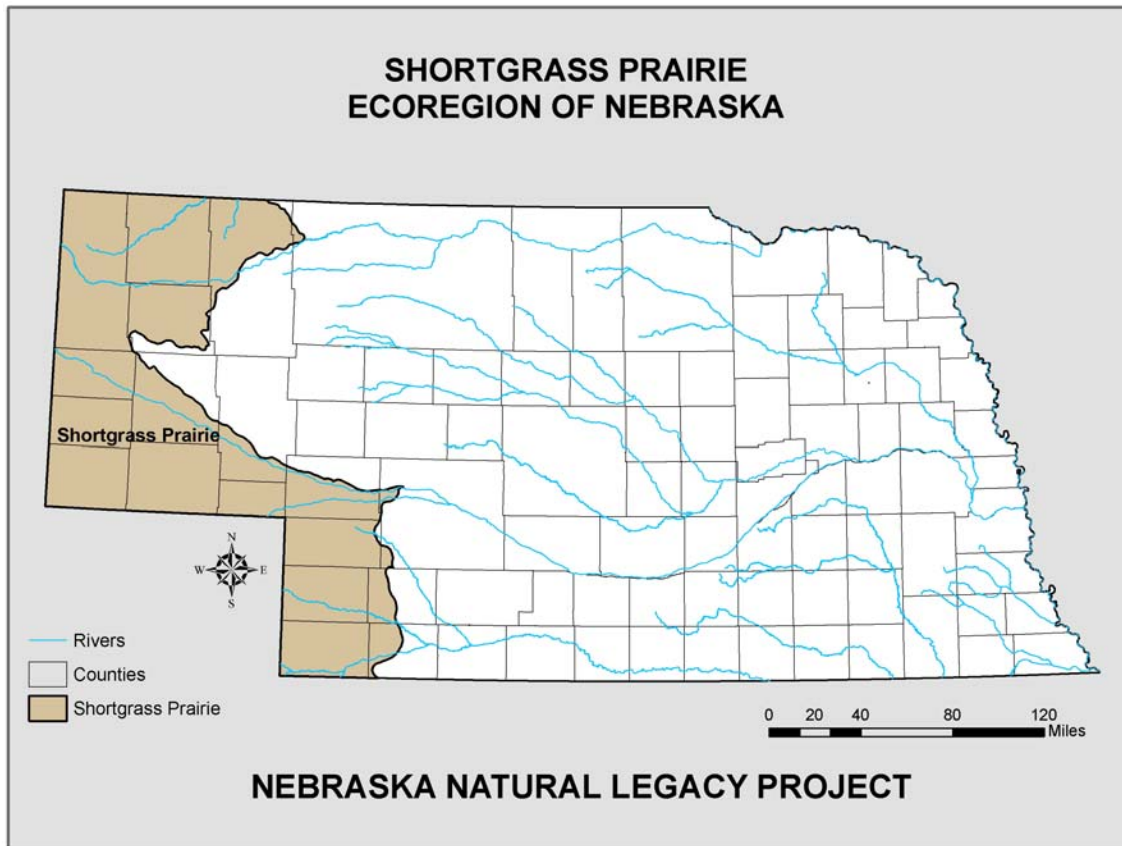


## CHAPTER 8: SHORTGRASS PRAIRIE ECOREGION



### INTRODUCTION

Western Nebraska is generally referred to as the shortgrass prairie ecoregion of the state and contains a surprisingly high diversity of habitats. This ecoregion includes shortgrass, mixedgrass, and sandsage prairie types, sparsely vegetated badlands, western coniferous forest, and playa wetlands. The region features dramatic changes in elevation and topography over relatively short distances, with soils ranging from sandy to clay-loam, to hard sandstone. The region contains a greater variety of exposed soil types than any other area of the state, with older paleo-soils that have not experienced any recent disturbance from glaciation. Annual rainfall ranges from 12-17 inches and the annual average temperature ranges from 47-50 degrees Fahrenheit. Humidity is generally low in the ecoregion.

Shortgrass prairie in its truest form is most common in the southern panhandle in Banner, Cheyenne, Deuel, and Kimball counties. Mixedgrass prairie finds its way into the ecoregion in the southeast and includes a distinct shortgrass prairie type known as sandsage prairie. Scottsbluff and Morrill Counties include the Wildcat Hills bluff formation that is dominated by mixedgrass prairie and Ponderosa Pine woodlands.

The North Platte River bisects the ecoregion and includes many tributaries, wet meadows, and deciduous woodlands. Relic Sandhill prairie extends through Morrill and Sioux Counties,

complete with the rolling topography and mixedgrass vegetation typical of interior Sandhills. Farther north a mosaic of shortgrass and mixedgrass prairies merge until it meets the Pine Ridge in northern Dawes, Sheridan and Sioux Counties. North of this rocky ridge of Ponderosa Pine, shale mixedgrass and badlands prairies extend to the border of South Dakota.

In addition to the North Platte, other small river systems in the panhandle include Lodgepole Creek in the southern panhandle and the Upper Niobrara and White Rivers in the north. Five large reservoirs and a number of smaller artificial lakes provide habitat for fish, amphibians, invertebrates, and birds. Naturally occurring playas found throughout the ecoregion (particularly the south), are generally only wet during periods of heavy or sustained rains and provide significant habitat when conditions are favorable. Similarly, the region contains a number of small creeks, which may or may not be wet year-round, with associated wet meadows and springs.

## **Vegetation**

Two distinct prairie types occur in the ecoregion: shortgrass and mixed grass. Shortgrass prairie communities are dominated by short statured grasses such as buffalograss, blue grama, side-oats grama, and purple threeawn. More than 100 species of forbs including milkvetches, scarlet guara, cutleaf ironplant, spine-fruit prickly pear, purple locoweed, slender-flower scurfpea, prairie coneflower, and scarlet globe mallow can be found interspersed with grasses. The low precipitation in the shortgrass prairie ecoregion, in conjunction with grazing causes, most shortgrass vegetation to rarely exceed 10 inches in height.

Mixedgrass prairie in the ecoregion is typically dominated by blue grama, prairie sandreed, threadleaf sedge, needle-and-thread grass, little bluestem, and western wheatgrass. Grass height can reach 18-24 inches in height but is often shorter in this ecoregion due to local management and precipitation. Shrubs found in mixedgrass prairies include skunkbush sumac, winterfat, fringed sage, snowberry, yucca, and broom snakeweed. More than 100 species of forbs can be found including scarlet guara, dotted gayfeather, skeletonplant, cutleaf ironplant, lemon scurfpea, and scarlet globe mallow.

Within the mixedgrass prairie type there are two unique communities. The northwestern mixedgrass prairie tends to be dominated by western wheatgrass and blue grama, and may include big sagebrush, silver sagebrush, rubber rabbitbrush, greasewood, and yucca. The (western) loess mixedgrass prairie is dominated by typical shortgrass prairie species if grazed intensely, but on slopes or lightly grazed areas taller grasses like little and big bluestem, switchgrass, and sideoats grama become more common. Leadplant and sandsage are the most common shrubs, where eastern red cedar has not invaded. Common forbs include western ragweed, fringed sage, prairie coneflower, scarlet globe mallow, scarlet guara, broom snakeweed, and others.

The sandhills dune prairie and sandsage prairie (Sandhills borders prairie) is recognized mainly by the high proportion of sandsage but also includes sand bluestem, blue grama, prairie sandreed, needle-and-thread, and yucca. Forbs in this community include sand-lily, desert goosefoot, plains sunflower, bush morning-glory, and showy ipomopsis. Sandhills prairie is dominated by prairie sandreed, hairy grama, and sunsedge, and shrubs include leadplant, dwarf prairie rose, western poison ivy, and yucca. Forbs include stiff sunflower, bush morning glory, plains

gayfeather, brittle prickly pear, hairy puccoon, desert goosefoot, winged pigweed, field snake cotton, etc. Sandage prairie in the southern part of the ecoregion is dominated by prairie sandreed and needle-and-thread, shrubs such as sandsage and yucca, and forbs that are similar to those found in the sandhills community.

Western alkaline meadows along the North Platte are characterized by inland saltgrass, alkali sacaton, clustered field sedge, foxtail barley, and meadow bluegrass. Forbs include spearscale, alkali aster, viscid camphor-daisy, and thelypod. Ponderosa pine woodlands are dominated by ponderosa pine, but may have inclusions of quaking aspen and a green ash subcanopy. Saskatoon serviceberry, chokecherry, dwarf juniper, fragrant sumac, mountain mahogany, and wolfberry are common shrubs. Kentucky bluegrass and littleseed ricegrass may be found in the sparse herbaceous layer.

Riparian woodlands are dominated by an open canopy of tall cottonwoods and shorter peachleaf willows. The subcanopy may include green ash, box-elder, Russian olive, and junipers. Sandbar willow is a common shrub, but wild plum, chokecherry and buffaloberry are also present on higher terraces and banks. The herbaceous layer is sparse and may include field horsetail, Emory's sedge, woolly sedge, marsh muhly, and prairie cordgrass.

Badlands are mainly unvegetated eroded areas sparsely covered by low shrubs such as saltbush and rubber rabbitbrush and a scant cover of forbs such as silver orache, poverty weed, and Russian thistle. Occasionally mixedgrass prairie grasses may also be found. Similar to badlands are the interspersed rock outcrops across the rugged terrain of the panhandle. Here the dominant shrub is typically skunkbush sumac, with herbaceous vegetation made up of blue grama and thickspike wheatgrass or few-flower buckwheat and Hood's phlox.

## **Animals**

More than 300 species of resident and migratory birds have been recorded in the shortgrass prairie ecoregion. Common shortgrass prairie species include McCown's and Chestnut-collared longspurs, Brewer's sparrow, horned lark, burrowing owl and the state threatened mountain plover. Species commonly found in the mixedgrass prairie community include western meadowlark, grasshopper sparrow, and lark bunting. The pine ridge region includes many forest species such as Lewis' woodpecker, pygmy nuthatch, ovenbird, and mountain bluebird. The region's wetlands support many species of waterfowl including Canada goose, mallard, and northern pintail, and shorebirds such as western sandpiper, and greater yellowlegs.

A variety of mammals are known to occur in the ecoregion. Ungulates include both white-tailed and mule deer, elk, pronghorn, and bighorn sheep. Coyotes and bobcats are the most common large predator but in recent years mountain lions have also been recorded in the panhandle. The ecoregion serves as one of the remaining strongholds for the diminutive swift fox, a state endangered species. Prairie dogs are locally abundant and the federally endangered black-footed ferret was once present in the ecoregion. Other mammals include the river otter, black-tailed jackrabbit, badger, plains pocket gopher, and grasshopper mouse.

The aquatic habitats of Nebraska's Panhandle support numerous species of fish. The region's lakes and reservoirs have been stocked with gamefish such as walleye, largemouth bass, white bass and bluegill. River-associated species include channel catfish, river carpsucker, the state-

threatened finescale dace, state-endangered blacknose shiner, shovelnose sturgeon, western silvery minnow, plains minnow, suckermouth minnow, flathead chub, blacknose dace, plains topminnow, and Iowa, Johnny, and orange-throat darters. Brown trout and rainbow trout have been stocked in cold water streams in the ecoregion.

Many species of amphibians and reptiles are known to occur in the shortgrass prairie ecoregion. Amphibians include western striped chorus frog and Woodhouse's toad. Reptiles include bullsnake, prairie rattlesnake, lesser earless lizard, short horned lizard, ornate box turtle, and painted turtle.

## **DOMINANT LAND USE AND HISTORY**

The first known use of the shortgrass ecoregion by humans was by Pawnee and Otoe Indians who built earth lodges in the North Platte River Valley. Later, nomadic tribes of Pawnee, Sioux and Northern Cheyenne traversed the region hunting the great herds of bison and other game. The earliest Europeans in the region were likely explorers who ventured into the southeastern corner of the ecoregion with Coronado in the 1500's. The Oregon and Mormon Trails, which crossed the region, carried thousands of settlers westward during the western expansion of the 1840's and 1850's. Relatively few individuals settled in the ecoregion during this time.

The Homestead Act of 1864 spurred settlement by providing 160 acres to homesteaders who could improve their land claim within five years. An additional 160 acres could be acquired if a sufficient number of trees were planted on the claim site. Completion of the transcontinental railroad brought an increasing number of settlers to this part of Nebraska in the late 1860s. Tracts of grassland as far as the eye could see were very enticing to cattlemen. Vast ranches were established, primarily on public land. Cattle thrived on the short, warm-season grasses such as buffalo grass and blue grama which were rich in protein even after dormancy. The Kincaid Act of 1904 allowed homesteaders to increase their land claim to 640 acres, making farming the dry prairies less risky. Section-sized farms started springing up and large ranchers who formerly ran cattle freely across the open plains, faced new difficulties.

The Reclamation Act of 1902 proved to be the impetus for irrigating the arid lands and encouraging crop production in the ecoregion. A few farmers along the Owl and Winter Creeks dug canals by hand to bring river water to their crops in 1887. Canal associations soon followed allowing accelerated development of irrigation systems. By 1909 enough sugar beets were being produced to support the first sugar factory. At the height of sugar beet production there were five factories in the Scottsbluff area.

Land that was located too far from irrigation canals started growing winter wheat. This crop did very well with limited rainfall, especially under a summer fallowing rotation (resting the land every other year and cultivating vegetation to preserve subsoil moisture). Another prominent crop of the region was dry beans. The first 100 acres of dry beans was planted in 1927. In subsequent years the area became one of the major dry edible bean producing regions of the nation.

During the 1920's the short grass prairie region saw dramatic changes as large areas of prairie were converted to crop fields. Nineteen twenty-nine marked the first year of a seven year drought. Below average precipitation combined with high temperatures and driving winds

created the worst drought in the region's history. During the height of the dust bowl years, lights had to be used during the day in order to see. The drought coupled with the nation's economic depression left many farmers and ranchers in the region in economic ruin.

The 1940's saw a recovery for farming in the ecoregion and many farms and ranches once again prospered. Improvements in farming efficiency in the 1950's through 1960's lead to dramatic increases in crop production. The wide-scale use of center pivot irrigation systems in the 1970's and 1980's brought previously unirrigated land into crop production. In the late 1990's severe drought returned to the area and the amount of land under cultivation began to decline. Moratoriums on new groundwater development were put in place to help safeguard depleted water resources. No-till farming and dry land friendly crops like sunflowers received wider acceptance during the late 1990's.

Currently almost 87 % of the land in the northwest portion of the ecoregion is in grass and used for grazing and nearly 88 % of the land in the southeast part of the ecoregion is under crop production. Of the 5.6 million acres of land in the short-grass prairie region, 2.28 million acres is used as cropland, half of which is irrigated. Approximately 2.75 million acres are in grassland and used principally for grazing. A very small portion of the ecoregion is in native woodlands.

The Conservation Reserve Program (CRP) and the Conservation Reserve Enhancement Program (CREP) have taken tens of thousands of acres cropland out of production and returned it to grassland. Due to declining groundwater and surface water resources in the ecoregion, many CRP and CREP lands will likely remain in grassland even after contracts expire.

The current trend is towards fewer but larger farms and ranches in the ecoregion. This trend is being driven by economics and a loss of residents in rural areas to more populated towns and cities. Many landowners have concerns about future land acquisitions for public use and its impact on sustaining a ranching tradition. The northern portion of the panhandle has a much higher percentage of land area in public ownership than in other parts of the state. Recent efforts to promote agritourism in the region are being done in part to increase economic prosperity. Promoting the region's biological diversity and unique landscape could likewise lead to increased economic sustainability.

## **NATURE-BASED RECREATION**

The short-grass prairie ecoregion has a wealth of natural amenities. The region is a well-known destination for the natural history enthusiast, hunters and anglers, hikers, and the casual visitor interested in varied scenery. Six of the top ten tourist attractions in Nebraska are found in the shortgrass prairie ecoregion and all are at based at least in part on natural amenities. Tourism is the second largest industry in the panhandle, generating \$40 million in retail dollars in Scotts Bluff County alone.

The ecoregion is home to Lake McConaughy, the largest reservoir in the state and a well-known destination for anglers, bird watchers, hunters, and campers. The reservoir supports trophy sized striped bass and walleye and the adjacent Lake Ogallala is one of the best rainbow trout fisheries in the Great Plains. Over 340 species of birds have been observed at Lake McConaughy, more than any other site in Nebraska. Several hundred eagles can be seen during the winter from a heated eagle viewing facility below the dam.

Nebraska's pine ridge region offers some of the most scenic vistas in the state. The 22,000-acre Fort Robinson State Park provides opportunities to observe bighorn sheep and pronghorn. A small but growing elk herd in the pine ridge entertains both hunters and wildlife viewers. Anglers can enjoy quality trout fishing in the area's coldwater springs and turkey and deer hunting opportunities abound. Fort Robinson offers different trail types, including equestrian trails. In addition to Fort Robinson and Chadron State Parks, numerous state wildlife management areas, the National Forest and Soldier Creek Wilderness also occur on Pine Ridge. Oglala National Grassland and Toadstool Geologic Park, both administered by the U.S. Forest Service are located north of Pine Ridge and provide their own unique habitats and outdoor recreation opportunities.

A second bighorn sheep herd was recently established in the wildcat hills. The Wildcat Hills Nature Center is the region's leading environmental education center. A variety of programs are offered to adults and children about the region's unique flora and fauna and a trail system accommodates wildlife viewers. The nearby Scotts Bluff National Monument has a three mile scenic trail that leads to the summit of the monument. There are currently plans for a 26 mile network of trails and greenways that generally follow the North Platte and plan to link Scottsbluff and Gering with Scotts Bluff National Monument.

Although the sandsage prairie is less well known for nature-based recreation, it provides quality hunting and birdwatching opportunities. The true mixedgrass prairie in the southwest corner of the Panhandle provides one of the most reliable opportunities to observe the state threatened mountain plover. Economic development in the ecoregion is becoming ever more entwined with the natural amenities of the area. Declining rural populations and diminished agricultural opportunities are changing the make-up of the ecoregion. Nature-based recreation is providing renewed hope and opportunities in the shortgrass prairie ecoregion.

The principal challenge to expanding and conserving nature-based recreational resources in the ecoregion is involving a larger and more diverse cross-section of the region's residents in nature-based recreation activities. Key individuals from the business, economic development, and agricultural sectors should be involved in planning, promotion, and development of the ecotourism trade. There is no centralized clearinghouse of wildlife viewing-related information and a significant lack of wildlife viewing infrastructure in the ecoregion. Although there are many quality opportunities for nature-based recreation, access points are limited or obscured, interpretive information is lacking, and promotion of viewing opportunities is limited. A greater number of individuals who are knowledgeable about wildlife viewing are needed to help inform community leaders and the public about the ecoregion's wildlife viewing potential.

## **EDUCATION**

Environmental education has long been viewed as a critical element of conservation in the shortgrass prairie ecoregion. Efforts to bring wildlife education into the classroom have been ongoing for several decades. Educational Service Unit #13 in Scotts Bluff has been a model for working collaboratively with agencies and private organizations to facilitate environmental education in the region's schools. The Wildcat Hills Nature Center in Gering was built to help students and adults learn about the natural history of the area. Nearly half of the Panhandle's 64 schools are class I elementary only districts (<10 students/grade). Small classroom size affords great opportunities for student-centered learning but often requires that a larger number of

individuals be trained in environmental education. Rural schools sometimes have more space available for outdoor classrooms or may even be located close to natural areas that can be used for field trips.

The region's larger schools are experiencing increases in enrollment and are becoming more ethnically diverse. Constraints on teachers to meet new and existing curriculum requirements sometimes leaves little additional time to devote to important disciplines such as environmental education. Understanding and addressing cultural differences in environmental education programming is also important. Schools surveyed in the ecoregion indicated that interest in wildlife education is high and nearly all schools incorporate wildlife themes in the classroom at least several times each year.

Currently, resource professionals are stretched too thin to adequately meet the demand for environmental education in the region. Although many teachers are interested in the environment, they often lack the training or resources to effectively teach about the region's biological diversity. Environmental educators in the ecoregion often are not able to travel to Lincoln, Omaha or other urban centers in eastern Nebraska to network with other professionals and participate in training.

There are a number of environmental education programs that take place in the ecoregion each year. These include but are not limited to "Since then Water Wonders", "Branch Out", "Zoo Quest", and "Environ-Art". The Riverside Zoo in Scotts Bluff reaches more than 10,000 children and adults each year and zoo staff conduct teacher training in environmental education. Rocky Mountain Bird Observatory conducts landowner workshops and participates in environmental education programs on birds. Chadron State College recently began offering course work in wildlife ecology for college-level students.

Despite the rich natural heritage of the ecoregion, there is often a lack of understanding and awareness of the ecoregion's biological diversity by its residents. In addition, ranchers and farmers often have a unique understanding and experiences about wildlife and are usually willing to share their knowledge. Increased collaboration amongst environmental educators, resource professionals, teachers, farmers and ranchers, and community leaders could lead to increased understanding of various viewpoints and increase education capacity.

## **PARTNERSHIPS**

- ❖ In 2001, **Nebraska Prairie Partners** was formed in cooperation with the Rocky Mountain Bird Observatory (RMBO) and Nebraska Game and Parks Commission (NGPC). They recognized a need for biological information and landowner outreach in western Nebraska in order to facilitate bird conservation in the region. RMBO had expertise on regional prairie bird conservation, field monitoring, and landowner outreach. NGPC had local infrastructure, funding, and a proven private lands incentive program. The purpose of this project was to implement grassland bird monitoring and research and provide outreach and technical expertise to private landowners. Monitoring currently takes place on 450 sections of land for common prairie birds, and another 450 sites for various species of special conservation concern. Target species include: Burrowing owl, Ferruginous Hawk, and Mountain Plover. Approximately 350 private landowners have been involved in the program thus far. The

Nebraska Shortgrass Prairie Partnership was started in 2003 and is designed to conserve and enhance shortgrass prairie habitat on private lands by offering technical assistance and financial incentives. Both projects are supported by grants from the Nebraska Game and Parks Commission, U.S. Fish and Wildlife Service, the Nebraska Environmental Trust, and Playa Lakes Joint Venture. For more information, visit: [www.rmbo.org](http://www.rmbo.org).

- ❖ The **Platte River Basin Environments, Inc. (PRBE)** was organized officially in 1991. This organization seeks to acquire and manage Platte River and other important habitats in the shortgrass prairie ecoregion. Led by avid sportsmen and conservation enthusiasts its members also have expertise in hydrology, geology, range management, and wildlife biology. Since its formation, PRBE board members have secured over \$3 million dollars in grants and donations. Major grants and gifts have come from the Nebraska Environmental Trust, North American Wetlands Conservation Act, Oregon Trail Community Foundation, Ducks Unlimited, Pheasants Forever, National Wild Turkey Federation, Peter Kiewit Foundation, and the Private Stewardship Grant Program. PRBE's efforts and partnerships with over 24 entities earned them the 2004 National Wetlands Conservation Award. Properties PRBE has helped acquire and protect include: Wildcat Hills Nature Center, Cedar Canyon Wildlife Management Area (WMA), Kiowa WMA, Faucus Springs WMA, Chadron Creek WMA, PRBE's Mitchell Valley Units, PRBE's Spotted Tail Units, PRBE's Horse Creek Units, PRBE's Bead Mountain Ranch Units, PRBE's dream is that similar groups across Nebraska will begin to conserve land for public use.
- ❖ The **Playa Lake Joint Venture** was formed in 1989 to help conserve playas and associated habitats for birds and other wildlife in parts of six states in the western Great Plains. Since its inception, the PLJV has raised close to \$50 million to conserve more than 100,000 acres of playas and other wetland and wildlife habitat in the High Plains. The activities of the PLJV are guided by a master plan that gives direction for conservation activities at the regional level. The Joint Venture is a regional partnership of federal and state wildlife agencies, conservation groups, industry and private landowners. Partners include: the U.S. Fish and Wildlife Service, U.S. Forest Service, Ducks Unlimited, The Nature Conservancy, Pheasants Forever, Conoco-Phillips, and state wildlife agencies of Colorado, Kansas, Nebraska, New Mexico, Oklahoma and Texas – and via these partners numerous landowners. For more information, visit: [www.pljv.org](http://www.pljv.org).

## ECOREGION-SPECIFIC STRESSES AND CONSERVATION ACTIONS

### Key Stresses

Stresses and conservation actions in the shortgrass prairie ecoregion are identified in chapter three and in descriptions of biologically unique landscapes. The following stresses were identified by conservation practitioners as the top stresses in the ecoregion.

- ❖ Alteration of natural disturbance regime: Shortgrass and mixed-grass prairies in the ecoregion historically were subject to intensive short duration grazing by native herbivores followed by periods of rest. Constant season-long grazing by cattle has changed plant and animal composition by favoring a relatively small proportion of species adapted to prolonged grazing. Periodic fires historically burned through

expansive areas of prairie and ponderosa pine forest. The lack of fire has altered species composition and structure of grasslands, forest, and wetlands.

- ❖ Altered hydrology and channel degradation of rivers and streams: Rivers, streams, and wetlands in the ecoregion are being stressed by surface water diversions and groundwater withdrawals. The loss of water to aquatic communities jeopardizes many species. A lowering of the water table along rivers and streams changes plant composition and often promotes the spread of invasive species. Reduced flows to the Platte and Republican Rivers have contributed to a shift from a grass/forb-dominated community to trees and shrubs, changing the species composition in the ecoregion.
- ❖ Spread of invasive species: Invasive species are severely threatening the ecoregion's biological diversity. Cheat grass, Russian olive, reed canary grass and other species have competitively excluded native plants and degraded habitat for fish and wildlife.
- ❖ Lack of knowledge about the region's biological diversity and ecological processes: The region's residents have limited opportunities to learn about the plant and animal species that are found in the ecoregion. Most school-aged children and adults are unaware of many of the species found in the ecoregion, key stresses, and the ecological processes that are important to sustaining biological diversity. Private landowners have limited access to information about management actions that can be taken to sustain natural communities and biological diversity on their land.
- ❖ Conversion and fragmentation of natural habitats: Although large areas of the ecoregion are still intact, sub-division of larger ranches into smaller units and acreages is resulting in loss and fragmentation of natural communities. Second home construction along rivers, native forests, and near recreational areas threatens to impact species. Some limited agricultural conversion of grassland continues throughout the ecoregion.

## **Biologically Unique Landscapes of the Shortgrass Prairie Ecoregion**

One of the goals of the Legacy Project is to identify a set of priority landscapes that, if properly managed, would conserve the majority of Nebraska's biological diversity. These landscapes, which we are calling Biologically Unique Landscapes, were selected based on the occurrences of at-risk species and ecological communities. Chapter 3 includes a description of the methods used to select the landscapes.

The map on the following page shows the biologically unique landscapes for the Shortgrass Prairie ecoregion. Following the map are brief descriptions of each landscape including stresses affecting species and habitats, proposed conservation actions, and lists of Tier I at-risk species and ecological communities found in the landscape. An asterisk next to a community name indicates that it is a priority for conservation in that landscape.

### **Shortgrass Landscapes**

Kimball Grasslands

North Platte River Wetlands

Oglala Grasslands

Panhandle Prairies

Pine Ridge

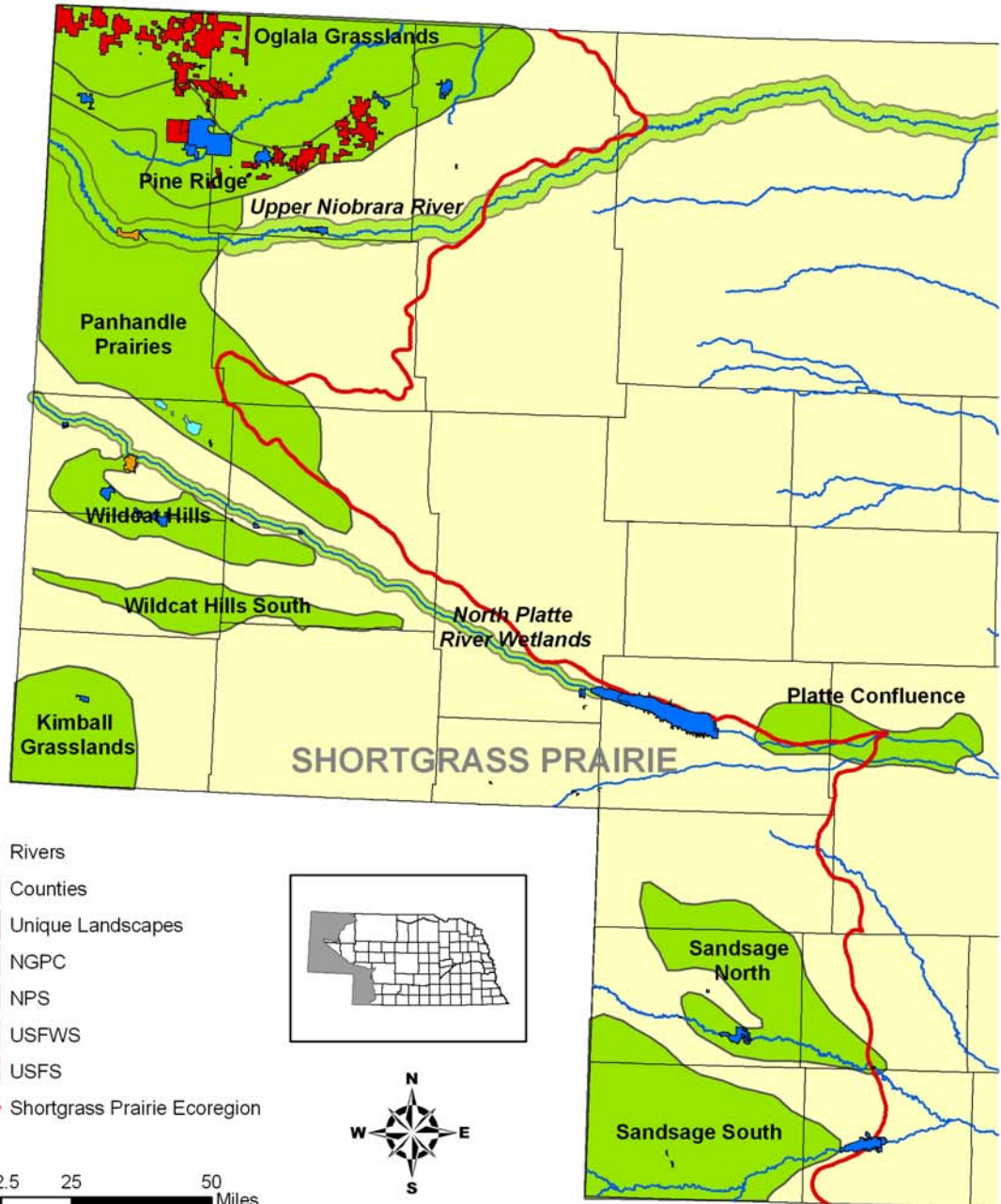
Platte Confluence (see Mixedgrass Ecoregion for description)

Sandsage (North and South combined)

Upper Niobrara River

Wildcat Hills (North and South combined)

## BIOLOGICALLY UNIQUE LANDSCAPES SHORTGRASS PRAIRIE ECOREGION



NEBRASKA NATURAL LEGACY PROJECT

## **Landscape Name: Kimball County Grasslands**

### **Landscape Description**

This landscape occupies the level to rolling hills and breaks of southwest Kimball County. Most of the more level ground is in dryland crops, primarily wheat. Native mixedgrass prairie still occupies the shallow-soiled breaks bordering Lodgepole Creek and other stream valleys.

The landscape is unique in that it supports the state's only population of the federally and state listed Colorado butterfly plant. In addition, nesting populations of the state-listed mountain plover occur in this landscape, where they utilize heavily grazed native grasslands and cropland such as wheat stubble. Playa wetlands are found on level sites in the northern portion of the landscape.

### **Stresses Affecting Species and Habitats**

- ❖ Canada thistle invasion of meadows where the Colorado butterfly plant occurs.
- ❖ Herbicide spraying, to control invasive species, in meadows where the Colorado butterfly plant occurs.
- ❖ Flow depletions in Lodgepole Creek that impact groundwater levels in adjacent meadows with the Colorado butterfly plant.
- ❖ Tillage in fallow wheat fields that destroys mountain plover nests.
- ❖ Sedimentation and hydrological alteration of playa wetlands.
- ❖ Conversion of native prairie to cropland.
- ❖ Exotic plant invasion of native grasslands, the primary species of concern is cheatgrass.

### **Conservation Strategies**

- ❖ Work with private landowners whose meadows contain the Colorado butterfly weed to develop and implement forms of Canada thistle control that do not damage populations of the butterfly plant.
- ❖ Restore and maintain the natural hydrology of Lodgepole Creek that is needed to sustain biological diversity and ecosystem function.
- ❖ Conduct voluntary nest clearing of crop fields to prevent damage to mountain plover nests.
- ❖ Restore selected crop fields and CRP lands to shortgrass prairie for mountain plover nesting habitat.
- ❖ Prevent sedimentation and restore the hydrology of the playa wetlands.
- ❖ Develop management agreements with landowners to implement grazing and burning regimes on native grasslands that favor mountain plover and native plant diversity.

### **Tier 1 At-risk Species:**

#### **Plants:**

Colorado butterfly plant

#### **Animals:**

Plains topminnow

Burrowing owl  
 Ferruginous hawk  
 McCown's longspur  
 Mountain plover  
 Swift fox

**Aquatic Communities:**

Headwater, Warm Water Stream

**Terrestrial Communities:**

Ponderosa Pine Woodland\*  
 Sandbar Willow Shrubland  
 Western Streamside Wet Meadow\*  
 Western Mixedgrass Prairie\*  
 Shortgrass Prairie\*  
 Rock Outcrop\*

**Landscape Name: North Platte River Wetlands**

**Landscape Description**

This landscape includes the North Platte River channel and the associated freshwater and alkaline wetland complexes within the river valley from the upper end of Lake McConaughy to the Wyoming/Nebraska border and also in the headwater reach of Pumpkin Creek. The North Platte River valley in this reach has a braided, mainly tree-lined channel. Cottonwood, eastern red cedar and Russian olive are the dominant floodplain trees. The majority of the river floodplain is farmed. However, both alkaline and freshwater wetland complexes remain. Many of the freshwater meadows are heavily invaded by exotic grasses. The alkaline meadows tend to be in better condition. This landscape is unique in that it contains one of two alkaline wetland complexes in the state. North Platte valley wetlands are an essential migratory stopover point for waterfowl and shorebirds. The alkaline meadows also support unique assemblages of insects including tiger beetles, dragonflies and butterflies. Major protected areas in this landscape include Kiowa WMA, Chet and Jane Fleisbach WMA, and lands owned by Platte River Basin Environments, Inc.

**Stresses Affecting Species and Habitats**

- ❖ Ditching and drainage of wetlands.
- ❖ Reduced river flows that impact groundwater levels in river valley wetlands.
- ❖ Reduced groundwater levels from irrigation water withdrawal.
- ❖ Exotic species invasion, the species of primary concern is tall wheatgrass, Russian olive, cheatgrass, phragmites, and Canada thistle.
- ❖ Livestock grazing and haying practices that reduce native plant diversity and promote uniform habitat structure.
- ❖ Conversion of native prairie to cropland.
- ❖ Reduction in ground water level and stream flow in Pumpkin Creek and other areas (e.g., University Lakes area).

## Conservation Strategies

- ❖ Use voluntary conservation easements or voluntary fee title acquisition to protect key high quality freshwater and alkaline wetlands and wet meadows.
- ❖ Work with private landowners to implement ecologically sensitive grazing and haying regimes.
- ❖ Work with agronomists to discontinue use of tall wheatgrass plantings.
- ❖ Use ditch plugging and water control structures to restore the natural hydrology to wetland complexes.
- ❖ Work with private landowners to implement integrated pest management systems and invasive species brush management.
- ❖ Restore and maintain the natural hydrology of key streams (e.g. Pumpkin Creek) that is needed to sustain biological diversity and ecosystem function.
- ❖ Conduct tree clearing on specific areas of the North Platte River channel.

## Tier 1 Species

### Plants:

None

### Animals:

Regal fritillary

River otter

Bald eagle

Burrowing owl

Whooping crane

### Aquatic Communities:

Headwater, Warm Water Stream

Mid-order, Warm Water River

### Terrestrial Communities:

Western Riparian Woodland

Sandbar Willow Shrubland\*

Freshwater Marsh\*

Western Alkaline Marsh\*

Western Alkaline Meadow\*

Western Streamside Wet Meadow\*

Northern Cordgrass Wet Prairie\*

Perennial Sandbar\*

Sandbar/Mudflat

**Landscape Name: Oglala Grasslands****Landscape Description**

This landscape occupies the plains and rolling hills in the northwestern Panhandle north of the Pine Ridge. Mixedgrass prairie covers most of the plains and hills, though there are numerous areas of badlands and several streams with partially wooded valleys. The soils are predominantly clays derived from Pierre Shale and support mixedgrass prairie dominated by blue grama, green needle grass, and western wheatgrass.

This landscape is unique in that it is one of the larger intact grasslands remaining in Nebraska, though many “go-back” fields occur in the area. This landscape includes the state’s most extensive badlands and the only occurrences of several plant communities including western floodplain terrace grassland, silver sagebrush shrub prairie, greasewood shrub prairie, and northwestern mixedgrass prairie. Scattered playas occur in the landscape. These grasslands support extensive prairie dog towns, swift fox populations, and extensive habitat for grassland birds. The Oglalla National Grasslands occupy a large portion of this landscape.

**Stresses Affecting Species and Habitats**

- ❖ Livestock grazing practices that reduce native plant diversity and promote uniform habitat structure.
- ❖ Exotic species invasion, primarily cheatgrass.

**Conservation Strategies**

- ❖ Work with private landowners and the U.S. Forest Service to implement ecological sensitive grazing systems that reduce cheatgrass and promote native plant diversity and a diverse vegetation structure.
- ❖ Restore sagebrush communities on selected sites.

**Tier 1 At-risk Species:****Plants:**

Wild buckwheat

**Animals:**

Burrowing owl  
 Ferruginous hawk  
 Long-billed curlew  
 Brewers sparrow  
 Bell’s vireo  
 Swift fox

**Aquatic Communities:**

Headwater, Warm Water Stream  
 Mid-order, Warm Water River\*

**Terrestrial Communities:**

Spring Seep  
 Western Streamside Wet Meadow\*  
 Western Floodplain Terrace Grassland\*  
 Silver Sagebrush Shrub Prairie\*  
 Greasewood Shrub Prairie\*  
 Shortgrass Prairie\*  
 Northwestern Mixedgrass Prairie\*  
 Western Mixedgrass Prairie  
 Western Sandy Slope Prairie  
 Rock Outcrop  
 Badlands\*

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**Landscape Name: Panhandle Mixedgrass Prairies****Landscape Description**

This landscape occupies the plains and rolling hills in the northern Panhandle from the Pine Ridge south to the North Platte River valley. It includes the rough breaks and rocky outcrops associated with the Niobrara River in central Sioux County and the North Platte River in Scotts Bluff and Morrill counties. The plains include isolated sand dunes in west-central Sioux County. These dunes support Sandhills dune prairie and sandsage prairie. The soils are loamy to loamy sands, except on the sand dunes. The landscape is occupied primarily by native prairie with only scattered cropland.

This landscape is unique in that it is one of the largest intact, higher quality grasslands remaining in Nebraska. These grasslands support prairie dog towns, the state's largest swift fox populations, and extensive habitat for grassland birds. Alkaline wetlands occur along Snake Creek in the far east-central portion of this landscape. The North Platte National Wildlife Refuge is the only protected land in this landscape.

**Stresses Affecting Species and Habitats**

- ❖ Livestock grazing practices that reduce native plant diversity and promote uniform habitat structure.
- ❖ Exotic species invasion, primarily cheatgrass.
- ❖ Conversion of prairie to cropland (e.g. in the Niobrara River valley)

**Conservation Strategies**

- ❖ Work with private landowners to implement ecological sensitive grazing systems. These systems should strive to reduce cheatgrass abundance and promote native plant diversity and diverse vegetative structure.
- ❖ Protect key high-quality sites through conservation easements or voluntary fee title acquisition.

**Tier 1 At-risk Species:**

**Plants:**

Wild buckwheat

**Animals:**

Plains topminnow  
Burrowing owl  
Ferruginous hawk  
McCown's longspur  
Long-billed curlew  
Brewer's sparrow  
Swift fox

**Aquatic Communities:**

Headwater, Warm Water Stream

**Terrestrial Communities:**

Spring Seep  
Western Streamside Wet Meadow  
Sandsage Prairie\*  
Sandhills Dune Prairie\*  
Shortgrass Prairie\*  
Western Mixedgrass Prairie\*  
Loess mixedgrass Prairie  
Western Sandy Slope Prairie\*  
Dry Cliff  
Rock Outcrop\*  
Badlands

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**Landscape Name: Pine Ridge**

**Landscape Description**

The Pine Ridge is a rocky escarpment that rises several hundred feet from the surrounding plains in Sioux, Dawes, and Sheridan counties in northwest Nebraska. The escarpment is composed of sandstone, siltstones and volcanic ash. Ponderosa pine woodlands and forest occupy many of the north- and east-facing slopes, and bottoms. Pine woodlands and mixedgrass prairie occupy the south- and west-facing slopes. Several streams, including the White River, Hat Creek and Soldier Creek, headwater in the Pine Ridge. The valleys of these northward flowing streams support deciduous woodlands and meadows in their floodplains.

The Pine Ridge is a pine-dominated escarpment within the grassland dominated Great Plains. It supports many at-risk species at the edge of their range, including two of the state's three populations of the Rocky Mountain bighorn sheep. There are several large protected areas

within this landscape including the Nebraska National Forest, Fort Robinson State Park and several wildlife management areas.

### **Stresses Affecting Species and Habitats**

- ❖ Housing and ranchette development.
- ❖ Increased densities of ponderosa pine and to a lesser extent eastern red cedar, due to lack of fire.
- ❖ Logging practices with a high degree of groundcover and soil disturbance.
- ❖ Livestock grazing practices that reduce native plant diversity and promote uniform habitat structure. This, along with other factors such as logging, has led to exotic plant invasion, primarily cheatgrass, smooth brome, Kentucky bluegrass, eastern red cedar, leafy spurge, and Canada thistle.
- ❖ Catastrophic wildlife fire (crown fires) due to excess fuel accumulation.
- ❖ Lack of grazing and prescribed fire on some public lands.

### **Conservation Strategies**

- ❖ Use conservation easements to protect key areas from development.
- ❖ Work with public and private landowners to implement planned grazing systems.
- ❖ Work with public and private landowners to implement prescribed, low-intensity surface fires to control exotic plants, reduce ponderosa pine and eastern red cedar densities, and reduce threat of crown fires. Dense stands of trees may require mechanical thinning prior to burning to reduce fuel loads.
- ❖ Conduct ecologically sensitive tree thinning on private and public land.
- ❖ Implement biodiversity management on public lands, including increased use of prescribed, low-intensity surface fire and planned grazing systems. A fire return interval of 5-10 years should be appropriate for public lands within the Pine Ridge.

### **Tier 1 At-risk Species:**

#### **Plants:**

None

#### **Animals:**

Tawny crescent

Lewis' woodpecker

Bell's vireo

Long-legged myotis

Fringe-tailed myotis

Townsend's big-eared bat

Swift fox

Rocky Mountain bighorn sheep

#### **Aquatic communities:**

Headwater, Coldwater Stream\*

Headwater, Warmwater Stream\*

**Terrestrial Communities:**

Ponderosa Pine Forest\*  
 Ponderosa Pine Woodland\*  
 Mixed Conifer Woodland\*  
 Green Ash-Elm Canyon Bottom Woodland\*  
 Mountain Mohogany Shrubland  
 Buckbrush Shrubland  
 Spring Seep  
 Western Mixedgrass Prairie\*  
 Pine Ridge Sandy Slope Prairie\*  
 Dry Cliff\*  
 Rock Outcrop\*  
 Badlands

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**Landscape Name: Sandsage Prairie****Landscape Description**

This landscape is composed of low rolling sand dunes and stream breaks in a four county area in far southwest Nebraska. Loess mixedgrass prairie and western mixedgrass prairie occur on the breaks and bluffs of the Republican and Frenchman rivers while sandsage prairie occurs on rolling sand dunes. The mixedgrass prairies are partially fragmented by cropland and degraded in some areas due to livestock grazing practices that reduce plant species diversity. The sandsage prairies have been highly fragmented by center pivot development. The landscape is significant because it contains some of the last remnants of sandsage prairie and some of the highest quality loess mixedgrass prairies in the state. Historically, sandsage prairie contained lakes and wetlands, but these have disappeared in recent decades due to the lowering of the groundwater table. If the groundwater were restored, these wetland areas may reappear. Several higher quality small streams flow into the Republican River, including Buffalo Creek and Rock Creek. The stretch of the Republican River above Swanson Reservoir is not as degraded as lower reaches and still contains a braided channel and open sandbars. The largest protected areas in the landscape are Enders Reservoir WMA, Swanson Reservoir WMA, and Red Willow Reservoir WMA.

**Stresses Affecting Species and Habitats**

- ❖ Conversion of native grasslands to cropland, especially conversion of sandsage prairie to center pivot irrigation.
- ❖ Groundwater withdrawal for center pivot irrigation, which effect wetlands and stream flows.
- ❖ Livestock grazing practices that reduce native plant diversity and promote uniform habitat structure in prairies, which can lead to exotic plant invasion and over abundance of sandsage.
- ❖ Spraying of sandsage prairies to reduce sandsage abundance.
- ❖ Exotic plant invasion, primarily smooth brome and cheatgrass, in native prairies.

## **Conservation Strategies**

- ❖ Protect largest blocks of sandsage prairie from conversion to cropland through conservation easements or voluntary fee title acquisition.
- ❖ Work with landowners to restore groundwater levels and potentially restore wetlands in the sandsage prairie.
- ❖ Work with private landowners to implement planned grazing systems.
- ❖ Work with the Natural Resource Conservation Service to eliminate the practice of herbicide spraying on private lands as a method of reducing sandsage abundance.
- ❖ Implement prescribed burning on private lands as a method of reducing sandsage in sandsage prairies and controlling exotic cool-season grasses in mixedgrass prairies.
- ❖ Invasive woody species removal and grazing management within the Republican River valley upstream from Swanson Reservoir.
- ❖ Restore wetlands in the Republican River valley upstream from Swanson Reservoir.

### **Tier 1 At-risk Species:**

#### **Plants:**

Sandhills goosefoot  
Compact prairie clover

#### **Animals:**

Plains Topminnow  
Ferruginous hawk  
Bald eagle  
Burrowing owl  
Greater prairie chicken  
Short-eared owl  
Long-billed curlew  
Bell's vireo

#### **Aquatic Communities:**

Headwater, Cold Water Stream\*  
Headwater, Warm Water Stream\*  
Mid-order, Warm Water River

#### **Terrestrial Communities:**

Spring Seep  
Wet-mesic Tallgrass Prairie  
Sandsage Prairie\*  
Sandhills Dune Prairie  
Loess Mixedgrass Prairie\*  
Western Mixedgrass Prairie\*  
Rock outcrop\*

## Landscape Name: Upper Niobrara River

### Landscape Description

This landscape occupies the Niobrara River channel, and a two-mile wide buffer on each side of the river, from eastern Cherry County westward to the Nebraska/Wyoming border. In the far west the Niobrara River is a narrow, coldwater stream with an open, gently sloping valley with few trees. Rocky outcrops are also common along the valley bluffs and mixedgrass prairie occurs on most of the bluffs. Eastward as the river gains flows the valley becomes entrenched. Where the river enters the Sandhills in western Cherry County the valley is several hundred feet deep and ponderosa pine woodlands occupy portions of the bluff and cottonwood dominated-woodlands occupy portions of the floodplain. Portions of the valley bottom are in cropland.

The only dam on this reach of the Niobrara River is the one that forms Box Butte Reservoir in Dawes County, otherwise flows on the river are fairly natural. The upper Niobrara River supports a unique assemblage of cold-water fish including the pearl dace and the state-listed blacknose shiner and finescale dace. Wet meadows in the Niobrara River valley in western Sioux County support the state's only known population of Ute lady's-tresses orchid. Protected areas on the upper Niobrara include Agate Fossil Beds National Monument, The Nature Conservancy's Cherry Ranch and Prairie Plains Resource Institute's Guadalcanal Memorial Prairie.

### Stresses Affecting Species and Habitats

- ❖ Reduced river flows due to irrigation development. This threat is most prevalent in the western reaches of the river.
- ❖ Housing and ranchette development.
- ❖ Conversion of valley bottom meadows to cropland.
- ❖ Livestock grazing practices that reduce native plant diversity and promote uniform habitat structure in both uplands and riparian areas.

### Conservation Strategies

- ❖ Maintain the natural hydrology of the Niobrara River that is necessary to sustain biological diversity and ecosystem function.
- ❖ Utilize local rancher expertise when implementing management actions on protected sites
- ❖ Use conservation easements to protect key lands threatened by development.
- ❖ Work with private landowners to implement ecological sensitive grazing systems.
- ❖ In meadows containing the Ute lady's-tresses orchid, implement haying and grazing regimes that benefit the orchid.
- ❖ Restrict stocking of exotic fish when they threaten at-risk fish species.

### Tier 1 At-risk Species:

#### Plants:

Ute lady's-tresses orchid  
Blowout penstemon  
Wild buckwheat

**Animals:**

Regal fritillary  
Plains topminnow  
Pearl Dace  
Blacknose shiner  
Finescale dace  
Burrowing owl  
Ferruginous hawk  
Bell's vireo  
Long-billed curlew  
Brewer's sparrow  
Swift fox  
River otter

**Aquatic Communities:**

Headwater, Cold Water Stream\*  
Headwater, Warm Water Stream  
Mid-order Warm Water River\*

**Terrestrial Communities:**

Western Riparian Woodland  
Ponderosa Pine Woodland\*  
Sandbar Willow Shrubland\*  
Spring Seep\*  
Freshwater Marsh\*  
Northern Sedge Wet Meadow  
Northern Cordgrass Wet Prairie  
Western Streamside Wet Meadow\*  
Perennial Sandbar  
Sandhills Dune Prairie  
Shortgrass Prairie  
Western Mixedgrass Prairie  
Western Sandy Slope Prairie  
Sandbar/Mudflat  
Rock Outcrop\*

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**Landscape Name: Wildcat Hills**

**Landscape Description**

The Wildcat Hills is a rocky escarpment that rises several hundred feet on the south side of the North Platte River in Scotts Bluff, Banner, and Morrill counties. The escarpment is composed primarily of sandstone, siltstone and volcanic ash. The north bluff of the escarpment is steep and deep canyons cut into the bluff. The canyons support stands of mountain mahogany, eastern red cedar and Rocky Mountain juniper. The north-facing slopes of the escarpment support

ponderosa pine woodlands. Mixedgrass prairie, rock outcrops, and scattered patches of sandsage prairie occupy the remainder of the Wildcat Hills.

The Wildcat Hills are unique in that they are an intact mosaic of pine woodlands and mixedgrass prairie mosaic and support the largest stands of mountain mahogany shrubland in the state. The Wildcat Hills also support one of three Rocky Mountain bighorn sheep populations in the state. Protected lands within the Wildcat Hills include Wildcat Hills SRA and WMA, Buffalo Creek WMA, Cedar Canyon WMA, Platte River Basin Environ's Bead Mountain Ranch, and Scottsbluff National Monument.

### **Stresses Affecting Species and Habitats**

- ❖ Housing and ranchette development.
- ❖ Livestock grazing practices that reduce native plant diversity and promote uniform habitat structure in both uplands and riparian areas.
- ❖ Exotic plant invasion, primarily cheatgrass, smooth brome, Kentucky bluegrass and eastern red cedar.
- ❖ Lack of fire, leading to eastern red cedar encroachment in some areas.
- ❖ Lack of grazing and prescribed fire on some public lands.

### **Conservation Strategies**

- ❖ Use conservation easements to protect areas from development.
- ❖ Work with private landowners to implement planned grazing systems.
- ❖ Work with private landowners to implement prescribed fire to control exotic plants, and reduce eastern red cedar densities.
- ❖ Increase biodiversity management on public lands within the Wildcat Hills including increased use of prescribed fire and planned grazing.

### **Tier 1 At-risk Species:**

#### **Plants:**

Nuttall desert parsley

#### **Animals:**

Plains topminnow

Burrowing owl

Swift fox

Rocky Mountain bighorn sheep

#### **Aquatic communities:**

Headwater, Warm Water Stream

#### **Terrestrial Communities:**

Ponderosa Pine Woodland\*

Mixed Conifer Woodland\*

Green Ash-Elm Canyon Bottom Woodland\*

Juniper Woodland\*

Mountain Mohogany Shrubland\*

Buckbrush Shrubland  
Spring Seep  
Sandsage Prairie  
Western Mixedgrass Prairie\*  
Western Sandy Slope Prairie\*  
Dry Cliff\*  
Rock Outcrop\*