	regionally endemic species
Black-necked Gartersnake	<i>(Thamnophis cyrtopsis)</i>	regionally endemic species
American Eel	<i>(Anguilla rostrata)</i>	documented population decline and change in G ranking
Silverband Shiner	<i>(Notropis shumardi)</i>	regionally endemic species; revised Global ranking
Least Darter	<i>Etheostoma microperca</i>	expand SGCN designation from Blue River population to all Oklahoma populations
Redspot (Artesian) Darter	<i>(Etheostoma artesia)</i>	regionally endemic species; recently recognized as a distinct species
Redfin Darter	<i>(Etheostoma whipplei)</i>	regionally endemic species
Scaly Sand Darter	<i>(Ammocrypta vivax)</i>	regionally endemic species
Bleached Skimmer	<i>(Libellula composita)</i>	revised Global ranking
Ouachita Spiketail	<i>(Cordulegaster talaria)</i>	G2 ranked species; regionally endemic
Seepage Dancer	<i>(Argia bipunctulata)</i>	revised Global ranking
Microcaddisfly	<i>(Hydroptila protera)</i>	G1 ranked species; recently ranked nationally
Microcaddisfly	<i>(Mayatrichia ponta)</i>	G2 ranked species; recently ranked nationally
Caddisfly	<i>(Metrichia nigritta)</i>	G2 ranked species
Microcaddisfly	<i>(Ochrotrichia weddleae)</i>	G1 ranked species; regionally endemic
Three-toothed Caddisfly	<i>(Triaenodes tridontus)</i>	G1 ranked species
Mayfly	<i>(Apobaetis futilis)</i>	G2 ranked species
Mayfly	<i>(Nixe flowersi)</i>	G1 ranked species; regionally endemic
Mayfly	<i>(Tricorythodes curvatus)</i>	G1 ranked species; regionally endemic
Osage Winter Stonefly	<i>(Allocapnia jeanae)</i>	G2 ranked species; regionally endemic
Shield Winter Stonefly	<i>(Allocapnia peltoides)</i>	G3 ranked species; regionally endemic
Truncate Stonefly	<i>(Perlesta bolukta)</i>	G2 ranked species; regionally endemic
Toothed Stonefly	<i>(Perlesta browni)</i>	G3 ranked species; regionally endemic
Cherokee Needlefly	<i>(Zealeuctra cherokee)</i>	G3 ranked species; regionally endemic
Oklahoma Spur-throat Grasshopper	<i>(Melanoplus oklahomae)</i>	G1 ranked species; state endemic
Loamy-ground Tiger Beetle	<i>(Cicindela belfragei)</i>	G3 ranked species
Swift Tiger Beetle	<i>(Cicindela celeripes)</i>	G1 ranked species
Ghost Tiger Beetle	<i>(Cicindela lepida)</i>	G 3 ranked species
American Bumble Bee	<i>(Bombus pensylvanicus)</i>	G3 ranked species
Southern Plains Bumble Bee	<i>(Bombus fraternus)</i>	regionally endemic species

Variable Cuckoo Bee	(<i>Bombus variabilis</i>)	G3 ranked species
Cave Springtail	(<i>Pseudosinella dubia</i>)	G1 ranked species; Ozark endemic species
Cave Springtail	(<i>Arrhopalites jay</i>)	G2 ranked species; Ozark endemic species
Conchas Crayfish	(<i>Orconectes deanae</i>)	regionally endemic to North Canadian River
Painted Crayfish	(<i>Orconectes difficilis</i>)	G3 ranked species; recent taxonomic revision and re-ranking
Neosho Midget Crayfish	(<i>Orconectes macrus</i>)	regionally endemic to Neosho River
Meek's Crayfish	(<i>Orconectes meeki</i>)	regionally endemic to the Ozarks
Oregon Fairy Shrimp	(<i>Eubbranchipus oregonus</i>)	G3 ranked species
Cave Isopod	(<i>Amerigoniscus centralis</i>)	G1 ranked species; Oklahoma endemic species
Cave Isopod	(<i>Caecidotea mackini</i>)	newly ranked species; Oklahoma endemic species
Cave Isopod	(<i>Caecidotea oculata</i>)	G3 ranked species; regionally endemic species
Cave Isopod	(<i>Caecidotea simulator</i>)	G3 ranked species; regionally endemic species
Cave Isopod	(<i>Miktoniscus oklahomensis</i>)	G1 ranked species; Oklahoma endemic species
Cave Millipede	(<i>Trigenotyla blacki</i>)	G2 ranked species; regionally endemic
Cave Millipede	(<i>Trigenotyla vaga</i>)	G2 ranked species; regionally endemic
Cave Spider	(<i>Islandiana unicornis</i>)	G2 ranked species
Cave Harvestman	(<i>Crosbyella spinturnix</i>)	G1 ranked species; Oklahoma endemic species
Ozark Mantleslug	(<i>Megapallifera ragsdalei</i>)	G3 ranked species
Ouachita Mantleslug	(<i>Pallifera tournescalis</i>)	G1 ranked species: Ouachita Mt endemic
Waxcoil Snail	(<i>Helicodiscus nummus</i>)	G1 ranked species; regionally endemic species
Crosstimbers Coil Snail	(<i>Helicodiscus tridens</i>)	G2 ranked species; regionally endemic species
Wichita Mountains Pillsnail	(<i>Euchemotrema wichitorum</i>)	G2 ranked species; Oklahoma endemic
Smooth-lip Shagreen	(<i>Inflectarius edentatus</i>)	G2 ranked species; regionally endemic species
Oklahoma Liptoosnail	(<i>Millerelix deltoidea</i>)	G2 ranked species; regionally endemic species
Wyandotte Liptoosnail	(<i>Millerelix simpsoni</i>)	G2 ranked species; regionally endemic species
Tulsa Whitelip Snail	(<i>Neohelix lioderma</i>)	G2 ranked species; Oklahoma endemic
Lidded Oval Snail	(<i>Patera indianorum</i>)	G2 ranked species; regionally endemic species
Ouachita Slitmouth Snail	(<i>Stenotrema unciferum</i>)	G2 ranked species; regionally endemic species
Slope Ambersnail	(<i>Catinella wandae</i>)	G2 ranked species
Shadow Gloss Snail	(<i>Zonitoides kirbyi</i>)	G2 ranked species
Pyramid Pigtoe	(<i>Pleurobema rubrum</i>)	G2 ranked species; new data suggests it may occur in Oklahoma

E. SIGNIFICANT DEVIATIONS:

In July of 2013, we requested and received a two-year, no-cost extension for this grant to maximize our ability to solicit and incorporate new information from technical experts and stakeholders. The revision process required greater personnel time than we had initially anticipated because we made extensive edits to every section of this strategic plan.

F. DATE: December 10, 2015

G: PREPARED BY: Mark Howery, Wildlife Diversity Biologist
Oklahoma Department of Wildlife Conservation

H. APPROVED BY:



Andrea Crews, Federal Aid Coordinator
Oklahoma Department of Wildlife Conservation



Alan Peoples, Wildlife Division Chief
Oklahoma Department of Wildlife Conservation

APPENDIX 1. Roadmap to the Eight Required Elements: a crosswalk between the eight elements and their locations within the Oklahoma Comprehensive Wildlife Conservation Strategy

This document provides guidance for how to find the eight required elements in Oklahoma's Comprehensive Wildlife Conservation Strategy (OCWCS). It provides chapters, sections and page numbers to examine how each required element is addressed.

Element 1:

Information regarding the distribution and abundance of species of wildlife, including low and declining populations as each state fish and wildlife agencies deems appropriate, that are indicative of the diversity and health of the state's wildlife. (These species are hence referred to as the state's Species of Greatest Conservation Need.)

The Oklahoma Comprehensive Wildlife Conservation Strategy identifies 310 species as Species of Greatest Conservation Need. Two hundred forty-one of these species were identified during the development of the original OCWCS in 2005, while the other 69 species were identified during the comprehensive revision process based upon new information. The information used to evaluate species for inclusion in the list of Species of Greatest Conservation Need included current literature (summarized in Appendix C, pages 390-394) and from the best professional judgment of the technical experts that were consulted during the comprehensive revision (Appendix F., pages 411-414) and during the development of the original OCWCS in 2005 (Appendix G., pages 415-418).

These species are identified in several locations within the OCWCS.

1) Appendix D (pages 395-403) explains how these 310 species were chosen and how they were evaluated, scored and ranked into three tiers of relative conservation priority. The OCWCS planning team endeavored to develop a simple, objective and uniform set of criteria that could be applied across all taxa to select the Species of Greatest Conservation Need and rank them. Appendix D states why each species was selected as a Species of Greatest Conservation Need, by identifying which of the six selection criteria were met by each species. Additionally, the selection and ranking processes are discussed in the Approach and Methods Section of the Introduction (pages 8-9).

2) Appendix E (pages 404-410) lists each of Oklahoma's Species of Greatest Conservation Need by both their common name and scientific name and groups them by their tier of priority (Tier I, II and III).

3) The Species of Greatest Conservation Need are listed again in Table IN2. within the State Overview and Ecological Framework section of the Introduction (pages 24-36). Within this table, the species are listed by their common and scientific name; they are organized by taxonomic groups at the level of their Class, and the ecological region(s) in which each species occurs is noted to provide a geographic frame of reference. This table provides a course assessment of distribution that is refined down to the habitat level in each regional chapter of the OCWCS. Table IN2 was created in response to comments that were received from technical reviewers that requested a summary table that organized species by region and a listing of

species that separated the invertebrate taxa into smaller groups. The Species of Greatest Conservation Need selection criteria were applied to all species for which sufficient information was available. The list includes representatives from all of the terrestrial and freshwater vertebrate classes (jawless and jawed fish were combined), as well as seven classes of invertebrates (two classes within the phylum Mollusca and five classes within the phylum Arthropoda).

4) The OCWCS divides the state into seven regional chapters; these are six chapters based upon terrestrial ecological regions and one chapter that addresses the large rivers systems that span multiple terrestrial regions. Within these regions, there are further subdivisions by habitat type. In total, 56 habitat types are identified and a list of Species of Greatest Conservation Need is provided for each habitat type. For example, in the Tallgrass Prairie Region, six important habitat types are identified and a summary table of their Species of Greatest Conservation Need is identified for each (pages 151-152, 158-159, 164-165, 169-171, 175, and 180-181). Each of the summary tables provides information about the regional status and statewide population trend for each species to the greatest extent determinable based upon existing information. Taken collectively, the 56 groupings of Species of Greatest Conservation Need by region and by habitat provide the distribution information that Congress requires. These tables also provide the abundance information that Congress requires through the regional status assessments that provide relative abundance and distribution.

Element 2:

Information regarding the location and relative condition of key habitats and community types essential to the conservation of each state's Species of Greatest Conservation Need;

The key habitats and community types that are essential to the conservation of Oklahoma's Species of Greatest Conservation Need are identified within the seven regional chapters (the Large Rivers region and six terrestrial ecological regions). Within the Large Rivers regional chapter, all of the riverine microhabitats are combined into a single river assessment. However, each of the seven large rivers is discussed individually (pages 37-39). Within each of the six terrestrial ecological region chapters, between six and eleven important habitat types are identified. These are referred to as "Conservation Landscapes" although a few of them do not occur on a landscape scale (e.g. caves, springs, herbaceous wetlands).

Fifty-six (56) categories of key habitats within regions are identified and each is addressed in its own section within the OCWCS. The list of sections addressing each regional habitat type is provided in the Table of Contents at the beginning of the OCWCS. Examples of these habitat and community types include the Shinnery Oak Shrublands within the Mixed-grass Prairie Region (pages 99-104) and the Mesic Hardwood Forests within the Ozark Region (pages 269-274). Each important habitat and community type is discussed in an individual section within the appropriate regional chapter. Each of these habitat sections begins with a narrative description of the habitat that includes its location, dominant plant species and current condition.

The key habitats and community types were prioritized as described in the Approach and Methods section (page 9). Habitats were evaluated based upon their uniqueness, their geographic abundance and the number of Tier I and Tier II species that each supports. All of

these habitats are considered to be relatively important; therefore they were categorized into three levels of priority: medium, high and very high to indicate that none were low priorities.

In the introduction to each of the six terrestrial ecological region chapters, a current vegetation map and a summary table are provided to describe the relative abundance and distribution of each of the habitats that can be mapped. These regional maps can be found on pages: 53-54 (Shortgrass Prairie Region); 91-92 (Mixed-grass Prairie Region); 148-149 (Tallgrass Prairie Region); 190-191 (Cross Timbers Region); 251-252 (Ozark Region) and 312-313 (Ouachita Mountains, Arkansas River Valley, and West Gulf Coastal Plain Region).

To place all of the regions and habitat types within a statewide context, background information is provided in the State Overview and Ecological Framework section of the Introduction (pages 19-23). Additional statewide maps of vegetation and soils are provided in the first pages of Appendix B (pages 381-382).

Element 3:

Information regarding the problems which may adversely affect species of greatest conservation need or their habitats, and priority research and survey efforts needed to identify factors which may assist in restoration and improved conservation of these species and their habitats;

Within the OCVCS, the term "Conservation Issues" is used to denote the problems that may adversely affect species. Within each of the sections addressing specific habitat and community types (aka Conservation Landscapes) a series of issue statements are listed and these issues are grouped into larger categories such as "Habitat Loss and Fragmentation," "Invasive Species," and "Current or Historic Land Management Practices that Affect Habitat and Species of Greatest Conservation Need." Most of the habitat sections identify 12 to 30 conservation issues grouped into three to six larger categories. As an example, the Small Rivers habitat type in the Ozark Region Chapter (pages 253-259) identifies 26 conservation issues in five broad categories. Because the conservation issues are associated with habitat types and the communities of Species of Greatest Conservation Need within those habitats, a list of conservation issues is identified for every habitat and can be found by examining each habitat type listed in the Table of Contents.

The conservation issues that are identified in the OCVCS are triggered by a wide range of activities including activities that are not regulated by the state wildlife agency (in some cases, the conservation issues are not regulated by any federal, state, county or municipal government). Conservation issues were included regardless of agency jurisdiction boundaries; any conservation issue that could potentially affect one or more Species of Greatest Conservation Need was included.

The best professional judgment of multiple technical expert reviewers was used to rank the relative importance/priority of each set of conservation issues. Technical experts typically made their decisions based upon the geographic extent of an issue and the number of species that it affected. A widespread issue that affected multiple taxa was generally a higher priority than an issue occurring over a small geographic area or affecting only a few species. This is described in the Approach and Methods Section (pages 7-9). One recurring category of conservation issues

was the existence of data gaps related to species, habitats and conservation issues that created impediments to effective conservation delivery. Recommendations were included in most of the habitat sections to address these data deficiencies.

Element 4:

Information regarding the actions necessary to conserve Species of Greatest Conservation Need and their habitats and priorities for implementing such conservation actions;

Within each of the 56 regional habitat sections, is a list of potential conservation actions that may resolve or ameliorate the conservation issues that are identified. These conservation actions are not prioritized, but are attached to a specific category of conservation issues which have been prioritized by technical experts. Because a single conservation action might be applicable to resolving multiple conservation issues, the conservation actions were assigned to the categories of conservation issues rather than to specific issues.

Using the Small Rivers habitat type in the Ozark Region (pages 253-259) as an example, forty-three (43) conservation actions were recommended. These were comprised of ten conservation actions recommended to address the group of issues related to altered water quality; seven actions recommended to address the issues related to information gaps; sixteen actions recommended in an attempt to address alterations in flow and water quantity; six actions recommended to address issues related to invasive species, and four actions recommended to address issues related to heavy recreational use of the habitat. As was the case with the conservation issues, the recommended conservation actions were not limited to those actions that could be accomplished by the state wildlife agency, nor were they limited to those actions that could be funded through the State and Tribal Wildlife Grants program.

Element 5:

The provisions for periodic monitoring of species of greatest conservation need and their habitats, for monitoring the effectiveness of conservation actions, and for adapting conservation actions as appropriate to respond to new information or changing conditions;

Monitoring is addressed in several ways and in several locations within the OCWCS. Because of the limited funding available through the State and Tribal Wildlife Grants program in comparison to the number of Species of Greatest Conservation Need, the OCWCS recommends that monitoring effort be directed toward:

- A) project-specific monitoring to evaluate the effectiveness of conservation actions (as discussed on pages 12-13)
- B) periodic population monitoring for representative species (e.g. Black-tailed Prairie Dog colonies and Lesser Prairie Chicken leks as listed in the mixed-grass prairie habitat on page 98)
- C) monitoring of habitat conditions and acreages to provide an indication of the likely population trends for multiple associated species (as discussed on pages 12-13)

At the end of every habitat section, the OCWCS provides a short list of recommended monitoring and effectiveness measures. These are focused on monitoring populations of Species of Greatest Habitat Need, monitoring animal and vegetation response to conservation actions, monitoring the size and condition of important habitats, and monitoring the effectiveness of outreach and assistance programs. Using the example of the Small Rivers habitat within the Ozark Region, nine monitoring recommendations are made (page 259). Most of these are intended to be either regional in scope (e.g. monitoring of population sizes and trends) or project-specific (e.g. changes in relative condition of in-stream habitats). These monitoring and effectiveness measures can be used by grant writers who develop proposals for State and Tribal Wildlife Grants funding to work in that habitat or with one or more of the Species of Greatest Conservation Need associated with that habitat.

Monitoring also is discussed in the context of Adaptive Management in the Approach and Methods section on pages 12-13. The intention is to use regional monitoring of animal populations and habitats to assess the background condition, then to use this as a basis of comparison for project-specific monitoring in order to evaluate the effectiveness of projects. Both forms of monitoring will be useful to the Oklahoma Department of Wildlife Conservation (ODWC) and its conservation partners as the OCWCS is reviewed and revised in the future.

Element 6:

Each State's provisions to review the Comprehensive Wildlife Conservation Strategy at intervals not to exceed 10 years;

The future review and revision of the OCWCS is briefly described in the Approach and Methods section on page 13. The ODWC will conduct a comprehensive review and revision of the OCWCS every ten years. This process will begin two to three years before the ten-year deadline so that adequate time is available to meet with stake holders and to provide technical experts and the public the opportunity to review the OCWCS over an extended period of time.

The procedures followed during the current comprehensive review and revision are described in the Approach and Methods section on pages 7-12. Subsequent revisions of the OCWCS are likely to follow this same process unless the feedback that is received from technical experts and the public advocate for a modified approach consistent with the principles of adaptive management.

Element 7:

Each State's provisions for coordination during the development, implementation, review, and revision of the Comprehensive Wildlife Conservation Strategy with Federal, State, and local agencies and Native American tribes that manage significant land or water within the State or administer programs that significantly affect the conservation of species or their habitats;

The provisions and procedure for the current comprehensive review of the OCWCS are described on pages 7-13. As described, the revisions made to the OCWCS were driven heavily by recommendations that were made during stakeholder meetings when ODWC Wildlife Diversity staff (also known as the OCWCS Review Team) met face to face with technical

experts and organizations. To kick-off the review and revision process, ODWC held an experts workshop in 2012 with facilitated terrestrial and aquatic break-out sessions. More than 60 technical experts from academia, conservation organizations and land management organizations attended this meeting and provided input that led to changes including the creation of a Large Rivers chapter and modifications to several of the Appendices. During the period from February 2013 to February 2015, members of the OCWCS Review Team held meetings with stakeholders from agencies and organizations including The Nature Conservancy, the Oklahoma Biological Survey and Oklahoma Natural Heritage Program, the U.S. Fish and Wildlife Service's Tulsa Field Office, the Ouachita National Forest, the Oklahoma Department of Transportation, the Oklahoma Division of Forestry, the Oklahoma Division of State Parks, the Sutton Avian Research Center and Oklahoma Ornithological Society Board, the Oklahoma Museum of Natural History, and the Oklahoma Cooperative Fish and Wildlife Research Unit. Additionally, presentations were made at the 2013 Fall Meeting of the Oklahoma Ornithological Society, the Fall of 2013 Ozark Summit meeting, the Spring 2014 meeting of the Oklahoma Master Naturalists Association and the Spring 2014 meeting of the Oklahoma Clean Lakes and Watersheds Association meeting to stimulate interest. The OCWCS Review Team used the information from these stakeholder meetings to update the OCWCS and create a revised draft for technical review and edits, and then for a broad public review.

Attached in Appendix 1 of this Road Map is a list of 298 technical experts that were invited to review the draft of the revised OCWCS. The reviewer list includes the zoology and biology faculty at every university and four-year college in Oklahoma that conducts research at the organismal level in the areas of ecology, land management, population biology, taxonomy, and behavior. Also included are representatives from each of the land-management agencies and organizations that hold substantial acreage in the state including the U.S. Forest Service, the U.S. Fish and Wildlife Service, the Army Corps of Engineers, the USDA Natural Resources Conservation Service, the Oklahoma Department of Transportation, the Oklahoma Department of Agriculture, the Samuel Roberts Noble Foundation, and The Nature Conservancy. Because the Oklahoma Department of Wildlife Conservation is the largest owner and manager of public conservation lands in Oklahoma, all of its statewide and area-specific fisheries biologists and wildlife biologists were invited to review and edit the draft OCWCS. Representatives from 28 of the 35 Native American Tribes in Oklahoma were invited to participate in the review process. None of the tribes in Oklahoma have reservation status and because of the small size of many of these tribes, several of them do not have tribal natural resource management programs or points of contact for conservation agencies. Other reviewers included technical experts with the Oklahoma Biological Survey/Oklahoma Natural Heritage Inventory, the Oklahoma Museum of Natural History and the Sutton Avian Research Center.

In an effort to avoid overwhelming the technical reviewers with a large volume of text at one time, the OCWCS Review Team released two or three chapters at a time and provided the technical reviewers with six to ten weeks to review and provide general or specific comments. Based on previous experience with other planning processes, the OCWCS Review Team provided the technical reviewers with each chapter as a Word document, rather than a .pdf file. This was done to make the review process easier for the technical reviewers and increase their level of participation because they could use the Track Changes function or modify the file in a way that was easiest for them in order to share their comments and edits.

Appendix F. of the OCWCS (pages 411-414) provides a list of the individuals who participated in stakeholder meetings and/or that provided written edits, comments and additions during the Technical Review period.

Element 8:

Each State's provisions to provide the necessary public participation in the development, revision, and implementation of its Strategy;

The public participation procedures for the comprehensive review and revision of the OCWCS are discussed on pages 10-12. In order to maximize public participation in the review process, the OCWCS Review Team reached out to the public in four ways: A) indirectly through outreach to newspapers and radio stations, B) directly via a large-scale e-mail campaign, C) directly via repeated articles in the *Wildside* - the electronic newsletter of the Oklahoma Wildlife Diversity Program, and D) directly through a public meeting in the Oklahoma City metropolitan area at the ODWC's Lake Arcadia Conservation Education Center.

In mid-August, at the end of the technical expert review period, the OCWCS Revision Team incorporated all of the technical comments and released a public review draft. (Technical experts were encouraged to submit additional comments and edits throughout the public review period.) The public review draft was posted on the ODWC's site on its webpage for the OCWCS and the State and Tribal Wildlife Grants program. To announce the comment period for the draft OCWCS, a direct news release was issued through ODWC's Information Division to all of the newspapers, radio stations and television stations in Oklahoma, as well as to 69,774 individual subscribers to the agency's electronic news release mailing list. The news release described the OCWCS, invited the public to attend a public meeting on September 3, 2015, and provided a direct link to a .pdf file of the OCWCS that people could download to their computers. At the public meeting, the OCWCS Review Team made a PowerPoint presentation that described the purpose and history of the OCWCS and the State and Tribal Wildlife Grants Program, and provided an overview of the Strategy's structure. Copies of the entire OCWCS and regional summary sheets were available for the public to take home and review.

In addition to the news release, the OCWCS Review Team incorporated a series of articles about the OCWCS revision in the Oklahoma Wildlife Diversity Program's electronic newsletter in December 2014, July 2015 and August 2015. The news release, with the link to the entire OCWCS and an invitation to the public meeting, also was emailed to the 7,126 newsletter subscribers. There is some overlap between the *Wildside* newsletter subscribers and the ODWC news release subscribers, but on average the *Wildside* audience should be more interested in nongame/wildlife diversity issues than the news release subscribers.

Public comments and additional technical comments were incorporated as they were received. Appendix F (pages 411-414) contains a list of both the technical reviewers and public reviewers that submitted written comments. Affiliations were listed in those cases where these were known.

APPENDIX 2. Final Draft of the Oklahoma Comprehensive Wildlife Conservation Strategy Submitted to the Regional Review Team.