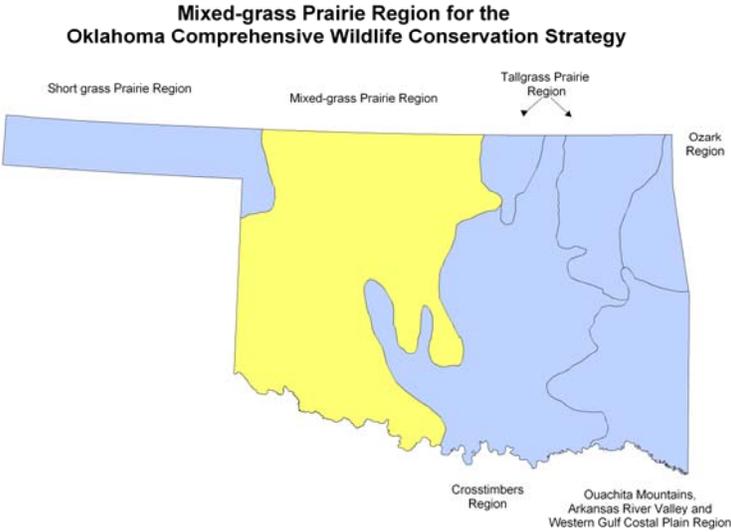


Mixed-grass Prairie Region

This is a large and diverse ecological region that encompasses much of western Oklahoma including all or portions of Harper, Ellis, Woods, Woodward, Major, Alfalfa, Grant, Kay, Noble, Logan, Garfield, Kingfisher, Canadian, Blaine, Dewey, Custer, Washita, Roger Mills, Beckham, Harmon, Greer, Jackson, Kiowa, Tillman, Caddo, Comanche, Cotton, Stephens, and Jefferson counties. This region is equivalent to Bailey’s Red Bed Plains and South-central Great Plains sections and to Omernick’s Central Great Plains ecoregion and a portion of the Southwestern Tablelands ecoregion.



The best professional judgment of the advisory group and technical experts was used to identify each Conservation Landscape’s status and trend. And, even though some issues and actions apply to multiple Regions, each Region chapter is designed to stand-alone.

Conservation Landscapes listed in general priority order

- Very High priority Conservation Landscapes:
 - Mixed-grass Prairie
 - Shinnery Oak Shrubland
 - Sand Sagebrush/Bluestem Shrubland
 - Gypsum or Sandstone Canyonlands and Gypsum Caves

- High priority Conservation Landscapes:
 - Tallgrass Prairie
 - Large Rivers and Sloughs/Ponds
 - Herbaceous Wetland
 - Small Rivers
 - Post Oak/Blackjack Savannah or Shrublands and Post Oak/Blackjack Oak/Hickory Woodlands
 - Sand Plum, Hawthorn, or Sumac Shrubland

- Moderate priority Conservation Landscapes:
 - Streams and Associated Riparian Forests
 - Springs
 - Mesquite Savannah or Shrublands
 - Juniper Savannah or Woodlands

Conservation Landscape: Mixed-grass Prairie

The relative condition of Mixed-grass Prairie habitat in the Mixed-grass Prairie Region is currently good with an increasing trend. Historically, this is the most widespread and common habitat type found in the Mixed-grass Prairie Region. Mixed-grass Prairies have a diverse species composition, however more plant communities are dominated by Little Bluestem (*Schizachyrium scoparium*) and Sideoats Grama (*Bouteloua curtipendula*). Mixed-grass Prairie plant associations include Little Bluestem/Indiangrass (*Sorghastrum nutans*), Little Bluestem/Sideoats Grama/Blue Grama (*Bouteloua gracilis*), Little Bluestem/Big Bluestem, and Little Bluestem/Hairy Grama. Silver Bluestem (*Bothriochloa saccharoides*) and Prairie Threeawn (*Aristida oligantha*) occur in disturbed sites. Other common grasses and forbs include Sneezeweed (*Helenium anarum*), Hairy Sunflower (*Helianthus hirsutus*), Heath Aster (*Aster ericoides*), Roundleaf Bladderpod (*Lesquerella ovalifolia*), Purple Coneflower (*Echinacea angustifolia*), Leadplant (*Amorpha canescens*), Panic Grass (*Dichanthelium oligosanthos*), and Foxtail Barley (*Hordeum jubatum*). Much of the historic Mixed-grass Prairie in the Region has been converted to other land uses, especially crop land and introduced pasture. Nearly 4 million acres of Mixed-grass Prairie is thought to remain but this is less than 40 percent of the historic acreage. Mixed-grass Prairie has been altered by several factors including fire suppression, heavy year-round grazing, introduced grasses and forbs, and the expansion of Eastern Redcedar.

Recognized plant associations within this habitat type include:

- Silver Bluestem Grassland
- Vine Mesquite – Buffalograss Grassland
- Little Bluestem – Sideoats Grama – Blue Grama Grassland
- Little Bluestem – Blue Grama Grassland

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	American Golden Plover		X						X
Bird	Baird's Sparrow	X							X
Bird	Bald Eagle	X						X	
Bird	Barn Owl	X							X
Bird	Bell's Vireo		X			X			
Bird	Buff-breasted Sandpiper	X				X			
Bird	Burrowing Owl	X							X
Bird	Cassin's Sparrow		X						X

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Chestnut-collared Longspur	X							X
Bird	Ferruginous Hawk	X							X
Bird	Greater Prairie Chicken	X				X			
Bird	Harris's Sparrow		X						X
Bird	LeConte's Sparrow		X						X
Bird	Lesser Prairie Chicken	X				X			
Bird	Loggerhead Shrike		X			X			
Bird	Long-billed Curlew	X							X
Bird	McCown's Longspur				X				X
Bird	Northern Bobwhite		X			X			
Bird	Painted Bunting		X						X
Bird	Peregrine Falcon	X							X
Bird	Prairie Falcon	X							X
Bird	Red-headed Woodpecker		X			X			
Bird	Sandhill Crane		X				X		
Bird	Scaled Quail		X			X			
Bird	Short-eared Owl				X				X
Bird	Smith's Longspur	X							X
Bird	Sprague's Pipit				X				X
Bird	Swainson's Hawk		X						X
Bird	Upland Sandpiper				X		X		
Bird	Whooping Crane	X						X	
Inve	Prairie Mole Cricket	X				X			
Inve	Rattlesnake Master Borer	X							X
Mamm	Black-tailed Prairie Dog		X					X	
Mamm	Brazilian (Mexican) Free-tailed Bat				X				X
Mamm	Desert Shrew				X				X
Mamm	Eastern Spotted Skunk				X				X
Mamm	Long-tailed Weasel				X				X
Mamm	Mountain Lion	X						X	
Mamm	Texas Kangaroo Rat	X							X
Mamm	Western Big-eared Bat	X							X
Rept	Texas Gartersnake				X				X
Rept	Texas Horned Lizard				X				X
Rept	Texas Long-nosed Snake				X				X
Rept	Western Diamond-backed Rattlesnake				X				X
Rept	Western Massasauga				X				X

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends of are

declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.

2. Baseline knowledge about flora/fauna and both the historic and current distribution and condition of this habitat type is incomplete.

Conservation Actions:

- Conduct research to determine why species of greatest conservation need are low and/or declining.
- Conduct surveys of existing literature, reports, and museum records to evaluate historic distributions, abundances and habitat affinities of species of greatest conservation need, and examine possible causes of suspected population declines.
- Conduct field studies to establish baseline conditions for the current distributions, abundances, and habitat affinities of species of greatest conservation need.
- Verify the accuracy of existing data and assess changes over time.
- Develop and provide long-term funding to maintain databases to store and analyze distributional and ecological data for species of greatest conservation need.
- Conduct ecological studies on priority species of greatest conservation need to identify factors that limit population sizes, evaluate factors that may be responsible for population declines, and develop recommendations to enhance populations through improving habitat conditions.
- Develop methods to accurately identify and map the distribution and condition of this habitat to establish a baseline condition.
- Use surveys, workshops, and data acquisition to update the Comprehensive Wildlife Conservation Strategy.

Conservation Issue: Habitat loss and fragmentation from land management practices:

3. Fragmentation of habitat has reduced the quality of this habitat and reduced its value to species of greatest conservation need (including that caused by inheritance laws making it difficult to pass large tracts intact to succeeding generations).
4. Conversion of large tracts of this habitat to cropland has reduced the quantity and quality of the habitat for use by species of greatest conservation need
5. Heavy grazing sometimes reduces the quality and quantity of this habitat.
6. Some birds are especially susceptible to collisions with fences.
7. Urban sprawl has reduced the quantity and quality of this habitat type in some areas.
8. Energy exploration and development can sometimes reduce the quality and quantity of this habitat type.

Conservation Actions:

- Encourage landowners to take advantage of Farm Bill provisions, including those providing economic incentives for practices favorable to species of greatest conservation need.
- Support laws to make it easier for landowners to pass large tracts to succeeding generations.
- Consider land acquisition and conservation easements to protect some of the more important tracts of this habitat.
- Promote and encourage grazing practices having the least negative impacts on habitat quantity and quality.
- Encourage and support guidelines for the Conservation Reserve Program that result in Conservation Reserve Program lands being planted to 100 percent native grasses and forbs.
- Encourage and support the replanting of existing cropland, abandoned cropland, and “improved” (Bermuda grass) pastures to Mixed-grass Prairie habitat using native grasses and forbs.
- Encourage the removal of interior fencing in pastures and the use of patch burn technology in conjunction with mineral blocks to manage cattle grazing patterns.

- Coordinate with stakeholders on energy developments (e.g., site selection and mitigation).
- Support the development of a statewide mitigation plan for wind power development.

Conservation Issue: Invasive and exotic plants and animals that are detrimental to species of greatest conservation need:

9. Woody vegetation encroachment reduces both the quantity and the quality of this habitat.
10. Fire suppression sometimes removes a naturally occurring control mechanism for invasive woody species.
11. Invasive plant species have moved into tracts of this habitat due to conditions becoming favorable.

Conservation Actions:

- Encourage and support changing the existing Conservation Reserve Program guidance to be more favorable to this habitat by planting Conservation Reserve Program lands to 100 percent native grasses and forbs.
- Encourage and facilitate prescribed burning and burn cooperatives.
- Encourage the use of patch burn management to manage cattle rather than extensive interior fencing.
- Encourage and support replanting existing cropland, abandoned cropland and “improved” (Bermuda grass) pastures to Mixed-grass Prairie habitat using native grasses and forbs.
- Encourage landowners to use the Farm Bill programs like the Grassland Reserve Program or the Conservation Reserve Programs to plant crop fields to native grasses and forbs instead of Old World Bluestem and Lovegrass.

Conservation issue: Black-tailed Prairie Dog habitat related issues

12. Land usage has reduced the number and sizes of Black-tailed Prairie Dog towns.

Conservation Actions:

- Provide landowner incentives for following agricultural practices that maintain Black-tailed Prairie Dogs.
- Encourage and support alternative economic use of agricultural lands, including fee hunting, fee access for fishing, and ecotourism.
- Develop and distribute informational materials for landowners and others on topics including grazing ecology, natural systems, and exotic invasive species.
- Encourage the use of programs like the Landowner Incentive Program for the conservation of Black-tailed Prairie Dogs and other species of greatest conservation need.
- Support necessary changes in the inheritance legislation to enable large ranches to remain in single family ownership.
- Encourage land acquisition and conservation easements by private entities (e.g., land trusts and organizations such as The Nature Conservancy).
- Increase funding from the subsidy side of the Farm Bill for the Conservation Reserve and Grassland Reserve Programs.
- Encourage the development or updating of Best Management Practices for practices that protect this habitat and make it suitable for species of greatest conservation need.
- Identify and prioritize core areas of habitat and corridors to connect to get the most benefits.

Potential indicators for monitoring the effectiveness of the conservation actions:

- Acres enrolled in conservation programs.
- Acres of native plant communities restored.
- Numbers, size and distribution of Black-tailed Prairie Dog colonies.
- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.
- Response of species to management practices such as burning, fencing, and grazing.

Conservation Landscape: Shinnery Oak Shrubland

The relative condition of Shinnery Oak Shrubland habitat in the Mixed-grass Region is currently good with a declining trend. The Shinnery Oak Shrubland habitat is unique to this Region and occurs locally on sandy soils and stabilized dunes in portions of Harmon, Beckham, Roger Mills, Ellis, Dewey, and Woodward counties. Duck and Fletcher (1944) estimated that nearly 750,000 acres of Shinnery Oak Shrublands historically occurred in Oklahoma. Dering and Pettit (1972) estimated that more than 100,000 acres of this had been converted to other cover types; primarily crop fields and introduced pastures. Shinnery Oak Shrublands are a climax plant community in which shrubs and grasses are codominant. Harvard Oak (*Quercus harvardii*), also known as Shinnery Oak, is the dominant shrub, though Sand Sagebrush (*Artemisia filifolia*), Sand Plum (*Prunus angustifolia*), and Netleaf Hackberry (*Celtis reticularia*) are also common. Dominant grasses are Sand Dropseed (*Sporobolus cryptandrus*) and Little Bluestem (*Schizachyrium scoparium*). Sand Bluestem (*Andropogon hallii*), Switchgrass (*Panicum virgatum*), Sideoats Grama (*Bouteloua curtipendula*), and Sand Lovegrass (*Eragrostis trichodes*) are also common. Harvard (i.e., Shinnery) Oak is a low shrub usually less than two meters tall that develops a massive system of underground stems and deep root system. A single Harvard Oak may have over 100 above ground stems, each appearing to be a single small shrub and spreading 3 to 16 meters in diameter (Mueller 1951). Harvard Oak hybridizes with other oak species. Much of the Shinnery Oak Shrublands in Oklahoma contain scattered groves or mottes of oaks up to 5 meters tall that are hybrids between Harvard Oak and Post Oak (*Quercus stellata*) (Muller 1951, Correll and Johnston 1970). Like pure Harvard Oak, these hybrids develop large underground stem and root systems. Typically, a motte of hybrid oaks is comprised of a single individual with several dozen large stems.

Recognized plant associations within this habitat type include:

Shinnery Oak/Sand Dropseed – Little Bluestem Shrubland

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Barn Owl	X							X
Bird	Bell's Vireo		X			X			
Bird	Burrowing Owl	X							X
Bird	Cassin's Sparrow		X						X
Bird	Ferruginous Hawk	X							X
Bird	Harris's Sparrow		X						X

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	LeConte's Sparrow		X						X
Bird	Lesser Prairie Chicken	X				X			
Bird	Loggerhead Shrike		X			X			
Bird	Northern Bobwhite		X			X			
Bird	Painted Bunting		X						X
Bird	Red-headed Woodpecker		X			X			
Bird	Scaled Quail		X			X			
Bird	Swainson's Hawk		X						X
Inve	Outis Skipper								
Inve	Shinnery Oak Buck Moth								
Mamm	Brazilian (Mexican) Free-tailed Bat				X				X
Mamm	Mountain Lion	X						X	
Mamm	Ringtail				X				X
Rept	Common Lesser Earless Lizard				X				X
Rept	Texas Gartersnake				X				X
Rept	Texas Horned Lizard				X				X
Rept	Texas Long-nosed Snake				X				X
Rept	Western Massasauga				X				X

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends of are declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.
2. Baseline knowledge about flora/fauna and both the historic and current distribution and condition of this habitat type is incomplete.

Conservation Actions:

- Conduct research to determine why species of greatest conservation need are low and/or declining.
- Conduct surveys of existing literature, reports, and museum records to evaluate historic distributions, abundances, and habitat affinities of species of greatest conservation need, and examine possible causes of suspected population declines.
- Conduct field studies to establish baseline conditions for the current distributions, abundances, and habitat affinities of species of greatest conservation need.
- Verify the accuracy of existing data and assess changes over time.
- Develop and provide long-term funding to maintain databases to store and analyze distributional and ecological data for species of greatest conservation need.
- Conduct ecological studies on priority species of greatest conservation need to identify factors that limit population sizes, evaluate factors that may be responsible for population declines, and develop recommendations to enhance populations through improving habitat conditions.

- Develop methods to accurately identify and map the distribution and condition of this habitat to establish a baseline condition and to assess and identify the most important Shinnery Oak tracts.
- Use surveys, workshops, and data acquisition to update the Comprehensive Wildlife Conservation Strategy.

Conservation Issue: Habitat loss and fragmentation from land management practices:

3. School land property administration sometimes does not consider the ecological impacts of their actions.
4. Use of herbicides can reduce the quantity and quality of this habitat.
5. Heavy grazing sometimes reduces the quantity and quality of this habitat.
6. Advisors to landowners sometimes lack proper technical information.
7. A variety of activities including oil and gas development, tree rows and hardwood invasion, windbreaks, conversion to crop fields, power lines and utilities, and wind power development have resulted in fragmentation of this habitat.
8. The Conservation Reserve Program does not currently restore this habitat type.

Conservation Actions:

- Cooperate with the school land office to develop mechanisms for maintaining and improving habitat on school land properties that will benefit Lesser Prairie Chickens and other species of greatest conservation need.
- Research the feasibility of restoring pasture and cropland to Shinnery Oak.
- Develop and distribute information to landowners and others concerning grazing management, fire management, energy development, and natural systems.
- Provide the most up-to-date information to technical assistance and extension staff.
- Encourage road right-of-way management that considers maintenance of this habitat.
- Consider conservation easements and land acquisition to conserve some of the most important tracts of Shinnery Oak habitat in the Mixed-grass Prairie Region.
- Cooperate with the state Conservation Reserve Program and Grassland Reserve Program technical committees and promote giving greater consideration to increasing shrubs.
- Encourage modifications to existing Conservation Reserve Program contracts that will be more favorable to Shinnery Oak habitat.
- Cooperate with oil and gas and wind energy developers and others to minimize surface damages to shrublands.
- Encourage the development of a statewide mitigation plan for wind power development.
- Encourage and facilitate changes in grazing management that restores native grass cover to this shrub land community.

Conservation Issue: Invasive and exotic plants and animals that are detrimental to species of greatest conservation need:

9. Fire suppression has altered the ability of this habitat to be self-sustaining.
10. As a result of fire suppression in this habitat, junipers have invaded many tracts.
11. Conditions in this habitat have become favorable for invasion by Brown-headed Cowbirds.

Conservation Actions:

- Encourage regular burning to maintain this habitat.
- Encourage use of prescribed fire to control invasive species.
- Encourage and facilitate burn cooperatives.
- Develop and distribute information to landowners and others concerning grazing management, fire management, energy development, natural systems, and invasive species.
- Encourage and support actions to manage Brown-headed Cowbird populations.

Potential indicators for monitoring the effectiveness of the conservation actions:

- GIS/remote sensing (e.g., numbers of acres and distributions).
- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.

Conservation Landscape: Sand Sagebrush/Bluestem Shrubland

The relative condition of Sand Sagebrush/Bluestem Shrubland habitat in the Mixed-grass Prairie Region is currently good with a stable trend. Sand Sagebrush Shrublands are found locally in the northwestern portion of the Mixed-grass Prairie Region and occur on deep sandy soils and stabilized dunes in the vicinity of the Cimarron, North Canadian, and Canadian Rivers. This Region encompasses approximately half of the Sand Sagebrush (*Artemisia filifolia*) Shrublands that occur in Oklahoma. Sand Sagebrush is typically found growing in association with Sand Dropseed (*Sporobolus cryptandrus*) and Little Bluestem (*Schizachyrium scoparium*). In these plant communities, Sand Sagebrush may comprise 5 to 50 percent of the canopy cover depending upon factors such as grazing pressure which tends to decrease grass coverage and increase sagebrush, or fire frequency which tends to decrease sagebrush and increase the coverage by grasses. Other grasses and forbs found in this community include Sand Bluestem (*Andropogon hallii*), Sideoats Grama (*Bouteloua curtipendula*), Prairie Sandreed (*Calamovilfa longifolia*), Sand Lovegrass (*Eragrostis trichodes*), Sand Paspalum (*Paspalum stramineum*), Prairie Sunflower (*Helianthus petiolaris*), Mentzelia (*Mentzelia sp.*), Hairy Goldenaster (*Chrysopsis villosa*), Halfshrub Sundrops (*Calylophus serrulatus*), Annual Buckwheat (*Eriogonum anuum*), Indian Blanket (*Gaillardia pulchellum*), Western Spiderwort (*Tradescantia occidentalis*), and Yucca (*Yucca glouca*).

Recognized plant associations within this habitat type include:

Sand Sagebrush/Sand Dropseed – Little Bluestem Shrubland

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Barn Owl	X							X
Bird	Bell's Vireo		X			X			
Bird	Burrowing Owl	X							X
Bird	Cassin's Sparrow		X						X
Bird	Ferruginous Hawk	X							X
Bird	Harris's Sparrow		X						X
Bird	Lesser Prairie Chicken	X				X			
Bird	Loggerhead Shrike		X			X			
Bird	Northern Bobwhite		X			X			
Bird	Painted Bunting		X						X

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Red-headed Woodpecker		X			X			
Bird	Scaled Quail		X			X			
Bird	Swainson's Hawk		X						X
Mamm	Black-tailed Prairie Dog		X					X	
Mamm	Brazilian (Mexican) Free-tailed Bat				X				X
Mamm	Western Big-eared Bat	X							X
Rept	Common Lesser Earless Lizard				X				X
Rept	Texas Gartersnake				X				X
Rept	Texas Horned Lizard				X				X
Rept	Texas Long-nosed Snake				X				X
Rept	Western Massasauga				X				X

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends of are declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.
2. Baseline knowledge about flora/fauna and both the historic and current distribution and condition of this habitat type is incomplete.

Conservation Actions:

- Conduct research to determine why species of greatest conservation need are low and/or declining.
- Conduct surveys of existing literature, reports, and museum records to evaluate historic distributions, abundances, and habitat affinities of species of greatest conservation need, and examine possible causes of suspected population declines.
- Conduct field studies to establish baseline conditions for the current distributions, abundances, and habitat affinities of species of greatest conservation need.
- Verify the accuracy of existing data and assess changes over time.
- Develop and provide long-term funding to maintain databases to store and analyze distributional and ecological data for species of greatest conservation need.
- Conduct ecological studies on priority species of greatest conservation need to identify factors that limit population sizes, evaluate factors that may be responsible for population declines, and develop recommendations to enhance populations through improving habitat conditions.
- Develop methods to accurately identify and map the distribution and condition of this habitat to establish a baseline condition.
- Use surveys, workshops, and data acquisition to update the Comprehensive Wildlife Conservation Strategy.

Conservation Issue: Habitat loss and fragmentation from land management practice:

3. Fragmentation of habitats, including that caused by inheritance laws, reduces the value of these habitats to species of greatest conservation need.

4. Conversion of these habitats to cropland reduces their value to species of greatest conservation need.
5. Excessive grazing can reduce the quantity and quality of this habitat.
6. Some bird species are especially vulnerable to collisions with fences.
7. Spraying of sagebrush with herbicides to encourage grasses often results in a reduction of shrubland.
8. Conservation Reserve Program contracts do not currently include restoration of this habitat.
9. Energy exploration and development can result in reductions in quality and quantity of this habitat in the Mixed-grass Prairie Region.

Conservation Actions:

- Consider land acquisition and conservation easements to conserve the most important tracts of this habitat in the Mixed-grass Prairie Region.
- Encourage and support changes in inheritance legislation to make it easier to pass large intact tracts to succeeding generations.
- Encourage grazing practices that include conservation of this habitat.
- Encourage the use of the Conservation Reserve Program to plant program acreages to 100 percent native grasses and forbs.
- Encourage replanting cropland, abandoned cropland and improved (e.g., Bermuda grass) pastures to Sagebrush/Bluestem Prairie habitat using native grasses and forbs and shrubs.
- Encourage the use of Farm Bill offerings like the Conservation Reserve Program and Grassland Reserve Program to be used for planting Conservation Reserve Program fields to native grasses and forbs instead of Old World Bluestems and Lovegrass.
- Encourage grazing practices which result in removal of interior fencing in pastures and use patch burn technology, in conjunction with mineral blocks, to manage cattle.
- Encourage modifications to existing Conservation Reserve Program contracts that provide for conservation of this habitat.
- Cooperate with energy developers and others both in site selection and mitigation.
- Encourage the development and implementation of a statewide mitigation plan for wind power development.
- Cooperate with energy developers and others to minimize surface damages to shrubland.

Conservation Issue: Invasive and exotic plants and animals that are detrimental to species of greatest conservation need:

10. Fire suppression has created conditions in this habitat that encourage woody encroachment.
11. Invasive species can reduce the quality of this habitat and its suitability for species of greatest conservation need.

Conservation Actions:

- Encourage and support prescribed burning.
- Encourage and facilitate burn cooperatives.

Conservation issue: Black-tailed Prairie Dog habitat related Issue:

12. Land usage has reduced the number and sizes of Black-tailed Prairie Dog towns.

Conservation Actions:

- Provide landowner incentives for following agricultural practices that maintain Black-tailed Prairie Dogs.
- Encourage and support alternative economic use of agricultural lands, including fee hunting, fee access for fishing, and ecotourism.

- Develop and distribute informational materials for landowners and others on topics including grazing ecology, natural systems, and exotic invasive species.
- Encourage the use of programs like the Landowner Incentive Program for the conservation of Black-tailed Prairie Dogs and other species of greatest conservation need.
- Support necessary changes in the inheritance legislation to enable large ranches to remain in single family ownership.
- Encourage land acquisition and conservation easements by private entities (e.g., land trusts and organizations such as The Nature Conservancy).
- Increase funding from the subsidy side of the Farm Bill for the Conservation Reserve and Grassland Reserve Programs.
- Encourage the development or updating of Best Management Practices for practices that protect this habitat and make it suitable for species of greatest conservation need.
- Identify and prioritize core areas of habitat and corridors to connect to get the most benefits.

Potential indicators for monitoring the effectiveness of the conservation actions:

- Acres enrolled in conservation programs.
- Acres of native plant communities restored.
- GIS data layers / remote sensing to measure numbers of acres and their distribution.
- Numbers, size and distribution of Black-tailed Prairie Dog colonies.
- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.
- Response of species to management practices such as burning, fencing, and grazing.

Conservation Landscape: Gypsum or Sandstone Canyonlands and Gypsum Caves

The relative condition of Gypsum or Sandstone Canyonlands and Gypsum Caves habitat in the Mixed-grass Prairie Region is currently good with a stable trend. This habitat occurs in three discreet portions of the Mixed -grass Prairie Region. The largest expanse of this habitat occurs over the Blaine Gypsum formation in the north central portion of the Region extending through portions of Blaine, Major, Woods, and Woodward counties. Other gypsum pockets occur in Harmon, Greer, Beckham, and Washita County. This habitat type occurs on hilly, dissected uplands where layers of brick-red shales, sandstones, and interbedded grayish gypsum are exposed at or near the earth's surface. The thin, dry, calcareous soils overlying these rock layers support a unique community of low stature, drought-tolerant prairie grasses and forbs including Little Bluestem (*Schizachyrium scoparium*) and Hairy Grama (*Bouteloua hirsuta*). Years of erosion have carved out canyons, buttes, and mesas while groundwater movement has dissolved gypsum to create numerous caves. These caves harbor the northern most colonies of the Brazilian Free-tailed Bat (*Tadarida brasiliensis*).

Recognized plant associations within this habitat type include:

- Little Bluestem
- Yellow Indian Paintbrush
- Gordan's Bladderpod Grassland

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Barn Owl	X							X
Bird	Black-capped Vireo	X				X			
Bird	Cassin's Sparrow		X						X
Bird	Ferruginous Hawk	X							X
Bird	Lesser Prairie Chicken	X				X			
Bird	Loggerhead Shrike		X			X			
Bird	Northern Bobwhite		X			X			
Bird	Swainson's Hawk		X						X
Mamm	Brazilian (Mexican) Free-tailed Bat				X				X
Mamm	Desert Shrew				X				X
Mamm	Mountain Lion	X						X	
Mamm	Ringtail				X				X

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Mamm	Western Big-eared Bat	X							X
Rept	Common Lesser Earless Lizard				X				X
Rept	Texas Horned Lizard				X				X
Rept	Texas Long-nosed Snake				X				X
Rept	Western Diamond-backed Rattlesnake				X				X
Rept	Western Massasauga				X				X

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends of are declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.
2. Baseline knowledge about flora/fauna and both the historic and current distribution and condition of this habitat type is incomplete.

Conservation Actions:

- Conduct research to determine why species of greatest conservation need are low and/or declining.
- Conduct surveys of existing literature, reports, and museum records to evaluate historic distributions, abundances, and habitat affinities of species of greatest conservation need, and examine possible causes of suspected population declines.
- Conduct field studies to establish baseline conditions for the current distributions, abundances, and habitat affinities of species of greatest conservation need.
- Verify the accuracy of existing data and assess changes over time.
- Develop and provide long-term funding to maintain databases to store and analyze distributional and ecological data for species of greatest conservation need.
- Conduct ecological studies on priority species of greatest conservation need to identify factors that limit population sizes, evaluate factors that may be responsible for population declines, and develop recommendations to enhance populations through improving habitat conditions.
- Develop methods to accurately identify and map the distribution and condition of this habitat to establish a baseline condition.
- Use surveys, workshops, and data acquisition to update the Comprehensive Wildlife Conservation Strategy.

Conservation Issue: Habitat loss and fragmentation from land management practices:

3. Fire suppression and other ideal conditions have resulted in a virtual explosion by all species of junipers encroaching into this habitat.
4. Heavy grazing can lead to soil erosion in this habitat.
5. Wind power development may reduce the quantity and quality of this habitat.

Conservation Actions:

- Develop and implement alternative methods of cedar control and removal.

- Develop and distribute informational materials to landowners and others dealing with fire and fire management.
- Encourage and facilitate prescribed burning.
- Encourage and facilitate formation of burn cooperatives, including law or regulation changes if necessary.
- Develop and distribute information to landowners and others on grazing management.
- Encourage use of Farm Bill provisions by landowners that include consideration of conserving species of greatest conservation need.
- Consider the use of land acquisition and conservation easements to conserve the most important tracts of this habitat in the Mixed-grass Prairie Region.
- Encourage and support legislation that provides opportunities for landowners to transfer large intact tracts to future generations.
- Encourage grazing practices that provide the least damaging impacts to this habitat.
- Encourage landowners using the Conservation Reserve to plant program acres to 100 percent native grasses and forbs.
- Conduct field studies to clarify the potential impacts of wind power development on species of greatest conservation need in this habitat.
- Participate in the development of a statewide mitigation plan for wind power development.
- Coordinate with other stakeholders on energy development and mitigation.

Potential indicators for monitoring the effectiveness of the conservation actions:

- Monitor and assess changes in the number of acres and distribution of habitat using GIS data sets.
- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.

Conservation Landscape: Tallgrass Prairie

The relative condition of Tallgrass Prairie habitat in the Mixed-grass Prairie Region is currently poor with a declining trend. The Tallgrass Prairie community is widespread along the eastern edge of the Mixed-grass Prairie Region in its transition zones with the Crosstimbers and Tallgrass Prairie Regions. Tallgrass Prairie communities also occur locally in the central and western portions of the Region on relatively mesic slopes, on stabilized dunes, and in floodplains. Within this Region, Tallgrass Prairies are dominated by Big Bluestem (*Andropogon gerardi*), Switchgrass (*Panicum virgatum*), and Little Bluestem (*Schizachyrium scoparium*). The structure of this herbaceous community is maintained by the occurrence of periodic fires that suppress the growth of woody plant species and favor grasses and some forbs. Other common grasses and forbs include Prairie Dropseed (*Sporobolus heterolepis*), Sideoats Grama (*Bouteloua curtipendula*), Compass Plant (*Silphium laciniatum*), Lead Plant (*Amorpha canescens*), Wild Alfalfa/Scurf Pea (*Psoralea tenuifolia*), Illinois Bundlesflower (*Desmanthus illinoensis*), Blazing Star (*Liatris sp.*), Goldenrod (*Solidago sp.*), Indian Paintbrush (*Castilleja coccinea*), and Maximilian Sunflower (*Helianthus maximilliani*).

Historically, Tallgrass Prairies were more abundant, especially in the eastern portion of the Region, than they are currently. Tallgrass Prairie habitat remains primarily on sites that are too steeply sloped, sandy, or rocky to be suitable for crop production or conversion to Bermuda grass pasture. The extent and distribution of Tallgrass Prairies is poorly known, but the existing tracts appear to be scattered and small relative to their presettlement condition. Where Tallgrass Prairie habitat remains, continuous grazing, fire suppression, and the encroachment of non-native plants have changed this plant community's composition and structure by increasing Juniper cover, increasing the abundance of exotic plants, and decreasing the abundance of native perennial forbs.

Recognized vegetation associations (Hoagland 2000) include:

- Big Bluestem – Switchgrass Herbaceous Community
- Big Bluestem – Little Bluestem - Indian Grass Herbaceous Community
- Sand Bluestem – Giant Sandreed Herbaceous Community
- Little Bluestem – Big Bluestem Herbaceous Community

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	American Golden Plover		X						X
Bird	American Woodcock	X							X

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Barn Owl	X							X
Bird	Bell's Vireo		X			X			
Bird	Buff-breasted Sandpiper	X				X			
Bird	Burrowing Owl	X							X
Bird	Greater Prairie Chicken	X				X			
Bird	Harris's Sparrow		X						X
Bird	LeConte's Sparrow		X						X
Bird	Loggerhead Shrike		X			X			
Bird	Northern Bobwhite		X			X			
Bird	Painted Bunting		X						X
Bird	Peregrine Falcon	X							X
Bird	Prairie Falcon	X							X
Bird	Red-headed Woodpecker		X			X			
Bird	Sandhill Crane		X				X		
Bird	Short-eared Owl				X				X
Bird	Smith's Longspur	X							X
Bird	Sprague's Pipit				X				X
Bird	Swainson's Hawk		X						X
Bird	Upland Sandpiper				X		X		
Inve	Prairie Mole Cricket	X				X			
Mamm	Eastern Spotted Skunk				X				X
Mamm	Long-tailed Weasel				X				X
Rept	Texas Horned Lizard				X				X
Rept	Western Massasauga				X				X

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends of are declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.
2. Baseline knowledge about flora/fauna and both the historic and current distribution and condition of this habitat type is incomplete.

Conservation Actions:

- Conduct research to determine why species of greatest conservation need are low and/or declining.
- Conduct surveys of existing literature, reports, and museum records to evaluate historic distributions, abundances, and habitat affinities of species of greatest conservation need, and examine possible causes of suspected population declines.
- Conduct field studies to establish baseline conditions for the current distributions, abundances, and habitat affinities of species of greatest conservation need.

- Verify the accuracy of existing data and assess changes over time.
- Develop and provide long-term funding to maintain databases to store and analyze distributional and ecological data for species of greatest conservation need.
- Conduct ecological studies on priority species of greatest conservation need to identify factors that limit population sizes, evaluate factors that may be responsible for population declines, and develop recommendations to enhance populations through improving habitat conditions.
- Develop methods to accurately identify and map the distribution and condition of this habitat to establish a baseline condition.
- Use surveys, workshops, and data acquisition to update the Comprehensive Wildlife Conservation Strategy.

Conservation Issue: Habitat loss and fragmentation from land management practices:

3. Conversion of this habitat for crop production or Bermuda grass pasture has reduced the quantity and quality of the habitat to support species of greatest conservation.
4. Introduced grasses have less value for species of greatest conservation need than those native grasses that are part of this habitat in its most natural condition.
5. Heavy grazing can in some cases reduce the quantity and quality of this habitat.
6. Herbicide treatments can alter the quality of this habitat for supporting species of greatest conservation need.
7. Fragmentation, including that caused by inheritance laws, reduces the ability of this habitat to support species of greatest conservation need.
8. Some birds are especially susceptible to collisions with fences.
9. Urban sprawl around metropolitan areas reduces the quality and quantity of this habitat in the Mixed-grass Prairie Region.
10. Energy exploration and development sometimes reduces the quantity and quality of this habitat.

Conservation Actions:

- Develop and distribute information to landowners and others concerning grazing management, fire usage, energy development, natural systems, and invasive species.
- Encourage the conversion of pastures containing introduced species to tall grasses.
- Consider land acquisition and conservation easements for protecting the most important tracts of this habitat.
- Encourage an economic study for profitability and nutrition of diverse forbs pasture.
- Encourage and support ranch diversification for lower grazing and off set by lease hunting, fishing access, and ecotourism viewing.
- Support efforts and cooperate to remove hurdles to lease hunting and hunting cooperatives.
- Support education components for ranch diversification.
- Encourage restoration of Bermuda grass pastures and crop fields to native Tallgrass Prairie grasses and forbs.
- Encourage and support restoration of Conservation Reserve Program fields to native Tallgrass Prairie plants.
- Encourage and facilitate development of a statewide mitigation plan for wind power development.

Conservation Issue: Invasive and exotic plants and animals that are detrimental to species of greatest conservation need:

11. Woody encroachment reduces the quantity and quality of this habitat in many areas.
12. Improper burning frequencies may not result in achievement of the desired objective, and may actually worsen habitat conditions.
13. Fire suppression has resulted in making conditions more or less ideal for encroachment by undesirable plants in this habitat.
14. Exotic plant invasive species have thrived in portions of this habitat.

Conservation Actions:

- Develop and distribute information to landowners and others concerning grazing management, fire usage, energy development, natural systems, and invasive species.
- Encourage development of business and a market for the cutting of Eastern Redcedar.
- Encourage and support conversion of pastures containing introduced species to tall grasses.
- Support and encourage changes in laws regulating fire to make it easier and safer to implement burning as a treatment for maintaining and improving this habitat.
- Encourage and support fire management cooperatives.
- Encourage and facilitate fire management contractors.
- Support laws and regulations reducing liability for fire contractors.
- Encourage restoration of Bermuda grass pastures and crop fields to native Tallgrass Prairie grasses and forbs.

Potential indicators for monitoring the effectiveness of the conservation actions:

- Periodically assess changes in the distribution and acreage of habitat.
- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.

Conservation Landscape: Large Rivers and Sloughs/Ponds

The relative condition of Large Rivers and Sloughs/Ponds habitat in the Mixed-grass Prairie Region is currently poor with a declining trend. Portions of five large rivers pass through the Mixed-grass Prairie Region: the Arkansas, Cimarron, North Canadian, Canadian and Red. Each of these rivers has a sandy substrate and a broad floodplain. There is a seasonal period of high flow during the spring months followed by a period of much lower flow during the summer that creates and maintains a dynamic mosaic of ephemeral habitats such as sandbars, mudflats, Sandbar Willow thickets, and marshy sloughs along and within the river channel that depend upon periodic scouring flows. For purposes of this Strategy, we consider the Large River habitat to be comprised of the river channel and these smaller ephemeral habitats that are tied to flooding and scouring flows. This mosaic of smaller habitats supports a diversity of species of conservation need including the least tern on sandbars, shorebirds and wading birds on mudflats, Arkansas River and Red River Shiners in shallow braided channels, and Bell's Vireo in willow thickets.

The Arkansas, Cimarron, North Canadian and Canadian rivers are all connected as part of the Arkansas River watershed. The Red River, which forms the southern boundary of the Region, is a separate watershed and supports a distinctly different community of fish and mussels including the Red River Shiner, Red River Pupfish and Chub Shiner. Each of the Regions large rivers has been modified to some extent by the construction of reservoirs on their main stems, flood control impoundments on their tributaries, and water withdrawals. These modifications have altered the historic fluctuation in flow rates and the magnitude of flood events and have thus affected the abundance and condition of ephemeral habitats such as sandbars, mud flats, and willow thickets associated with the rivers, and the movement of fish populations within the rivers. As a general pattern, flooding magnitude, water volume, and the quality of ephemeral habitats has declined over the past century.

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	American Golden Plover		X						X
Bird	Bald Eagle	X						X	
Bird	Canvasback	X							X
Bird	Interior Least Tern	X							X
Bird	Lesser Scaup		X			X			
Bird	Little Blue Heron		X						X
Bird	Louisiana Waterthrush		X						X

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Mountain Plover	X							X
Bird	Northern Pintail		X			X			
Bird	Peregrine Falcon	X							X
Bird	Prothonotary Warbler		X						X
Bird	Sandhill Crane		X				X		
Bird	Snowy Plover	X							X
Bird	Solitary Sandpiper	X							X
Bird	Trumpeter Swan	X							X
Bird	Western Sandpiper	X							X
Bird	Whooping Crane	X						X	
Bird	Wilson's Phalarope				X				X
Fish	Alligator Gar	X				X			
Fish	Arkansas River Shiner	X				X			
Fish	Arkansas River Speckled Chub	X				X			
Fish	Black Buffalo	X							X
Fish	Chub Shiner				X				X
Fish	Paddlefish		X				X		
Fish	Plains Minnow			X		X			
Fish	Prairie Speckled Chub		X						X
Fish	Red River Pupfish			X			X		
Fish	Red River Shiner			X			X		
Fish	Shovelnose Sturgeon	X							X
Inve	Bleufer			X			X		
Inve	Ohio River Pigtoe	X				X			
Inve	Plain Pocketbook		X			X			
Inve	Threeridge Mussel			X			X		
Mamm	Brazilian (Mexican) Free-tailed Bat				X				X
Mamm	River Otter		X					X	
Mamm	Western Big-eared Bat	X							X
Rept	Midland Smooth Softshell				X				X
Rept	Ouachita Map Turtle				X				X
Rept	Spiny Softshell Turtle				X				X

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends of are declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.
2. Baseline knowledge about river flow control and non-point and point-source pollution in this habitat is incomplete.

Conservation Actions:

- Conduct research to determine why species of greatest conservation need are low and/or declining.
- Conduct surveys of existing literature, reports, and museum records to evaluate historic distributions, abundances, and habitat affinities of species of greatest conservation need, and examine possible causes of suspected population declines.
- Conduct field studies to establish baseline conditions for the current distributions, abundances and habitat affinities of species of greatest conservation need.
- Verify the accuracy of existing data and assess changes over time.
- Develop and provide long-term funding to maintain databases to store and analyze distributional and ecological data for species of greatest conservation need.
- Conduct ecological studies on priority species of greatest conservation need to identify factors that limit population sizes, evaluate factors that may be responsible for population declines, and develop recommendations to enhance populations through improving habitat conditions.
- Develop methods to accurately identify and map the distribution and condition of this habitat to establish a baseline condition.
- Use surveys, workshops, and data acquisition to update the Comprehensive Wildlife Conservation Strategy.
- Conduct research to analyze dam breaching for at risk species (e.g., Paddlefish and terns).
- Determine the most effective ways to discourage building/developing in river floodplains.
- When studying impacts of development and runoff, consider the cumulative effects.
- Conduct investigations to determine alternative methods of flood control such as levee removal and floodplain mitigation as wetland banks.
- Identify spawning areas of important species of greatest conservation need potentially impacted by dredging.

Conservation issue: Water quality changes which negatively affect both habitat and species of greatest conservation need:

3. Water quality can be altered by such things as herbicides, nitrates, metals, oil field discharges, and other forms of pollution.

Conservation Actions:

- Encourage opposition to the Red River chloride project.
- Develop and distribute information to landowners and others concerning grazing management, energy development, and natural systems.
- Conduct research to analyze dam breaching for providing benefits to at risk species (e.g., Paddlefish and terns).
- Support and encourage pollution abatement efforts.
- Encourage practices that will improve water quality below dams.

Conservation Issue: Altered patterns of water flow that negatively affect both habitat and species:

4. Water impoundments alter the natural hydrology of this habitat and thereby its suitability for species of greatest conservation need.
5. Sedimentation occurring as a result of altered flow regimes can reduce the quantity and quality of this habitat.
6. Maintaining minimum in-stream flows to provide habitat for species of greatest conservation need can be a controversial topic in some areas.
7. Such things as channelization, sand mining, water diversions for municipal and agricultural uses, and dredging can alter river morphology and hydrology.
8. Lack of sandbars can hinder the suitability of this habitat for some species of greatest conservation need.

9. Frequencies and magnitudes of flooding impacts the suitability of this habitat for some species of greatest conservation need.
10. The proposed desalinization of the Red River system would likely reduce the quantity and quality of this habitat.

Conservation Actions:

- Develop and distribute information to landowners and others concerning grazing management, energy development, and natural systems.
- Conduct research to analyze dam breaching for providing benefits to at risk species (e.g., Paddlefish and terns).
- Encourage and support legislation needed to achieve in-stream flows.
- Encourage research concerning the use of mitigation to fund and support fish and wildlife protection and management from hydropower projects and U.S. Army Corps of Engineers impoundment project agreements.
- Coordinate with U.S. Army Corps of Engineers and others to modify the scope of projects to provide greater benefits to species of greatest conservation need in this habitat.
- Encourage practices that will improve water quantity below dams.

Conservation Issue: Habitat loss and fragmentation from land management practices:

11. Clearing of the riparian zone reduces the quantity and quality of this habitat.
12. Heavy grazing in the riparian zone can reduce the quantity and quality of this habitat.

Conservation Actions:

- Encourage and support the creation and maintenance of riparian buffer zones.
- Encourage prescribed burning and thinning of cottonwood.
- Develop and distribute information to landowners and others concerning grazing management, fire management, energy development, natural systems, and invasive species.

Conservation issue: Habitat loss or damage caused by heavy recreational use that negatively affects species of greatest conservation need:

13. Off-road vehicle usage can reduce the quality and quantity of river channels and floodplains.

Conservation Action:

- Evaluate the potential impact of off-road vehicles on species of greatest conservation need in this habitat and develop mitigation plans to reduce the impacts.

Conservation Issue: Invasive and exotic plants and animals that are detrimental to species of greatest conservation need:

14. Salt Cedar expansion has reduced the quantity and quality of this habitat in the Mixed-grass Prairie Region.
15. People have facilitated the movement of various fish species between river basins, such as the introduction of the Red River Shiner to the Cimarron River.

Conservation Action:

- Develop and distribute information to landowners and others concerning grazing management, energy development, natural systems, invasive species, and the ecological issues associated with bait bucket introductions and transfers of fish between watersheds.

Potential indicators for monitoring the effectiveness of the conservation actions:

- Invasive fish species surveys.
- Monitor compliance with Oklahoma water quality standards.
- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.
- U.S. Army Corps of Engineers stream flow monitoring in South Canadian River below Lake Meredith.
- U.S. Geological Survey gauging stations for flows.

Conservation Landscape: Herbaceous Wetland

The relative condition of Herbaceous Wetland habitat in the Mixed-grass Prairie Region is currently poor with a declining trend. Herbaceous Wetlands in the Mixed-grass Prairie Region are most often small (i.e., less than 10 acres in size). They may occur as sloughs and cutoff channels from streams and rivers, as seasonally flooded depressions within floodplains, or isolated from streams and rivers as swales and depressions in prairies and between stabilized sand dunes. Periodic fires during dry periods prevent woody plant species from dominating Herbaceous Wetlands. The plant community composition of Herbaceous Wetlands is variable depending upon soils and frequency of soil moisture saturation. Common Herbaceous Wetland plant communities include Pink Smartweed (*Polygonum pensylvanicum*), Barnyard Grass (*Echinochloa crusgalli*), Three-square Bulrush (*Scirpus americanus*), Softstem Bulrush (*Csirus tabernaemontani*), and Common Spike Rush (*Eleocharis tenuis*).

Recognized plant associations in this habitat type include:

- Common Reed Semi-permanently Flooded Marsh
- Three-square Bulrush Semi-permanently Flooded Marsh
- Softstem Bulrush - Common Spike Rush Semi-permanently Flooded Marsh
- Broadleaf Cattail Semi-permanently Flooded Marsh
- Pennsylvania Smartweed – Curlytop Smartweed Semi-permanently Flooded Wetland
- Broadleaf Arrowhead – Longbar Arrowhead Semi-permanently Flooded Wetland
- Inland Saltgrass – Alkali Sacaton Temporarily Flooded Grassland
- Inland Saltgrass – Three-square Bulrush Temporarily Flooded Grassland
- Common Spikerush – Hairy Waterclover Temporarily Flooded Marsh
- Prairie Cordgrass Temporarily Flooded Marsh

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	American Golden Plover		X						X
Bird	American Woodcock	X							X
Bird	Bald Eagle	X						X	
Bird	Black Rail	X							X
Bird	Buff-breasted Sandpiper	X				X			
Bird	Canvasback	X							X
Bird	Hudsonian Godwit				X				X
Bird	Interior Least Tern	X							X

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	King Rail				X				X
Bird	LeConte's Sparrow		X						X
Bird	Lesser Scaup		X			X			
Bird	Little Blue Heron		X						X
Bird	Loggerhead Shrike		X			X			
Bird	Long-billed Curlew	X							X
Bird	Northern Pintail		X			X			
Bird	Peregrine Falcon	X							X
Bird	Piping Plover	X							X
Bird	Prairie Falcon	X							X
Bird	Sandhill Crane		X				X		
Bird	Short-eared Owl				X				X
Bird	Solitary Sandpiper	X							X
Bird	Swainson's Hawk		X						X
Bird	Trumpeter Swan	X							X
Bird	Upland Sandpiper				X				X
Bird	Western Sandpiper	X							X
Bird	Whooping Crane	X						X	
Bird	Wilson's Phalarope				X				X
Inve	Dotted Skipper	X				X			
Mamm	Brazilian (Mexican) Free-tailed Bat				X				X
Mamm	Western Big-eared Bat	X							X
Rept	Midland Smooth Softshell				X				X
Rept	Spiny Softshell Turtle				X				X
Rept	Texas Gartersnake				X				X

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends of are declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.
2. Information regarding the distribution and locations wetland habitats is incomplete.
3. Information regarding the distributions and ecological needs of wetland wildlife species (e.g., which wildlife species occupy which wetland types) is incomplete.
4. The small size of wetlands makes them difficult to locate within larger habitat types such as prairies and woodlands.
5. Land landowners and conservation agency personnel are often unaware of the effects of management practices on wetlands animals and plant communities.

Conservation Actions:

- Encourage and facilitate a survey of wetlands in the Mixed-grass Prairie Region.

- Develop a database of wetland locations and conditions.
- Encourage and support biological inventories of wetlands to determine plant community composition and the distribution and abundances of wildlife species of conservation need.
- Encourage and support field studies to determine the ecological needs of wetland wildlife species (e.g., types of plant communities and the timing and duration of flooding needed for species of greatest conservation need).
- Develop and distribute information for landowners and others regarding the ecology of Herbaceous Wetlands within the Mixed-grass Prairie Region.
- Support studies to develop descriptions of quality Herbaceous Wetland habitats in this Region to serve as the target condition for wetland restoration and enhancement efforts.
- Use surveys, workshops and data acquisition to update the Comprehensive Wildlife Conservation Strategy.

Conservation Issue: Habitat loss and fragmentation from land management practices:

6. Wetlands have been and continue to be drained or filled to provide land for residential or agricultural development.
7. Irrigation practices can result in lowering water tables.
8. Agricultural developments, including large confined animal feeding operations (e.g., hog farms) can reduce the quantity and quality of this habitat.
9. Current land practices sometimes make conditions in this habitat ideal for invading species or introduced species, especially woody encroachment.
10. Some farming practices can lead to siltation of herbaceous wetlands.
11. Invasion by cattails sometimes results in herbaceous wetlands being reduced in quantity and quality.
12. Increased nutrients, pesticides, sediment, and endocrine disruptors in storm water runoff from urban and agricultural areas can alter the quality and quantity of this habitat.
13. Removal of buffer vegetation around wetlands to protect them from pollutants in storm water runoff results in a decline in habitat quality.
14. Pumping groundwater for wetlands management is not defined as a beneficial use.
15. Existing habitat conditions in many areas encourage Salt Cedar encroachment.
16. Many people do not understand the swampbusting provisions of Farm Bill.
17. Wetland Reserve Program enrollments lack adequate incentives.

Conservation Actions:

- Encourage improvements in the technology of irrigation that contribute to the health of this habitat.
- Encourage the selection of crops requiring less irrigation.
- Provide technical assistance and financial incentives for landowners to manage wetlands.
- Consider use of land acquisition and conservation easements to conserve some of the most valuable tracts of Herbaceous Wetlands in the Mixed-grass Prairie Region.
- Encourage and support legislation and regulations that provide tax breaks for wetlands conservation.
- Encourage fencing of wetlands to control grazing and allow the development of vegetative buffers.
- Encourage and support full use of the Farm Bill at national, state, and local levels.
- Develop and distribute information to landowners and others concerning seasonal wetlands, the value of water, swampbusting laws and practices, grazing management, crop selection, fire management, energy development, natural systems, and invasive species.
- Encourage legislation to designate groundwater pumping for wetlands as a beneficial use of groundwater.

- Encourage activities that will increase Conservation Reserve Enhancement Program enrollments.
- Encourage and support improving small landowner access to cost-share programs, especially those in the Farm Bill that improve water quality.

Potential indicators for monitoring the effectiveness of the conservation actions:

- Develop GIS datasets to monitor changes in the number of acres and distribution of wetlands.
- National Wetland Inventory.
- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.
- Wetlands in conservation programs; numbers of acres and distribution.

Conservation Landscape: Small Rivers

The relative condition of Small Rivers habitat in the Mixed-grass Prairie Region is currently poor with a declining trend. Primary small rivers in this habitat are South Fork of the Arkansas, Chickashia, Washita, South Fork of the Red, and North Fork of the Red.

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Bald Eagle	X						X	
Bird	Canvasback	X							X
Bird	Interior Least Tern	X							X
Bird	Lesser Scaup		X			X			
Bird	Little Blue Heron		X						X
Bird	Louisiana Waterthrush		X						X
Bird	Mountain Plover	X							X
Bird	Northern Pintail		X			X			
Bird	Peregrine Falcon	X							X
Bird	Prothonotary Warbler		X						X
Bird	Sandhill Crane		X				X		
Bird	Snowy Plover	X							X
Bird	Solitary Sandpiper	X							X
Bird	Trumpeter Swan	X							X
Bird	Whooping Crane	X						X	
Fish	Alligator Gar	X				X			
Fish	Arkansas Darter	X							X
Fish	Arkansas River Shiner	X				X			
Fish	Arkansas River Speckled Chub	X				X			
Fish	Paddlefish		X				X		
Fish	Plains Minnow			X		X			
Fish	Prairie Speckled Chub		X						X
Fish	Red River Pupfish			X			X		
Fish	Red River Shiner			X			X		
Inve	Bleufer			X			X		

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Inve	Ohio River Pigtoe	X				X			
Inve	Plain Pocketbook		X			X			
Inve	Threeridge Mussel			X			X		
Inve	Wartyback Mussel		X				X		
Mamm	Brazilian (Mexican) Free-tailed Bat				X				X
Mamm	River Otter		X					X	
Mamm	Western Big-eared Bat	X							X
Rept	Alligator Snapping Turtle				X				X
Rept	Eastern River Cooter				X				X
Rept	Midland Smooth Softshell				X				X
Rept	Ouachita Map Turtle				X				X
Rept	Spiny Softshell Turtle				X				X

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends of are declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.
2. Information regarding species of greatest conservation need and their habitat needs (e.g., distribution and ecological needs) is incomplete.
3. Resource monitoring is incomplete.

Conservation Actions:

- Develop a monitoring program to track habitat condition/quality and status of species of greatest conservation need.
- Conduct research to determine why species of greatest conservation need are low and/or declining.
- Conduct surveys of existing literature, reports, and museum records to evaluate historic distributions, abundances, and habitat affinities of species of greatest conservation need, and examine possible causes of suspected population declines.
- Conduct field studies to establish baseline conditions for the current distributions, abundances, and habitat affinities of species of greatest conservation need.
- Verify the accuracy of existing data and assess changes over time.
- Develop and provide long-term funding to maintain databases to store and analyze distributional and ecological data for species of greatest conservation need.
- Conduct ecological studies on priority species of greatest conservation need to identify factors that limit population sizes, evaluate factors that may be responsible for population declines, and develop recommendations to enhance populations through improving habitat conditions.
- Develop methods to accurately identify and map the distribution and condition of this habitat to establish a baseline condition.

- Use surveys, workshops, and data acquisition to update the Comprehensive Wildlife Conservation Strategy.

Conservation Issue: Habitat loss and fragmentation from land management practices:

4. Some irrigation practices degrade the quantity and quality of small rivers habitat in the Mixed-grass Prairie Region.
5. Heavy grazing has detrimental impacts on small rivers habitat.
6. Dams and water diversions cause reductions in flows and a lack of scouring in small rivers.
7. Excessive runoff of nutrients from confined animal farming operations (e.g., hog farms) can cause reductions of water quality in small rivers.
8. Channelization and reservoir construction alter channel morphology and hydrology.
9. Clearing of riparian vegetation along small rivers results in reduced habitat quality.
10. Water withdrawals for irrigation or municipal use reduce the quality and quantity of small rivers habitat.
11. Excessive grazing in the riparian zone reduces the quantity and quality of small rivers, as well as degradation of river banks.
12. The potential diversion of water to reduce naturally occurring salinity in the Red River system would reduce the quantity and quality of small rivers habitat.
13. Water quality in small rivers is sometimes reduced by discharges of herbicides, nitrates, endocrine disruptors, and oil field pollution chemicals.

Conservation Actions:

- Encourage programs and activities which restore river channel morphology.
- Encourage and support programs to improve water quality and flows below reservoirs.
- Encourage and support congressional reprioritizing of the U.S. Army Corps of Engineers projects to include fish, wildlife, and recreation as beneficial uses.
- Cooperate with the U.S. Army Corps of Engineers to establish more natural alternative flow patterns.
- Encourage and support legislation to establish minimum in-stream flow provisions.
- Encourage and support pollution abatement efforts.
- Encourage and support landowners and others efforts to create and maintain riparian buffer zones.
- Oppose the Red River chloride project (i.e., water diversions).
- Develop and distribute information to landowners and others concerning the value of water, grazing management, crop selection, fire management, energy development, and natural systems.
- Encourage replacement of stock ponds with alternative water sources.
- Encourage and support programs that protect riparian areas from grazing.
- Encourage and support increased use of Farm Bill incentives.

Conservation Issue: Invasive and exotic plants and animals that are detrimental to species of greatest conservation need:

14. Conditions in this habitat have become suitable for woody vegetation encroachment.
15. Invasive species encroachment, especially by the exotic Salt Cedar, has reduced the quantity and quality of this habitat.
16. Exclusion of fire has made this habitat vulnerable to invasion and encroachment.
17. Introduction of fish from other river systems through bait releases and accidental introductions (e.g., introduction of Red River Pupfish from the Red River to the Canadian River) threatens native fish populations.

Conservation Actions:

- Develop and distribute information to landowners and others concerning the value of water, grazing management, crop selection, fire management, energy development, natural systems, and invasive species (e.g., bait bucket releases and other fish translocations between river species).
- Encourage and support programs that help control invasive species.
- Encourage and facilitate the creation of burn cooperatives.
- Encourage an evaluation of burn laws in Oklahoma in an effort to make them more compatible with habitat conservation of small rivers in the Mixed-grass Prairie Region.

Conservation issue: Habitat loss or damage caused by heavy recreational use that negatively affects species of greatest conservation need:

18. Unregulated use of off-road vehicles can reduce habitat quantity and quality.

Conservation Actions:

- Conduct studies to determine the impacts of off-road vehicles on species of greatest conservation need and their habitats.
- Encourage efforts to locate and provide off-road vehicle areas/parks.

Potential indicators for monitoring the effectiveness of the conservation actions:

- Acres of riparian habitat restored.
- Miles of river channel restored.
- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.
- U.S. Geological Survey groundwater levels check.
- U.S. Geological Survey monitoring stations.
- Water flow (e.g., U.S. Geological Survey monitoring stations).
- Water quality monitoring.

Conservation Landscape: Post Oak/Blackjack Savannah or Shrublands and Post Oak/Blackjack Oak/Hickory Woodlands

The relative condition of Post Oak/Blackjack Savannah or Shrublands and Post Oak/Blackjack Oak/Hickory Woodlands habitat in the Mixed-grass Prairie Region is currently poor with a declining trend. Post Oak/Blackjack Oak Shrublands and Woodlands occur locally in the Wichita Mountains and bands of sandy soils and stabilized dunes north of the Canadian, North Canadian, and Cimarron rivers in the eastern part of the Region. This community is a mosaic with patches of Tallgrass Prairie interspersed with patches of oak scrub or oak thickets and open oak woodlands and its structure is maintained by periodic fires and dry soil conditions. The dominant grasses and trees in this community include Little Bluestem (*Schizachyrium scoparium*), Indian Grass (*Sorghastrum nutans*), Big Bluestem (*Andropogon gerardii*), Post Oak (*Quercus stellata*), Blackjack Oak (*Quercus marilandica*) and Eastern Redcedar (*Juniperus virginiana*). Other common woody plants include Chittamwood (*Bumelia lanuginosa*), Eastern Redbud (*Cercis canadensis*), Roughleaf Dogwood (*Cornus drummondii*), Mexican Plum (*Prunus mexicana*), and Winged Sumac (*Rhus copallina*). In a few sheltered sites within the Wichita Mountains, small numbers of Sugar Maple (*Acer saccharum*), Shumard Oak (*Quercus shumardii*), and Little Walnut (*Juglans microcarpa*) can be found growing in association with Post and Blackjack Oaks. This community supports the last remaining nesting populations of the endangered Black-capped Vireo. Decades of fire suppression have altered the structure of this community throughout the Region by allowing for greater densities of oak trees and an increased abundance and dominance of Eastern Redcedar (*Juniper virginiana*).

Recognized vegetation associations within this habitat type include:

- Post Oak – Eastern Redcedar Woodland
- Blackjack Oak/Little Bluestem Woodland
- Post Oak – Blackjack Oak/Little Bluestem Woodland
- Texas Live Oak – Post Oak/Little Bluestem Woodland

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	American Woodcock	X							X
Bird	Barn Owl	X							X
Bird	Bell's Vireo		X			X			
Bird	Black-capped Vireo	X				X			
Bird	Harris's Sparrow		X						X

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Loggerhead Shrike		X			X			
Bird	Northern Bobwhite		X			X			
Bird	Painted Bunting		X						X
Bird	Red-headed Woodpecker		X			X			
Inve	Iowa Skipper	X				X			
Mamm	Eastern Spotted Skunk				X				X
Mamm	Long-tailed Weasel				X				X
Rept	Texas Horned Lizard				X				X
Rept	Western Massasauga				X				X

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends of are declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.
2. Baseline knowledge about flora/fauna and both the historic and current distribution and condition of this habitat type is incomplete.

Conservation Actions:

- Conduct research to determine why species of greatest conservation need are low and/or declining.
- Conduct surveys of existing literature, reports, and museum records to evaluate historic distributions, abundances, and habitat affinities of species of greatest conservation need, and examine possible causes of suspected population declines.
- Conduct field studies to establish baseline conditions for the current distributions, abundances, and habitat affinities of species of greatest conservation need.
- Verify the accuracy of existing data and assess changes over time.
- Maintain databases (e.g., Natural Heritage Inventory) and analyze distributional and ecological data for species of greatest conservation need.
- Conduct ecological studies on priority species of greatest conservation need to identify factors that limit population sizes, evaluate factors that may be responsible for population declines, and develop recommendations to enhance populations through improving habitat conditions.
- Develop methods to accurately identify and map the distribution and condition of this habitat to establish a baseline condition.
- Use surveys, workshops, and data acquisition to update the Comprehensive Wildlife Conservation Strategy.

Conservation Issue: Habitat loss and fragmentation from land management practices:

3. Knowledge about the impacts of many land management practices on populations of many of the species of greatest conservation need in this habitat is incomplete.
4. Natural fire regimes in this habitat have been disrupted or eliminated.

5. Forests in this habitat are becoming unnaturally dense with little understory development.
6. Current laws and regulations make prescribed burning difficult through things such as landowner liability.
7. Burning in this habitat causes air quality conflicts and concerns.
8. People in urban areas are frequently unwilling to deal with the fire and smoke associated with prescribed burning.
9. There can be extreme logistical difficulties with burning in developed areas.
10. Technical assistance to landowners for prescribed burning is often limited.
11. Much of the native vegetation in this habitat has been converted to tame grasses such as Bermuda grass and Lovegrass.
12. There has been widespread invasion of other plants (e.g., *Sericea lespedeza*, and other exotic understory plants) throughout this habitat in the Mixed-grass Prairie Region.
13. Timber harvest has increased throughout this habitat.
14. Urbanization has fragmented many of the woodlands and savannah tracts within this habitat.
15. Construction of roads and corridors for utilities or pipelines reduces the quantity and quality of this habitat.
16. Heavy grazing can encourage the spread of Eastern Redcedar.
17. Herbicide treatment of oak savannahs can reduce the quality of this habitat for species of greatest conservation need.
18. Oil and gas exploration and development results in increased numbers of roads, increased erosion around well sites, increased potential for oil or saltwater spills, and causes other reductions in quantity and quality of this habitat.

Conservation Actions:

- Conduct studies of the responses wildlife populations to various land management practices such as thinning, deferred grazing, and prescribed late winter burning.
- Develop and distribute information on burning strategies and management to landowners.
- Encourage creation of burn cooperatives.
- Encourage and support burn laws that reduce landowner liability and include the right to burn.
- Encourage and facilitate professional burn crew support, making it accessible and affordable to landowners, and reducing liability and heavy equipment costs.
- Cooperate in the development of a program to assist landowners with proper fire management.
- Encourage and facilitate programs that provide financial incentives for landowners to restore habitat.
- Cooperate with other stakeholders to produce demonstration areas of restored woodlands and savannahs on public lands.
- Consider land acquisition and conservation easements to prevent development and conserve some of the more important tracts of this habitat.
- Cooperate with other stakeholders to identify and rank focus areas for implementation of actions.
- Cooperate with oil and gas industry representatives and others to create incentive programs to restore habitat

Potential indicators for monitoring the effectiveness of the conservation actions:

- Acres acquired (e.g., easements secured and acreage protected).
- Acres burned/treated.
- Acres of native plant communities restored.
- Amount of technical assistance being provided.
- Animal populations and vegetation response to management.

- Changes in acreage/coverage of exotic vegetation.
- Number of landowners participating in landowner incentive programs.
- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.
- Vegetation response to fire (e.g., grasses and woody plants).

Conservation Landscape: Sand Plum, Hawthorn, or Sumac Shrublands

The relative condition of Sand Plum, Hawthorn, or Sumac Shrubland habitat in the Mixed-grass Prairie Region is currently poor with a declining trend. This uncommon shrub-dominated habitat occurs locally on sandy soils and stabilized dunes in the northern portion of the Region or can occur as relatively small tracts within Mixed-grass Prairies and old fields that are subject to infrequent burning. This habitat type is typically dominated by Sand Plum (*Prunus angustifolia*) and/or Skunkbrush (*Rhus aromatica*). Other woody plants that may occur in lesser numbers include Sand Sagebrush (*Artemisia filifolia*), Oklahoma Plum (*Prunus gracilis*), and Netleaf Hackberry (*Celtis reticulata*). These shrubs typically grow in a mosaic of small thickets interspersed with Tall or Mixed-grass Prairie grasses including Little Bluestem (*Schizachyrium scoparium*), Sideoats Grama (*Bouteloua curtipendula*), and Switchgrass (*Panicum virgatum*). This habitat may occur as a climax plant association on stabilized dunes or as a transitional community in infrequently burned prairies.

Recognized plant associations within this habitat type include:

- Sand Plum/Little Bluestem Shrubland
- Smooth Sumac Shrubland
- Skunkbrush (Aromatic Sumac) Shrubland

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Barn Owl	X							X
Bird	Bell's Vireo		X			X			
Bird	Black-capped Vireo	X				X			
Bird	Cassin's Sparrow		X						X
Bird	Harris's Sparrow		X						X
Bird	Lesser Prairie Chicken	X				X			
Bird	Loggerhead Shrike		X			X			
Bird	Northern Bobwhite		X			X			
Bird	Painted Bunting		X						X
Bird	Red-headed Woodpecker		X			X			
Bird	Scaled Quail		X			X			
Bird	Short-eared Owl				X				X
Mamm	Brazilian (Mexican) Free-tailed Bat				X				X

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Mamm	Eastern Spotted Skunk				X				X
Mamm	Mountain Lion	X						X	
Mamm	Western Big-eared Bat	X							X
Rept	Common Lesser Earless Lizard				X				X
Rept	Texas Gartersnake				X				X
Rept	Texas Horned Lizard				X				X
Rept	Texas Long-nosed Snake				X				X
Rept	Western Massasauga				X				X

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends of are declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.
2. Baseline knowledge about flora/fauna and both the historic and current distribution and condition of this habitat type is incomplete.

Conservation Actions:

- Conduct research to determine why species of greatest conservation need are low and/or declining.
- Conduct surveys of existing literature, reports, and museum records to evaluate historic distributions, abundances, and habitat affinities of species of greatest conservation need, and examine possible causes of suspected population declines.
- Conduct field studies to establish baseline conditions for the current distributions, abundances, and habitat affinities of species of greatest conservation need.
- Verify the accuracy of existing data and assess changes over time.
- Maintain databases (e.g., Natural Heritage Inventory) and analyze distributional and ecological data for species of greatest conservation need.
- Conduct ecological studies on priority species of greatest conservation need to identify factors that limit population sizes, evaluate factors that may be responsible for population declines, and develop recommendations to enhance populations through improving habitat conditions.
- Develop methods to accurately identify and map the distribution and condition of this habitat to establish a baseline condition.
- Use surveys, workshops, and data acquisition to update the Comprehensive Wildlife Conservation Strategy.

Potential indicators for monitoring the effectiveness of the conservation actions:

- Acres enrolled in conservation programs.
- Acres of native plant communities restored.
- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.

- Response of populations of species of greatest conservation need to management practices such as burning, fencing, and grazing.

Conservation Landscape: Streams and Associated Riparian Forests

The relative condition of Streams and Associated Riparian Forests habitat is currently poor with a declining trend. Streams in the Mixed-grass Prairie Region are variable but most have sandy or silty substrates. Though in heavily dissected landscapes, streams often flow over areas of hard clay. Very little information exists regarding the historic conditions of these prairie streams but prior to settlement, many streams appear to have been slightly entrenched with well developed floodplains, moderate degrees of channel sinuosity (i.e., meanders), and moderate width to depth ratios. Narrow riparian woodlands and shrublands historically grew along the banks of most streams. These communities were comprised of a diversity of tree species including American Elm (*Ulmus americana*), Sugarberry (*Celtis laevigata*), Western Soapberry (*Sapindus drummondii*), Eastern Cottonwood (*Populus deltoides*), Black Willow (*Salix nigra*), Roughleaf Dogwood (*Cornus drummondii*), and Buttonbush (*Cephalanthus occidentalis*). Over the past century, many streams in the Region have been altered by human activity such as the removal of riparian vegetation and the straightening of the stream channels to remove meanders. These efforts to reduce the amount of acreage occupied by streams and their floodplains have resulted in many streams cutting deep incised channels that separate them from their former riparian zone.

Recognized plant associations within this habitat type include:

- Eastern cottonwood – American elm – sugarberry temporarily flooded forest
- American/red elm – sugarberry/hackberry – green ash temporarily flooded forest
- American/red elm – chinquapin oak temporarily flooded forest
- Eastern cottonwood – sandbar willow temporarily flooded woodland
- Eastern cottonwood – black willow temporarily flooded woodland
- Black willow temporarily flooded woodland
- Sandbar willow/Switchgrass temporarily flooded shrubland
- Buttonbush semi-permanently flooded shrubland

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	American Woodcock	X							X
Bird	Bald Eagle	X						X	
Bird	Bell's Vireo		X			X			
Bird	Bullock's Oriole		X						X
Bird	Golden-fronted Woodpecker	X							X
Bird	Little Blue Heron		X						X

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Loggerhead Shrike		X			X			
Bird	Louisiana Waterthrush		X						X
Bird	Northern Bobwhite		X			X			
Bird	Northern Pintail		X			X			
Bird	Painted Bunting		X						X
Bird	Prothonotary Warbler		X						X
Bird	Red-headed Woodpecker		X			X			
Bird	Snowy Egret								
Fish	Plains Minnow			X		X			
Fish	Red River Pupfish			X			X		
Mamm	Eastern Spotted Skunk				X				X
Mamm	Long-tailed Weasel				X				X
Mamm	Mountain Lion	X						X	
Mamm	River Otter		X					X	
Mamm	Western Big-eared Bat	X							X
Rept	Midland Smooth Softshell				X				X
Rept	Ouachita Map Turtle				X				X
Rept	Spiny Softshell Turtle				X				X
Rept	Western Massasauga				X				X

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends of are declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.
2. Baseline knowledge about flora/fauna and both the historic and current distribution and condition of this habitat type is incomplete.

Conservation Actions:

- Conduct research to determine why species of greatest conservation need are low and/or declining.
- Conduct surveys of existing literature, reports, and museum records to evaluate historic distributions, abundances, and habitat affinities of species of greatest conservation need, and examine possible causes of suspected population declines.
- Conduct field studies to establish baseline conditions for the current distributions, abundances, and habitat affinities of species of greatest conservation need.
- Verify the accuracy of existing data and assess changes over time.
- Develop and provide long-term funding to maintain databases to store and analyze distributional and ecological data for species of greatest conservation need.
- Conduct ecological studies on priority species of greatest conservation need to identify factors that limit population sizes, evaluate factors that may be responsible

for population declines, and develop recommendations to enhance populations through improving habitat conditions.

- Develop methods to accurately identify and map the distribution and condition of this habitat to establish a baseline condition.
- Use surveys, workshops, and data acquisition to update the Comprehensive Wildlife Conservation Strategy.
- Conduct field studies to develop accurate descriptions of what a quality habitat looks like to serve as the management goal.

Conservation Issue: Invasive and exotic plants and animals that are detrimental to species of greatest conservation need:

3. Conditions in this habitat have made it vulnerable to invasive species such as Redcedar, Salt Cedar, and Brown-headed Cowbirds.
4. Fire exclusion encourages the increase of cedars.

Conservation Actions:

- Encourage actions that reduce cedar encroachment.
- Develop and distribute information to landowners and others concerning grazing management, fire management, energy development, natural systems, and invasive species.
- Support the development and implementation of exotic and invasive species management plans.

Conservation Issue: Habitat loss and fragmentation from land management practices:

5. Heavy grazing can result in a reduction of the understory in this habitat.
6. Conversion of riparian habitat to other land use types, especially Bermuda grass pasture and crop fields, reduce its value to species of greatest conservation need.

Conservation Actions:

- Encourage fencing of riparian corridors to control cattle grazing.
- Encourage use of alternative shading for livestock to reduce impacts to habitat.
- Develop and distribute information to landowners and others concerning grazing management, fire management, energy development, natural systems, invasive species, and the availability of Farm Bill programs such as Wildlife Habitat Incentives Program and Environmental Quality Incentives Program.
- Consider land acquisition, conservation easements, and leasing to conserve the most important tracts of this habitat.
- Encourage and facilitate restoration of habitat and stream/river channels.
- Encourage management of livestock use of in bottomland forests.

Conservation issue: Altered patterns of water flow that negatively affect both habitat and species:

7. Channelization of streams has reduced the quantity and quality of this habitat in the Mixed-grass Prairie Region.

Conservation Actions:

- Encourage and facilitate the reconnection of forests with their rivers/streams by restoring channels and managing for the natural hydro period.
- Encourage and facilitate restoration of habitat and stream/river channels.

Potential indicators for monitoring the effectiveness of the conservation actions:

- GIS – change analysis.
- National Wild Turkey Federation GIS data sets.
- Partnerships with local governments.
- Population response of species of greatest conservation need to management actions such as riparian fencing, prescribed burning.

- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.

Conservation Landscape: Springs

The relative condition of Springs habitat in the Mixed-grass Prairie Region is currently poor with a declining trend.

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Fish	Arkansas Darter	X					X		
Mamm	Western Big-eared Bat	X				X			

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends are declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.
2. Baseline knowledge about flora/fauna and both the historic and current distribution and condition of this habitat type is incomplete.

Conservation Actions:

- Conduct research to determine why species of greatest conservation need are low and/or declining.
- Conduct surveys of existing literature, reports, and museum records to evaluate historic distributions, abundances, and habitat affinities of species of greatest conservation need, and examine possible causes of suspected population declines.
- Conduct field studies to establish baseline conditions for the current distributions, abundances, and habitat affinities of species of greatest conservation need.
- Verify the accuracy of existing data and assess changes over time.
- Maintain databases (e.g., Natural Heritage Inventory) and analyze distributional and ecological data for species of greatest conservation need.
- Conduct ecological studies on priority species of greatest conservation need to identify factors that limit population sizes, evaluate factors that may be responsible

for population declines, and develop recommendations to enhance populations through improving habitat conditions.

- Develop methods to accurately identify and map the distribution and condition of this habitat to establish a baseline condition.
- Use surveys, workshops, and data acquisition to update the Comprehensive Wildlife Conservation Strategy.

Conservation Issue: Water quality changes which negatively affect both habitat and species of greatest conservation need:

3. Heavy grazing can reduce the quantity and quality of this habitat.
4. Landowners and livestock operators sometimes modify springs by adding concrete structures to facilitate cattle watering.
5. Watering cattle by ponds can reduce the quality and quantity of this habitat.
6. Heavy cattle grazing and use of agricultural chemicals can produce drainage into springs which elevate nutrient levels and increase algae.

Conservation Actions:

- Consider land acquisition, conservation easements, and leasing to conserve the most important tracts of spring habitat in the Mixed-grass Prairie Region.
- Encourage the use of landowner incentive programs having provisions for protecting and restoring habitat, water quality, and riparian vegetation.
- Encourage and facilitate programs that restore vegetation around springs and remove modifications such as small impoundments.
- Encourage fencing springs to control access by livestock.
- Conduct field studies to delineate recharge areas of springs necessary to protect water quality and flows.

Conservation issue: Altered patterns of water flow that negatively affect both habitat and species:

7. Groundwater withdrawals reduce spring and stream flow.

Conservation Action:

- Encourage management of water withdrawals to lessen impact on spring flows.

Conservation issue: Habitat loss and fragmentation from land management practices:

8. Riparian zones are a limited, fragile habitat segment that are easily disturbed or modified and are subject to exotic plant invasion.

Conservation Actions:

- Consider land acquisition, conservation easements, and leasing to conserve the most important tracts of spring habitat in the Mixed-grass Prairie Region.
- Encourage and facilitate programs that restore vegetation around springs and remove modifications such as small impoundments, especially those at the spring source.
- Encourage fencing springs to control access by livestock.
- Cooperate with other stakeholders to implement programs that control or stop introduction of exotic species such as Salt Cedar.

Potential indicators for monitoring the effectiveness of the conservation actions:

- Easements obtained.
- Populations of spring/stream organisms.
- Protected springs/streams.
- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.
- Stream and spring flow.
- Water quality

Conservation Landscape: Mesquite Savannah or Shrublands

The relative condition of Mesquite Savannah or Shrublands habitat in the Mixed-grass Prairie Region is currently good with a stable trend. This community is sometimes treated as a variation of the Mixed-grass Prairie community with the addition of a Honey Mesquite (*Prosopis glandulosa*) overstory. The Mesquite Savannah and Shrubland community occurs widely in roughly the southern third of the Mixed-grass Prairie Region, particularly on sites with clay soils. The historic abundance of Mesquite within this community is poorly known and heavily debated. Despite the range of opinions regarding the historic abundance of Mesquite, most biologists agree that Mesquite is more prevalent today than it was prior to European settlement. Additionally, Mesquite is typically viewed as a native species with invasive tendencies whose abundance was historically controlled by periodic prairie fires. The combined effects of widespread fire suppression and heavy grazing over the past century have contributed to recent increases in the amount of Mesquite cover.

Common grasses and forbs within this community include Blue Grama (*Bouteloua gracilis*), Buffalo Grass (*Buchloe dactyloides*), Sideoats Grama (*Bouteloua curtipendula*), Little Bluestem (*Schizachyrium scoparium*), Vine Mesquite (*Panicum obtusum*), and Pricklypear Cactus (*Opuntia sp.*), Soapweed Yucca (*Yucca glauca*), and Sneezeweed (*Helenium anarum*).

Recognized vegetation associations include:

Honey Mesquite – Blue Grama – Buffalo Grass Shrubland

Honey Mesquite – Lotebush Shrubland

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Barn Owl	X							X
Bird	Harris's Sparrow		X						X
Bird	Loggerhead Shrike		X			X			
Bird	Northern Bobwhite		X			X			
Bird	Painted Bunting		X						X
Mamm	Black-tailed Prairie Dog		X					X	
Mamm	Mountain Lion	X							X
Mamm	Ringtail				X				X
Rept	Common Lesser Earless Lizard				X				X

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Rept	Texas Horned Lizard				X				X
Rept	Texas Long-nosed Snake				X				X
Rept	Western Diamond-backed Rattlesnake				X				X
Rept	Western Massasauga				X				X

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends of are declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.
2. Baseline knowledge about flora/fauna and both the historic and current distribution and condition of this habitat type is incomplete.

Conservation Actions:

- Conduct research to determine why species of greatest conservation need are low and/or declining.
- Conduct surveys of existing literature, reports, and museum records to evaluate historic distributions, abundances, and habitat affinities of species of greatest conservation need, and examine possible causes of suspected population declines.
- Conduct field studies to establish baseline conditions for the current distributions, abundances, and habitat affinities of species of greatest conservation need.
- Verify the accuracy of existing data and assess changes over time.
- Maintain databases (e.g., Natural Heritage Inventory) and analyze distributional and ecological data for species of greatest conservation need.
- Conduct ecological studies on priority species of greatest conservation need to identify factors that limit population sizes, evaluate factors that may be responsible for population declines, and develop recommendations to enhance populations through improving habitat conditions.
- Develop methods to accurately identify and map the distribution and condition of this habitat to establish a baseline condition.
- Use surveys, workshops, and data acquisition to update the Comprehensive Wildlife Conservation Strategy.

Conservation Issue: Habitat loss and fragmentation from land management practices:

3. Fragmentation, including that caused by inheritance laws, reduces the quantity and quality of this habitat to support species of greatest conservation need.
4. Conversion of this habitat to cropland has the potential for detrimental impacts to species of greatest conservation need.
5. Heavy grazing can reduce the quantity and quality of this habitat.

Conservation Actions:

- Encourage and facilitate prescribed burning and controlled herbicide application.
- Consider conservation easements and land acquisition to conserve some of the most important tracts of this habitat in the Mixed-grass Prairie Region.

- Encourage and support inheritance legislation making it easier for landowners to pass large tracts to succeeding generations.
- Encourage and promote grazing practices which conserve this habitat.
- Encourage use of the Conservation Reserve Program by planting program acres to 100 percent native grasses and forbs.
- Encourage replanting of cropland, abandoned cropland and “improved” (e.g., Bermuda grass) pastures to Mixed-grass Prairie habitat using native grasses and forbs.
- Encourage grazing management by removal of interior fencing in pastures and use of patch burn technology, in conjunction with mineral blocks.

Conservation issue: Invasive and exotic plants and animals that are detrimental to species of greatest conservation need:

6. Fire suppression and other conditions have made this habitat vulnerable to woody encroachment and invasive species.

Conservation Actions:

- Encourage and facilitate prescribed burning.
- Encourage and support formation of burn cooperatives, including legislative changes if necessary.

Conservation issue: Black-tailed Prairie Dog habitat related Issue:

7. There has been a reduction in the number and sizes of Black-tailed Prairie Dog towns.

Conservation Actions:

- Encourage programs that provide financial incentives for landowners who conserve Black-tailed Prairie Dogs.
- Develop and distribute information to landowners and others on several topics including grazing ecology, natural systems, and exotic invasive species.
- Encourage and support programs like the Landowner Incentive Program for the conservation of Black-tailed Prairie Dogs and other species of greatest conservation need.
- Encourage and support inheritance legislation to enable large ranches to remain in single family ownership.
- Encourage private land acquisition and conservation easements by land trusts and organizations such as The Nature Conservancy to protect and maintain this habitat type.
- Encourage and support increasing funding from the subsidy side of the Farm Bill for the Conservation Reserve and Grassland Reserve Programs.
- Encourage and support ranch diversification for lower grazing and off set by lease hunting, fishing access, and ecotourism viewing.
- Encourage and participate in development and updating Best Management Practices for a variety of land management practices.

Potential indicators for monitoring the effectiveness of the conservation actions:

- Acres enrolled in conservation programs.
- Acres of native plant communities restored.
- Numbers, size and distribution of Black-tailed Prairie Dog colonies.
- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.
- Response of species to management practices such as burning, fencing, and grazing.

Conservation Landscape: Juniper Savannah or Woodlands

The relative condition of Juniper Savannah or Woodlands habitat in the Mixed-grass Prairie Region is currently good with an increasing trend. Two types of juniper woodlands occur in the Mixed-grass Prairie Region of Oklahoma. Woodlands of Eastern Redcedar (*Juniperus virginiana*) are now common and distributed throughout the Region. Eastern Redcedar is a native juniper that has shown a dramatic increase in abundance across this Region over the past half century, most likely as a result of fire suppression or a combination of year-round grazing pressure coupled with fire suppression. As a result of its increasing abundance, many acres of Mixed-grass Prairie and Tallgrass Prairie have developed into juniper savannahs or woodlands. The increase in juniper abundance also has affected the structure of other habitat types including Sand Sagebrush Shrublands and Post Oak/Blackjack Oak Shrublands.

Much less common and more restricted-range juniper woodland occurs in the southwestern part of the Region. Here, woodlands dominated by Redberry or Pinchot Juniper (*Juniperus pinchotii*) are found on rugged, dissected hills in portions of Beckham, Greer, Harmon, and Jackson counties. It is likely that Redberry Juniper also has increased in abundance as a result of fire suppression but Redberry Juniper woodlands do not appear to have spread beyond their historic range and remain uncommon and local.

Recognized plant associations within this habitat type include:

- Pinchot Juniper/Grama (Sideoats, Hairy) Woodland
- Eastern Redcedar/Little Bluestem Woodland
- Little Bluestem/Eastern Redcedar Prairie

The species of greatest conservation need found in this habitat are listed in the following table. The population abundance and trend of each species are described in relative terms. The best professional judgment of the advisory group and technical experts was used to identify each species status and trend. Species are sorted alphabetically within groups of amphibians (Amph), birds, fish, invertebrates (Inve), mammals (Mamm), and reptiles (Rept) for easy reference.

Species status definitions:

Low – species is rare, has a small population size, and/or occurs in only a small portion of the Region.

Medium – species is uncommon and occurs over a large portion of the Region or species is common but occurs in only a small part of the Region.

Abundant – species is common and widespread within the Region in appropriate habitat.

Unknown – the status of this species is not known.

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Barn Owl	X							X
Bird	Burrowing Owl		X						X
Bird	Cassin's Sparrow		X						X
Bird	Ferruginous Hawk	X							X
Bird	Golden-fronted Woodpecker	X							X
Bird	Harris's Sparrow		X						X
Bird	Loggerhead Shrike		X			X			
Bird	Northern Bobwhite		X			X			
Bird	Painted Bunting		X						X

Species of Greatest Conservation Need		Status				Trend			
Group	Common Name	Low	Medium	Abundant	Unknown	Declining	Stable	Increasing	Unknown
Bird	Scaled Quail		X			X			
Inve	Outis Skipper	X							X
Mamm	Black-tailed Prairie Dog		X					X	
Mamm	Desert Shrew				X				X
Mamm	Ringtail				X				X
Mamm	Texas Kangaroo Rat	X							X
Mamm	Western Big-eared Bat	X							X
Rept	Common Lesser Earless Lizard				X				X
Rept	Texas Horned Lizard				X				X
Rept	Texas Long-nosed Snake				X				X
Rept	Western Diamond-backed Rattlesnake				X				X
Rept	Western Massasauga				X				X

The following conservation issues and actions are listed in general priority order.

Conservation Issue: Incomplete data concerning species of greatest conservation need (refer to the matrix above) and habitat, an impediment for effective conservation planning and implementation:

1. Data are incomplete for species of greatest conservation need (particularly those whose populations are low or unknown and for those whose status and trends of are declining or unknown) thus making it difficult to identify management issues and establish effective corrective strategies.
2. Baseline knowledge about flora/fauna and both the historic and current distribution and condition of this habitat type is incomplete.

Conservation Actions:

- Conduct research to determine why species of greatest conservation need are low and/or declining.
- Conduct surveys of existing literature, reports, and museum records to evaluate historic distributions, abundances, and habitat affinities of species of greatest conservation need, and examine possible causes of suspected population declines.
- Conduct field studies to establish baseline conditions for the current distributions, abundances, and habitat affinities of species of greatest conservation need.
- Verify the accuracy of existing data and assess changes over time.
- Maintain databases (e.g., Natural Heritage Inventory) and analyze distributional and ecological data for species of greatest conservation need.
- Conduct ecological studies on priority species of greatest conservation need to identify factors that limit population sizes, evaluate factors that may be responsible for population declines, and develop recommendations to enhance populations through improving habitat conditions.
- Develop methods to accurately identify and map the distribution and condition of this habitat to establish a baseline condition.
- Use surveys, workshops, and data acquisition to update the Comprehensive Wildlife Conservation Strategy.

Conservation Issue: Habitat loss and fragmentation from land management practices:

3. School land property administration often overlooks opportunities for habitat conservation.
4. Herbicide applications sometimes reduce the quantity and quality of this habitat in the Mixed-grass Prairie Region.
5. Heavy grazing pressure can reduce the quantity and quality of this habitat.
6. Local sources of technical advice on agricultural matters sometimes lack current information.
7. Habitat fragmentation resulting from oil and gas development, tree rows/hardwood invasion, windbreaks, crop fields, power lines/utilities, and wind power development can reduce the suitability of this habitat for species of greatest conservation need.
8. Conversion of natural habitat to introduced pasture or cropland reduces its suitability for species of greatest conservation need.

Conservation Actions:

- Develop and distribute information to landowners and school land administrators on items such as grazing, fire, energy, and natural systems.
- Cooperate with the school land office to develop incentives and requirements for habitat maintenance on school lands.
- Encourage and promote programs that restore pasture and cropland to natural habitat.
- Distribute the most up to date information to technical assistance/extension staff.
- Encourage management of this habitat on road rights-of-ways.
- Cooperate with state Conservation Reserve Program technical committee to develop recommendations for increasing shrubs.
- Encourage modifying existing Conservation Reserve Program contracts to conserve this habitat and species of greatest conservation need.
- Cooperate with energy companies to minimize surface damages from oil, gas, and wind energy developments.
- Participate in the creation of a statewide mitigation plan for wind power development.
- Encourage and support programs that result in grazing management restoring native grass cover to this habitat.

Conservation issue: Invasive and exotic plants and animals that are detrimental to species of greatest conservation need:

9. Fire suppression and other activities have resulted in an unnaturally high density of juniper and invasion of this habitat by Brown-headed Cowbirds.

Conservation Actions:

- Develop and distribute information to landowners and others on grazing, fire management, natural systems, and invasive species management.
- Encourage appropriate uses of prescribed fire in this habitat.
- Encourage and support formation of burn cooperatives.
- Encourage and facilitate the development of Brown-headed Cowbird management plans.

Potential indicators for monitoring the effectiveness of the conservation actions:

- GIS/remote sensing (e.g., numbers of acres and distributions).
- Relative condition (populations/trends) of species of greatest conservation need and key indicator species.
- Relative condition and quantity of habitat.

Potential partnerships to deliver conservation for Mixed-grass Prairie Region:

State Government

- Conservation Districts
- Oklahoma Biological Survey
- Oklahoma Commissioner of the Land Office
- Oklahoma Corporation Commission
- Oklahoma Department of Agriculture and Forestry Service
- Oklahoma Department of Environmental Quality
- Oklahoma Department of Wildlife Conservation
- Oklahoma Energy Resources Board
- Oklahoma Legislature
- Oklahoma Renewable Energy Council
- Oklahoma State University, Cooperative Extension Service
- Oklahoma State University, Department of Forestry
- Oklahoma Water Resources Board
- Other state universities and departments
- Texas Parks and Wildlife

Federal Government

- Federal Energy Regulatory Commission
- U.S. Army Corps of Engineers
- U.S. Bureau of Reclamation
- U.S. Department of Agriculture, Farm Service Agency
- U.S. Department of Agriculture, Forest Service
- U.S. Department of Agriculture, Natural Resources Conservation Service
- U.S. Department of Agriculture, Resource Conservation and Development Councils
- U.S. Department of Defense
- U.S. Department of the Interior, Bureau of Land Management
- U.S. Department of Agriculture, Forest Service, Black Kettle National Grasslands
- U.S. Fish and Wildlife Service – refuges division
- U.S. Fish and Wildlife Service - High Plains Initiative
- U.S. Geological Survey

Local Government

- Municipalities
- Tribal governments

Businesses, Citizens and Citizen Groups

- Local Audubon Chapters and Birding Clubs
- Chambers of Commerce
- Ducks Unlimited and local Oklahoma chapters
- Electric Utilities
- Farm Bureau
- Farm organizations
- Farmers Union
- Individual farmers and ranchers
- National and Oklahoma Wind Power Initiative
- National Rivers Society
- National Wild Turkey Federation and local Oklahoma chapters
- North American Grouse Partnership
- Northwest Range Fire Management Association
- Off-road vehicle clubs/associations/dealers

- Oklahoma Anglers United
- Oklahoma Cattlemen's Association
- Oklahoma Native Plant Society
- Oklahoma Section of the Society for Range Management
- Oklahoma Western Prairie Heritage Alliance
- Playa Lakes Joint Venture
- Private landowners
- Producer Cooperatives
- Quail Unlimited and local Oklahoma chapters
- Small Woodland Owner's Association
- Tallgrass Prairie Alliance
- Texas Prairie Rivers, Inc.
- The Nature Conservancy
- The Wildlife Society
- Urban development groups
- Western Governor's Association
- Wind energy groups