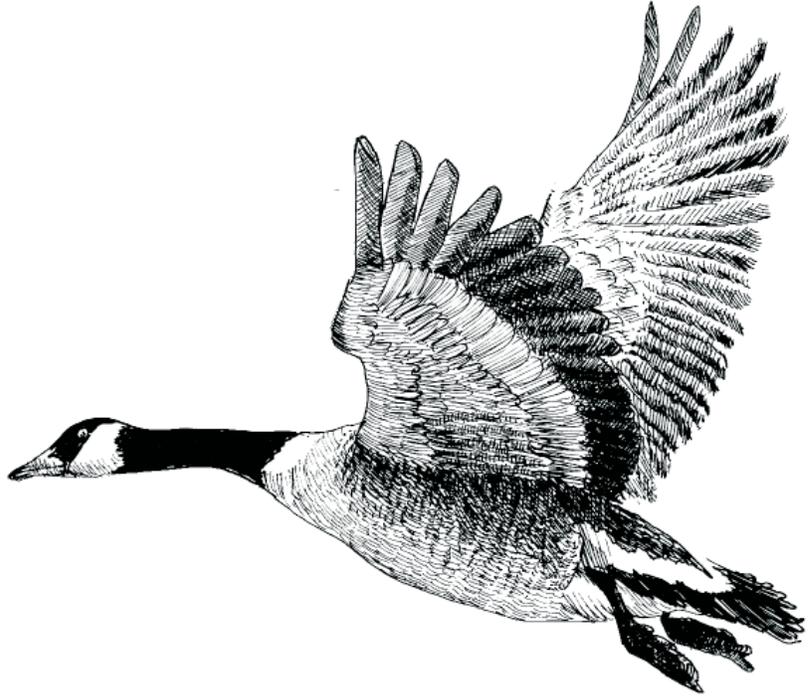


# Glossary of Terms





**Accessible:** Areas and activities allowing physical access to people of different abilities, especially those with physical impairments.

**Adaptive Management:** The rigorous application of management, research, and monitoring to gain information and experience necessary to assess and modify management activities. A process that uses feedback from research, monitoring, and evaluation of management actions to support or modify objectives and strategies at all planning levels. A process in which policy decisions are implemented within a framework of scientifically driven experiments to test predictions and assumptions inherent in management plan. Analysis of results help managers determine whether current management should continue as is or whether it should be modified to achieve desired conditions.

**Alternative:** 1) A reasonable way to solve an identified problem or satisfy the stated need (40 CFR 1500.2). 2) Alternatives are different means of accomplishing refuge purposes and goals and contributing to the System mission (Draft Service Manual 602 FW 1.5).

**Amphibian:** A class of cold-blooded vertebrates including frogs, toads or salamanders.

**Baseline:** A set of critical observations, data, or information used for comparison or a control.

**Biological Control:** The use of organisms or viruses to control invasive plants or other pests.

**Biological Diversity:** The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur (Service Manual 052 FW 1.12B). The National Wildlife Refuge System's focus is on indigenous species, biotic communities, and ecological processes. Also referred to as Biodiversity.

**Biomass:** The total amount of living material, plants and/or animals, above and below the ground in a particular habitat or area.

**Biotic:** Pertaining to life or living organisms; caused, produced by, or comprising living organisms.

**Canopy:** A layer of foliage, generally the uppermost layer, in a vegetative stand. Can be used to refer to mid-level or understory vegetation in multi-layered stands. Canopy closure is an

estimate of the amount of overhead vegetative cover (also canopy cover).

**C score:** Coefficient of conservatism that ranges from 0 to 10 and represents an estimated probability that a plant is likely to occur in a landscape unaltered from what is believed to be a pre-settlement condition.

**CCP:** see comprehensive conservation plan.

**Colony:** The nests or breeding place of a group of birds (such as herons or gulls) occupying a limited area.

**Compatible Use:** A wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the director of the U.S. Fish and Wildlife Service, will not materially interfere with or detract from the fulfillment of the Mission of the System or the purposes of the refuge (Draft Service Manual 603 FW 3.6). A compatibility determination supports the selection of compatible uses and identified stipulations or limits necessary to ensure compatibility.

**Comprehensive Conservation Plan (CCP):** A document that describes the desired future conditions of the refuge; and provides long-range guidance and management direction for the refuge manager to accomplish the purposes of the refuge, contribute to the mission of the System, and to meet other relevant mandates (Draft Service Manual 602 FW 1.5).

**Concern:** See definition of "Issue."

**Conspecific:** Individuals or pair of the same species.

**Cover:** present vegetation of an area (also cover type or canopy cover).

**Cool-season grasses:** grasses that begin growth earlier in the season and often become dormant in the summer. These grasses will germinate at lower temperatures. Examples of cool-season grasses at the refuge are western wheatgrass, needle and thread, and green needlegrass.

**Cultural Resources:** The remains of sites, structures, or objects used by people in the past.

**Cultural Resource Inventory:** A professionally conducted study designed to locate and evaluate evidence of cultural resources present within a defined geographic area. Inventories may involve various levels, including background literature

search, comprehensive field examination to identify all exposed physical manifestations of cultural resources, or sample inventory to project site distribution and density over a larger area. Evaluation of identified cultural resources to determine eligibility for the National Register follows the criteria found in 36 CFR 60.4 (Service Manual 614 FW 1.7).

**Cultural Resource Overview:** A comprehensive document prepared for a field office that discusses, among other things, its prehistory and cultural history, the nature and extent of known cultural resources, previous research, management objectives, resource management conflicts or issues, and a general statement on how program objectives should be met and conflicts resolved. An overview should reference or incorporate information from a field office background or literature search described in Section VIII of the Cultural Resource Management Handbook (Service Manual 614 FW 1.7).

**Dense Nesting Cover (DNC):** A composition of grasses and forbs that allow for a dense stand of vegetation which protects nesting birds from the view of predators. Usually consists of one to two species of wheatgrass, alfalfa, and sweet clover.

**Depredation:** Damage inflicted upon agricultural crops or ornamental plants by wildlife.

**Developed Wetland:** A wetland that can have water levels in it manipulated through various dikes, dams, diversions, and water control structures.

**DNC:** see dense nesting cover.

**Drawdown:** The act of manipulating water levels in an impoundment to allow for the natural drying out cycle of a wetland.

**Ecological Diversity:** The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur (Service Manual 052 FW 1.12B).

**Ecosystem:** A dynamic and interrelating complex of plant and animal communities and their associated non-living environment. A biological community, together with its environment, functioning as a unit. For administrative purposes, the Service has designated 53 ecosystems covering the United States and its possessions. These ecosystems generally correspond with watershed boundaries and their sizes and ecological complexity vary.

**Emergent:** A plant rooted in shallow water and having most of the vegetative growth above water. Examples are cattail and hardstem bulrush.

**Endangered Species (Federal):** A plant or animal species listed under the Endangered Species Act of 1973 (as amended) that is in danger of extinction throughout all or a significant portion of its range.

**Endangered Species (State):** A plant or animal species in danger of becoming extinct or extirpated in a particular State within the near future if factors contributing to its decline continue. Populations of these species are at critically low levels or their habitats have been degraded or depleted to a significant degree.

**Environmental Assessment (EA):** A concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and need for an action, alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an Environmental Impact Statement or Finding of No Significant Impact (40 CFR 1508.9).

**Extinction:** The complete disappearance of a species from the earth; no longer existing (Koford et al. 1994).

**Extirpate:** The extinction of a population; complete eradication of a species within a specified area.

**Fauna:** All the vertebrate and invertebrate animals of an area.

**Federal Trust Resource:** A trust is something managed by one entity for another who holds the ownership. The Service holds in trust many natural resources for the people of the United States of America as a result of Federal Acts and treaties. Examples are species listed under the Endangered Species Act, migratory birds protected by international treaties, and native plant or wildlife species found on a national wildlife refuge.

**Federal Trust Species:** All species where the Federal Government has primary jurisdiction including federally endangered or threatened species, migratory birds, anadromous fish, and certain marine mammals.

**Flora:** All the plant species of an area.

**Forb:** A broad-leaved, herbaceous plant; a seed-producing annual, biennial or perennial plant that does not develop persistent woody tissue but dies down at the end of the growing season.

**Friends Group:** Is defined as any formal organization whose mission is to support the goals and purposes of its associated refuge and the National Wildlife Refuge Association (NWRA) overall. This includes friends organizations and cooperative and interpretive associations.

**Fragmentation:** The alteration of a large block of habitat which creates isolated patches of the

original habitat that are interspersed with a variety of other habitat types (Koford et al. 1994); the process of reducing the size and connectivity of habitat patches, making movement of individuals or genetic information between parcels difficult or impossible.

**Geographic Information System (GIS):** A computer system capable of storing and manipulating spatial data; a set of computer hardware and software for analyzing and displaying spatially referenced features (i.e., points, lines and polygons) with non-geographic attributes such as species and age (Koford et al. 1994).

**Global Positioning System (GPS):** A system which by using satellite telemetry can pinpoint exact locations of places on the ground.

**Goal:** Descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not define measurable units (Draft Service Manual 620 FW 1.5).

**Grassland Block:** A contiguous area of grassland without fragmentation.

**Habitat:** Suite of existing environmental conditions required by an organism for survival and reproductions. The place where an organism typically lives and grows.

**Habitat Disturbance:** Significant alteration of habitat structure or composition. May be natural (e.g., fire) or human-caused events (e.g., timber harvest, discing).

**Habitat Type (vegetation type, cover type):** A land classification system based on the concept of distinct plant associations.

**Impoundment:** A body of water created by collection and confinement within a series of levees or dikes thus creating separate management units although not always independent of one another.

**Integrated Pest Management (IPM):** Methods of managing undesirable species (such as invasive plants) including: education, prevention, physical or mechanical methods of control, biological control, responsible chemical use, and cultural methods.

**Interseeding:** Seeding into an existing stand of vegetation with a drill or broadcast. Increasing species diversity is one of the primary goals of interseeding

**Introduced species:** A species present in an area due to intentional or unintentional escape, release, dissemination, or placement into an ecosystem as a result of human activity.

**Inviolate sanctuary:** A place of refuge or protection where animals and birds may not be hunted.

**Invasive plant:** a species that is non-native to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health.

**IPM:** see integrated pest management

**Issue:** Any unsettled matter that requires a management decision; e.g., a Service initiative, opportunity, resource management problem, a threat to the resources of the unit, conflict in uses, public concern, or the presence of an undesirable resource condition (Draft Service Manual 602 FW 1.5).

**Maintenance Management System (MMS):** A national database which contains the unfunded maintenance needs of each refuge. Projects included are those required to maintain existing equipment and buildings, correct safety deficiencies for the implementation of approved plans, and meet goals, objectives, and legal mandates.

**Management Alternative:** See alternative.

**Migration:** Regular extensive, seasonal movements of birds between their breeding regions and their “wintering” regions (Koford et al. 1994); to pass usually periodically from one region or climate to another for feeding or breeding.

**Migratory birds:** Birds which follow a seasonal movement from their breeding grounds to their “wintering” grounds. Waterfowl, shorebirds, raptors, and song birds are all migratory birds.

**Mission:** Succinct statement of purpose and/or reason for being.

**Mitigation:** Measures designed to counteract environmental impacts or to make impacts less severe.

**Mixed-grass prairie:** A transition zone between the tall-grass prairie and the short-grass prairie dominated by grasses of medium height that are approximately 2–4 feet tall. Soils are not as rich as the tall-grass prairie and moisture levels are less.

**MMS:** see maintenance management system.

**Monitoring:** The process of collecting information to track changes of selected parameters over time.

**National Wildlife Refuge (National Wildlife Refuge):** “A designated area of land, water, or an interest in land or water within the National Wildlife Refuge System, but does not include Coordination Areas.” Find a complete listing of all units of the System in the current Annual Report of Lands Under Control of the U.S. Fish and Wildlife Service.

**National Wildlife Refuge System:** Various categories of areas administered by the Secretary of the Interior for the conservation of fish and

wildlife, including species threatened with extinction, all lands, waters, and interests therein administered by the Secretary as wildlife refuges, areas for the protection and conservation of fish and wildlife that are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, or waterfowl production areas.

**National Wildlife Refuge System Improvement Act of 1997:** Sets the mission and the administrative policy for all refuges in the National Wildlife Refuge System. Clearly defines a unifying mission for the refuge System; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation); establishes a formal process for determining appropriateness and compatibility; establish the responsibilities of the Secretary of the Interior for managing and protecting the System; and requires a Comprehensive Conservation Plan for each refuge by the year 2012. This Act amended portions of the refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

**Native Species:** A species that other than as a result of an introduction historically occurred or currently occurs in that ecosystem.

**Neotropical migrant:** A bird species that breeds north of the United States and Mexican border and winters primarily south of this border.

**Nest success:** The percentage of nests that hatch (one or more eggs hatch) successfully of the total number of nests initiated in an area.

**Non-governmental organization:** Any group that is not composed of federal, state, tribal, county, city, town, local or other governmental entities.

**Noxious weed:** any living stage (including seeds and reproductive parts) of a parasitic or other plant of a kind that is of foreign origin (new to or not widely prevalent in the U.S.) and can directly or indirectly injure crops, other useful plants, livestock, poultry, other interests of agriculture, including irrigation, navigation, fish and wildlife resources, or public health. According to the Federal Noxious Weed Act (PL 93-639), a noxious weed (i.e., invasive plant) is one that causes disease or has adverse effects on humans or the human environment and, therefore, is detrimental to the agriculture and commerce of the U.S. and to public health. (also see invasive plant)

**Objective:** An objective is a concise target statement of what will be achieved, how much will be achieved, when and where it will be achieved, and who is responsible for the work. Objectives are derived from goals and provide the basis for determining management strategies. Objectives should be attainable and time-specific and should

be stated quantitatively to the extent possible. If objectives cannot be stated quantitatively, they may be stated qualitatively (Draft Service Manual 602 FW 1.5).

**Over-water species:** nesting species such as diving ducks and many colonial-nesting birds that build nests within dense stands of water-dependent plants (primarily cattail), or that build floating nests of vegetation that rest on the water.

**Partners in Flight (PIF):** A Western Hemisphere program designed to conserve Neotropical migratory birds and officially endorsed by numerous federal and state agencies and non-government organizations; also known as the Neotropical Migratory Bird Conservation Program (Koford et al. 1994).

**Pass Shooting:** Hunting waterfowl from a stationary location where waterfowl are expected to fly by.

**Patch:** An area distinct from that around it; an area distinguished from its surroundings by environmental conditions.

**Perennial:** Lasting or active through the year or through many years; a plant species that has a life span of more than 2 years.

**PIF:** see Partners in Flight.

**Plant Community:** An assemblage of plant species unique in its composition; occurs in particular locations under particular influences; a reflection or integration of the environmental influences on the site -- such as soil, temperature, elevation, solar radiation, slope, aspect, and rainfall; denotes a general kind of climax plant community, i.e., ponderosa pine or bunchgrass.

**Prescribed Fire:** The skillful application of fire to natural fuels under conditions of weather, fuel moisture, soil moisture, etc., that allow confinement of the fire to a predetermined area and produces the intensity of heat and rate of spread to accomplish planned benefits to one or more objectives of habitat management, wildlife management, or hazard reduction.

**Proposed Action:** The alternative proposed to best achieve the refuge purpose, vision, and goals; contributes to the refuge System mission, addresses the significant issues; and is consistent with principles of sound fish and wildlife management.

**Priority public use:** one of six uses authorized by the refuge Improvement Act of 1997 to have priority if found to be compatible with a refuge's purposes. This includes hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation.

**Public:** Individuals, organizations, and groups; officials of Federal, State, and local government agencies; Indian tribes; and foreign nations. It may include anyone outside the core planning team. It includes those who may or may not have indicated an interest in Service issues and those who do or do not realize that Service decisions may affect them.

**Public Involvement:** A process that offers affected and interested individuals and organizations an opportunity to become informed about, and to express their opinions on, Service actions and policies. In the process, these views are studied thoroughly and thoughtful consideration of public views is given in shaping decisions for refuge management.

**Purpose of the refuge:** The purpose of a refuge is specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorization, or expanding a refuge, refuge unit, or refuge subunit. (Draft Service Manual 602 FW 1.5).

**Raptor:** A carnivorous bird (such as a hawk, falcon, or vulture) that feeds wholly or chiefly on meat taken by hunting or on carrion (dead carcasses).

**Refuge Operations Needs System (RONS):** A national database which contains the unfunded operational needs of each refuge. Projects included are those required to implement approved plans, and meet goals, objectives, and legal mandates.

**Refuge Purpose:** see purpose of the refuge.

**Refuge Use:** Any activity on a refuge, except administrative or law enforcement activity carried out by or under the direction of an authorized Service employee.

**Resident species:** A species inhabiting a given locality throughout the year; non-migratory species.

**Rest:** Free from biological, mechanical, or chemical manipulation; referring to refuge lands.

**Restoration:** Management emphasis designed to move ecosystems to desired conditions and processes, and/or to healthy upland habitats and aquatic systems.

**Riparian area or zone:** Refers to an area or habitat that is transitional from terrestrial to aquatic ecosystems; including streams, lakes wet areas, and adjacent plant communities and their associated soils which have free water at or near the surface; an area whose components are directly or indirectly attributed to the influence of water; of or relating to a river; specifically applied to ecology, "riparian" describes the land immediately adjoining and directly influenced by streams. For example, riparian vegetation includes any and all

plant-life growing on the land adjoining a stream and directly influenced by the stream.

**RONS:** see refuge operations needs system

**Rough fish:** A fish that is neither a sport fish nor an important food fish.

**Scoping:** The process of obtaining information from the public for input into the planning process.

**Seasonally flooded:** Surface water is present for extended periods in the growing season, but is absent by the end of the season in most years.

**Sediment:** Material deposited by water, wind or glaciers.

**Service:** U.S. Fish and Wildlife Service.

**Shelterbelts:** Single to multiple rows of trees and shrubs planted around cropland or buildings to block or slow down the wind.

**Shorebird:** Any of a suborder (Charadrii) of birds (as a plover or a snipe) that frequent the seashore or mud flat areas.

**Spatial:** Relating to, occupying, or having the character of space.

**Special-status species:** Plants or animals which have been identified through either Federal law, State law, or agency policy, as requiring special protection of monitoring. Examples include federally listed endangered, threatened, proposed, or candidate species; state-listed endangered, threatened, candidate, or monitor species; U.S. Fish & Wildlife Service species of management concern and species identified by the Partners in Flight Program as being of extreme or moderately high conservation concern.

**Special-use permit:** A permit for special authorization from the refuge manager required for any refuge service, facility, privilege, or product of the soil provided at refuge expense and not usually available to the general public through authorizations in Title 50 CFR or other public regulations (Refuge Manual 5 RM 17.6).

**Species of concern:** Those plant and animal species, while not falling under the definition of special status species, that are of management interest by virtue of being Federal trust species such as migratory birds, important game species, or significant keystone species. Species which are (1) documented or apparent populations declines, (2) small or restricted populations, or (3) dependence on restricted or vulnerable habitats.

**Species richness:** The absolute number of species in an assemblage or community; the number of species in a given area (Koford et al. 1994).

**Step-down management plan:** a plan that provides the details necessary to implement management strategies identified in the comprehensive conservation plan (Draft Service Manual 602 FW 1.5).

**Strategy:** A specific action, tool or technique or combination of actions, tools and techniques used to meet unit objectives (Draft Service Manual 602 FW 1.5).

**Strategy:** A specific action, tool, or technique or combination of actions, tools, and techniques used to meet unit objectives (Draft Service Manual 602 FW 1.5).

**Submergent:** a vascular or non-vascular hydrophyte, either rooted or non-rooted, which lies entirely beneath the water surface, except for flowering parts in some species.

**Tame species:** see dense nesting cover

**Threatened Species (Federal):** Species listed under the Endangered Species Act of 1973, as amended, that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

**Threatened Species (State):** A plant or animal species likely to become endangered in a particular State within the near future if factors contributing to population decline or habitat degradation or loss continue.

**Travel Corridor:** A landscape feature that facilitates the biologically effective transport of animals between larger patches of habitat dedicated to conservation functions. Such corridors may facilitate several kinds of traffic, including frequent foraging movement, seasonal migration, or the once in a lifetime dispersal of juvenile animals. These are transition habitats and need not contain all the habitat elements required for long-term survival or reproduction of its migrants.

**Trust Species:** see Federal Trust Species.

**U.S. Fish and Wildlife Service (Service):** The principal Federal agency responsible for conserving, protecting, and enhancing fish and wildlife and their habitats for the continuing benefit of the American people. The Service manages the 93-million-acre National Wildlife Refuge System comprised of more than 530 national wildlife refuges and thousands of waterfowl production areas. It also operates 65 national fish hatcheries and 78 ecological service field stations, the agency enforces Federal wildlife laws, manages migratory bird populations, restores national significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species

Act, and helps foreign governments with their conservation efforts. It also oversees the Federal Aid program which distributes millions of dollars in the Federal Aid program which distributes the millions of dollars in excise taxes on fishing and hunting equipment to State wildlife agencies.

**U.S. Fish and Wildlife Service Mission:** The mission of the U.S. Fish & Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and plants and their habitats for the continuing benefit of the American people.

**U.S. Geological Survey (USGS):** A federal government agency whose mission is to provide reliable scientific information to describe and understand the earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

**USGS:** see U.S. Geological Survey.

**Vision Statement:** A concise statement of the desired future condition of the planning unit, based primarily upon the System mission, specific refuge purposes, and other relevant mandates (Draft Service Manual 602 FW 1.5).

**Visual obstruction:** A measurement of the density of a plant community; the height of vegetation that blocks the view of predators and conspecifics to a nest.

**Visual Obstruction Reading (VOR):** A method of visually quantifying vegetative structure and composition.

**VOR:** see visual obstruction reading

**Wading birds:** Birds that have long legs that enable them to wade in shallow water. Includes egrets, great blue herons, black crowned night herons, and bitterns.

**Warm-season grasses:** Grasses that begin growth later in the season (early June). These grasses require warmer soil temperatures to germinate and actively grow when temperatures are warmer. Examples of warm season grasses are Indiangrass, switchgrass, and big bluestem.

**Water Control Structure:** A metal and/or concrete structure placed in an earthen dam or dike which is used to control the flow of water. Two kinds are generally used. A slide or screw gate moves a metal plate in front of a pipe, restricting or stopping the flow of water into the pipe. A drop board structure uses metal or wooden boards that are dropped into grooves in front of the pipe. Water is blocked until it reaches the top of the board, at which time the water flows freely over the top.

**Waterfowl:** A category of birds that includes ducks, geese, and swans.

**Watershed:** The region draining into a river, river system, or body of water.

**Wetland Management District (WMD):** Land which the Service's Refuge System acquires (with Federal Duck Stamp funds), restores, and manages primarily as prairie wetland habitat critical to waterfowl and other wetland birds.

**Wetland Reserve Program:** A voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) provides technical and financial support to help landowners with their wetland-restoration efforts. The NRCS goals are to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program. This program offers landowners an opportunity to establish long-term conservation and wildlife practices and protection. ([www.nrcs.usda.gov/programs/wrp](http://www.nrcs.usda.gov/programs/wrp))

**Wildlife-dependent recreational use:** "A use of a refuge involving hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation." These are the six priority public uses of the System as established in the National Wildlife Refuge System Administration Act, as amended. Wildlife-dependent recreational uses, other than the six priority public uses, are those that depend on the presence of wildlife. The Service also will consider these other uses in the preparation of refuge CCPs; however, the six priority public uses always will take precedence.

**Wildland fire:** A free-burning fire requiring a suppression response; all fire other than prescribed fire that occurs on wildlands (Service Manual 621 FW 1.7).

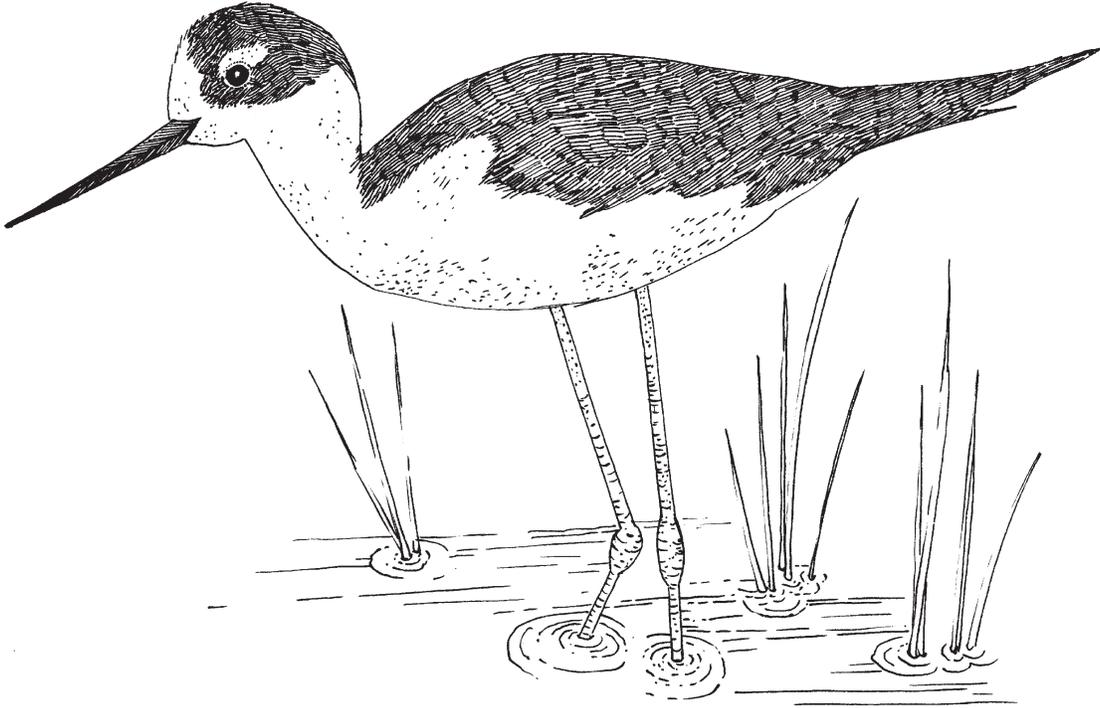
**Wildlife-dependent Recreation:** A use of a refuge involving hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation. The National Wildlife Refuge System Improvement Act of 1997 specifies that these are the six priority general public uses of the System.

**WMD:** see wetland management district.

**Woodland:** Open stands of trees with crowns not usually touching (generally forming 25- to 60-percent cover).



# Appendices





**Refuge Name:** Lacreek National Wildlife Refuge

**Establishing and Acquisition Authority:** Executive Order 7160, August 26, 1935; Migratory Bird Conservation Act 45 Stat 1222; Refuge Recreation Act 1962 76 Stat 653

**Refuge Purposes:**

*“...as a refuge and breeding grounds for migratory birds and other wildlife...”* Executive Order 7160, dated August 26, 1935

*“...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.”* USC 715d (Migratory Bird Conservation Act)

*“...the Secretary is authorized to cooperate with public and private agencies, organizations, and individuals, and he may accept and use, without further authorization, donations of funds and real and personal property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors when such covenants are deemed by the Secretary to be compatible with the purposes of the wildlife refuges...”* 16 USC 460k-2 (Refuge Recreation Act (16 USC 460k-460-k), as amended)

**National Wildlife Refuge System Mission:**

*“The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”*

**1. Description of Proposed Use: Farming, Grazing, and Haying**

Continue upland management activities such as farming, grazing, and haying that are conducted under cooperative farming or special-use permit by private individuals. Currently these economic uses are used as tools to manage habitat for wildlife.

Currently approximately 100 acres of uplands are farmed per year. Farming conducted for the sole purpose of grassland restoration. Cattle grazing is used as a grassland and wetland management tool. Grazed acreages have varied from 1,200 to 4,000 acres annually over the past five years. Haying is sporadically used as a grassland management tool. It is utilized to control noxious weeds, prepare areas for upland restoration, and to prepare areas for prescribed burns.

The CCP proposes to increase grassland restoration activities on the refuge. Farming would subsequently be used on 100 to 500 acres per year until grassland restoration activities on the refuge are completed. Cooperative farming activities are compatible only on areas that are not native prairie. Farming allows the refuge to establish seedbeds relatively free of noxious plants maximizing the likelihood that grassland restoration will be successful. Crops that may be used during farming include, but are not limited to, corn, soybeans, grain millet, hay millet, winter wheat, and spring wheat.

The CCP proposes to utilize grazing as a management tool for wetland and upland habitats. Specific acreages have not been identified in the CCP because habitat conditions within wetland and upland areas can change rather dramatically on a yearly basis due to precipitation and temperatures. An adaptive approach will be used when prescribing grazing treatments to refuge habitats.

**Availability of Resources:** The needed resources necessary to administer haying, grazing, and farming programs is sufficient at current staffing and budgetary levels. Changes proposed in the CCP should not increase the amount of staff time or financial resources necessary to administer these programs. Haying, grazing, and farming programs are generally conducted through special-use permits or cooperative farming agreements minimizing staff time and refuge assets to complete work.

**Anticipated Impacts of the Use:** Over a 5-year period, grazing has been conducted on 1,500 to 4,000 acres annually. While annual acreages have not been specified in the CCP, it is expected that future refuge grazing will fall into this range. Farming acres will likely increase from the current level of 100 acres annually up to 500 acres annually. Haying is only used sporadically at the refuge and this use is not anticipated to change.

Without management, wetland and upland habitat conditions would deteriorate due to long periods of rest. Cool season invasive species would likely increase and infest additional areas without the use of spring grazing. While all these activities disturb habitat and wildlife in the short term, long-term habitat and wildlife benefits outweigh these disturbances. Farming causes decreases in wildlife habitat availability; however, habitat conditions will improve following grassland restoration activities.

No cultural resources would be impacted. No impact to endangered species should occur.

**Determination:** The use of haying, grazing, and farming as habitat management tools is compatible.

**Stipulations Necessary to Ensure Compatibility:**

- Monitor vegetation and wildlife to assess the effects of the management tools
- Require general and special conditions for each permit to ensure consistency with management objectives
- Restrict farming permittees to a list of approved chemicals that are less detrimental to wildlife and the environment
- Restrict haying to after August 1 to avoid disturbance to nesting birds unless the refuge manager deems it necessary to hay earlier to control invasive plants or restore grasslands

**Justification:** To maintain and enhance the habitat for migratory birds and other wildlife, some habitat manipulation needs to occur. Upland and wetland habitat conditions would deteriorate without the use of a full range of management tools. Migratory bird habitat and ecological diversity would decrease as habitat suitability declines. Exotic and invasive plant species would increase and habitat diversity would decrease if grazing practices did not continue on the refuge. Farming provides a means to restore degraded grasslands for the benefit of grassland dependent species.

**Mandatory 15-year Re-evaluation Date:** 2020

## 2. Description of Proposed Use: Environmental Education and Interpretation

Provide opportunities for environmental education and interpretation. Environmental education consists of activities conducted by refuge staff, volunteers, and teachers. Interpretation occurs in less formal activities with refuge staff volunteers or through exhibits, educational trunks, signs, and brochures. Currently, environmental education and interpretation activities are conducted at the refuge office and on the refuge. Refuge staff provide tours and interpretation for these groups.

The lack of an Outdoor Recreation Planner coupled with the fact that the area is sparsely populated contributes to a rather small environmental education and interpretation program at the refuge. While the amount of environmental education and interpretation activities is limited, excellent opportunities are available at the refuge. Although additional positions devoted to outreach have not been identified in the CCP,

the CCP proposes to continue with current uses as well as improve environmental education and interpretation for all visitors through:

- Redesign and expand the auto tour route
- Add an interpretive kiosk along Highway 73
- Create a sandhills and wetland hiking trail
- Update the existing bird walk trail
- Improve the Pelican Islands Trail and construct an accessible platform
- Update and improve refuge signs
- Update existing brochures to the Service graphic standards

**Availability of Resources:** Implementing new facilities outlined in the CCP is closely tied to funding requests in the form of refuge operation needs system (RONS) and maintenance management system (MMS) projects. Existing programs such as current refuge signs and brochures can be updated with available resources.

**Anticipated Impacts of Use:** Minimal disturbances to wildlife and wildlife habitat would result from these uses at the current and proposed levels. Adverse impacts are minimized through careful timing and placement of activities. Some disturbance to wildlife would occur in areas frequented by visitors. There would be some minor damage to vegetation, littering, and increased maintenance. Location and time limitations placed on environmental education and interpretation activities would ensure that this activity would have only minor impacts on wildlife and would not detract from the primary purposes of the refuge.

No cultural resources would be impacted. No impact to endangered species should occur.

**Determination:** Environmental education and interpretation are compatible.

**Stipulations Necessary to Ensure Compatibility:**

- Allow environmental education and interpretation only in designated areas or under the guidance of refuge staff, a volunteer or a trained teacher to ensure minimal disturbance to wildlife, minimal damage to vegetation, and minimal conflicts between groups
- Annually review environmental education and interpretation activities to ensure these activities are compatible

**Justification:** Based on biological impacts described in the environmental assessment

(EA) and the draft CCP, it is determined that environmental education and interpretation within the Lacreek National Wildlife Refuge would not materially interfere with or detract from the purposes for which this refuge was established.

Environmental education and interpretation are priority public uses listed in the National Wildlife Refuge System Improvement Act of 1997. By facilitating environmental education, refuge visitors would gain knowledge and an appreciation of fish, wildlife, and their habitats, which would lead to increased public awareness and stewardship of natural resources. Increased appreciation for natural resources would support and complement the Service's actions in achieving the purposes of the refuge and the mission of the Refuge System.

**Mandatory 15-year Re-evaluation Date:** 2020

### 3. Description of Proposed Use: Wildlife Observation and Wildlife Photography

Provide Opportunities that Support Wildlife-dependent Recreation: Wildlife observation and wildlife photography are facilitated by an auto tour route, one hiking trail and two wildlife observation pullouts.

The CCP proposes to continue the above uses and add the following to improve wildlife observation and wildlife photography:

- Update and improve refuge signs
- Redesign and expand the auto-tour route
- Add an interpretive kiosk along Highway 73
- Create a sandhills and wetland hiking trail
- Update the existing birdwalk trail
- Improve the Pelican Islands Trail and construct an accessible platform
- Update and improve refuge signs
- Update existing brochures to the Service graphic standards

**Availability of Resources:** Implementing new facilities outlined in the CCP is closely tied to funding requests in the form of refuge operation needs system (RONS) and maintenance management system (MMS) projects. Existing programs such as current refuge signs and brochures can be updated with available resources.

**Determination:** Wildlife observation and wildlife photography are compatible.

### Stipulations Necessary to Ensure Compatibility:

- Restrict vehicles to designated roads and trails
- Monitor use, regulate access, and maintain necessary facilities to prevent habitat degradation and minimize wildlife disturbance

**Justification:** Based on the anticipated biological impacts above and in the EA, it is determined that wildlife observation and wildlife photography on the Lacreek National Wildlife Refuge would not interfere with the habitat goals and objectives or purposes for which it was established.

Wildlife observation and wildlife photography are priority public uses listed in the Improvement Act. By facilitating these uses, visitors would gain knowledge and an appreciation of fish and wildlife, which would lead to increased public stewardship of wildlife and their habitats. Increased public stewardship would support and complement the Service's actions in achieving the purposes of the refuge and the mission of the Refuge System.

**Mandatory 15-year Re-evaluation Date:** 2020

### 4. Description of Use: Recreational Fishing

Continue to Provide for Recreational Fishing at Designated Fishing Areas in Accordance with State Regulations.

The primary game fish are rainbow trout, northern pike, and catfish. The designated fishing areas include the trout ponds, refuge impoundments 3, 4, 7, and 10, and the LWRRA reservoir. Boating is allowed on all areas; however, no wake zones are required within 500 feet of shore on the trout ponds and in refuge Pools 3, 4, 7, and 10.

Fishing visitation and success on the refuge pools vary according to management activities. Recent dewatering of refuge pools has virtually eliminated the game fishery in Pools 3, 4, 7, and 10. The trout ponds are maintained as a put and take fishery and are stocked twice annually by the South Dakota Game Fish and Parks.

**Availability of Resources:** The current fishing program is administered using available resources. The CCP does not call for the implementation of any new fishing programs.

**Anticipated Impacts of Use:** Fishing and other human activities cause disturbance to wildlife. Fishing near water control structures and bridges may displace migratory birds such as American white pelicans and double crested cormorants that gather in these locations to feed on fish. Disturbance on Pools 3, 4, 7, and 10 will be minimal since the game fishery has been virtually eliminated on these pools during recent drawdowns. Restricting fishing to designated

fishing areas would minimize the disturbance to migratory birds and other wildlife and would not affect other programs.

**Determination:** Recreational fishing is compatible.

**Stipulations Necessary to Ensure Compatibility:**

- Require that fishing follow state and federal regulations
- Confine fishing to designated fishing areas
- Phase out the use of lead sinkers and lures over a 5-year period
- Monitor existing use to ensure that facilities are adequate and disturbance to wildlife continues to be minimal
- Designate a “no wake zone” that includes all waters within 500 feet of the shoreline or emergent marsh areas.

**Justification:** Based on the biological impacts addressed above and in the EA, it is determined recreational fishing would not materially interfere with the habitat goals and objectives or purposes for refuge establishment.

Fishing is a priority public use as listed in the National Wildlife Refuge System Improvement Act of 1997.

**Mandatory 15-year Re-evaluation Date:** 2020

## 5. Description of Use: Recreational Hunting

Allow recreational hunting of deer, ring-necked pheasant, sharp-tailed grouse, mourning dove, cottontail rabbit, wild turkey, and Hungarian partridge on designated portions of the refuge. Continue hunting of all species according to state regulations on the LWRRA.

Hunting on the refuge currently includes seasons for ring-necked pheasants, sharp-tailed grouse, archery deer, and a limited quota muzzleloader deer season. Additional species and seasons have been proposed in the CCP as well for mourning dove, cottontail rabbit, wild turkey, and Hungarian partridge on areas currently open to hunting. Hunting on the LWRRA for migratory birds, upland game birds, big game, predators, and furbearers is permitted according to State of South Dakota regulations.

**Availability of Resources:** Currently, sufficient resources are available to implement the proposed recreational hunting program.

**Anticipated Impacts of Use:** Some wildlife disturbance will occur during recreational hunting

activities at the refuge. All of the refuge outside of the LWRRA is closed to migratory bird hunting. This will ensure that adequate area remains undisturbed for the benefit of migratory birds. Approximately 50 percent of the refuge, excluding the LWRRA, is closed to all hunting. This will ensure adequate resting areas for resident and migratory species.

Other public use activities at the LWRRA such as boating, swimming, and recreational fishing will be minimally impacted by recreational hunting. Recreational use of the LWRRA is relatively low and other activities generally do not occur during the hunting season. While recreational hunting will disturb wildlife at the LWRRA, this area was acquired as a donation under the authority of the Refuge Recreation Act of 1962. The LWRRA was accepted by the Service to mitigate for the loss of public recreational opportunities that resulted with the establishment of Lacreek NWR. Public hunting is one of the restrictive covenants imposed for the LWRRA by the donors.

Restricting vehicle use to designated purposes, times, and established roads, trails, and parking lots protects habitats from damage and minimizes disturbance to wildlife. Closed areas around residences and the headquarters area provide safety zones and reduce conflicts between hunters and visitors.

**Determination:** Recreational hunting is compatible.

**Stipulations Necessary to Ensure Compatibility:**

- Require the use of nontoxic shot, in accordance with current regulations for migratory bird and upland game hunting
- Limit use of motorized vehicles to designated parking areas, access trails, and public roads.
- Prohibit all-terrain vehicles (ATVs)
- Prohibit camping, overnight use, and fires outside the LWRRA
- Require that hunting be in accordance with federal and state regulations
- Promote sound hunting practices for hunter safety and quality experiences

**Justification:** Hunting on national wildlife refuges has been identified as a priority public use in the National Wildlife Refuge System Improvement Act of 1997. Hunting is a legitimate wildlife management tool that can be used to manage populations. Hunting harvests a small percentage of the renewable resources, which is in accordance with wildlife objectives and principles.

Based on the biological impacts anticipated above and in the EA, it is determined that recreational hunting at Lacreek National Wildlife Refuge would not materially interfere with or detract from the purposes for which this refuge was established or its habitat goals and objectives.

**Mandatory 15-year Re-evaluation Date:** 2020

## **6. Description of Proposed Public Use: Boating, Swimming, Picnicking, and Camping at the Little White River Recreation Area**

Continue recreational activities including boating, swimming, picnicking, and camping at the LWRRA in accordance with state and refuge regulations.

Boating, swimming, picnicking, and camping at the refuge are only allowed at the LWRRA at the north side of the refuge. This area was donated to the refuge and was formally accepted in 1981 under the authority of the Refuge Recreation Act of 1962.

**Availability of Resources:** The CCP is not proposing any changes recreational activities allowed at the LWRRA. Facilities and programs are adequately maintained at current staffing levels.

**Anticipated Impacts of the Use:** Recreational activities proposed in the CCP for the LWRRA will have detrimental effects on wildlife and wildlife habitat. Increased public use activities may create disturbance to nesting waterfowl. Recreational hunting and fishing also occur at the LWRRA; however there should be minimal conflicts between the uses.

**Determination:** Boating, swimming, picnicking, and camping at the LWRRA are compatible.

### **Stipulations Necessary to Ensure Compatibility:**

- Activities are conducted in accordance with state and refuge regulations
- Limit the use of camping to designated campsites
- Install informational signs.

**Justification:** The LWRRA was officially accepted as a donation in 1982 under the authority of the 1962 Refuge Recreation Act. The Refuge Recreation Act of 1962 authorized the Secretary to acquire lands for recreational development and authorizes the development, operation and maintenance of the lands for recreational purposes. The Refuge Recreation Act of 1962 permitted donations to be accepted by the Secretary with restrictive covenants imposed by donors when such covenants are deemed by the Secretary to be

compatible with the purposes of the wildlife refuge. A number of specific encumbrances are listed in multiple documents pertaining to the LWRRA. These include swimming, fishing, hunting, and picnicking. It is clear that this area was intended to provide public recreation to offset the loss of opportunities that resulted with the establishment of Lacreek NWR. There is documentation to this effect as far back as 1939, when the first attempt to donate the LWRRA was made.



# Appendix B

## *Key Legislation and Policies*

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**Americans With Disabilities Act (1992):** Prohibits discrimination in public accommodations and services.

**Architectural Barriers Act (1968):** Requires federally owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.

**Clean Water Act (1977):** Requires consultation with the U.S. Army Corps of Engineers for major wetland modifications.

**Criminal Code of Provisions of 1940 as amended, (18 U.S.C. 41):** States the intent of Congress to protect all wildlife within federal sanctuaries, refuges, fish hatcheries, and breeding grounds. Provides that anyone (except in compliance with rules and regulations promulgated by authority of law) who hunts, traps, or willfully disturbs any such wildlife, or willfully injures, molest, or destroys any property of the United States on such land or water, shall be fined up to \$500 or imprisoned for not more than 6 months or both.

**Emergency Wetland Resources Act of 1986:** Authorizes the purchase of wetlands from Land and Water Conservation Fund moneys, removing a prior prohibition on such acquisitions. The Act also requires the Secretary to establish a National Wetlands Priority Conservation Plan, requires the states to include wetlands in their Comprehensive Outdoor Recreation Plans, and transfers to the Migratory Bird Conservation Fund amount equal to import duties on arms and ammunition.

**Endangered Species Act of 1973 and recent amendments (16 U.S.C. 1531-1543; 87 Stat. 884) as amended (Establishing legislation.):** Provides for conservation of threatened and endangered species of fish, wildlife, and plants by federal action and by encouraging state programs. Specific provisions include:

- The listing and determination of critical habitat for endangered and threatened species and consultation with the Service on any federally funded or licensed project that could affect any of these agencies;
- Prohibition of unauthorized taking, possession, sale, transport, etc., of endangered species;
- An expanded program of habitat acquisition;
- Establishment of cooperative agreements and grants-in aid to states that establish and

maintain an active, adequate program for endangered and threatened species; and

- Assessment of civil and criminal penalties for violating the Act or regulations.

**Environmental Education Act of 1990 (20 U.S.C. 5501 5510; 104 Stat. 3325):** Public Law 101 619, signed November 16, 1990, established the Office of Environmental Education within the Environmental Protection Agency to develop and administer a federal environmental education program.

Responsibilities of the Office include developing and supporting programs to improve understanding of the natural and developed environment, and the relationships between humans and their environment; supporting the dissemination of educational materials; developing and supporting training programs and environmental education seminars; managing a federal grant program; and administering an environmental internship and fellowship program. The Office is required to develop and support environmental programs in consultation with other federal natural resource management agencies, including the Fish and Wildlife Service.

**Executive Order 11988, Floodplain Management:** This Executive Order, signed May 24, 1977, prevents federal agencies from contributing to the “adverse impacts associated with occupancy and modification of floodplains” and the “direct or indirect support of floodplain development.” In the course of fulfilling their respective authorities, federal agencies shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.

**Executive Order 12996 Management and General Public Use of the National Wildlife Refuge System (1996):** Defines the mission, purpose, and priority public uses of the National Wildlife Refuge System. It also presents four principles to guide management of the system.

**Executive Order 13007 Indian Sacred Sites (1996):** Directs federal land management agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites, and where appropriate, maintain the confidentiality of sacred sites.

**Federal Noxious Weed Act (1990):** Requires the use of integrated management systems to control or contain undesirable plant species; and an interdisciplinary approach with the cooperation of other federal and state agencies.

**Fish and Wildlife Act of 1956 (70 Stat. 1119; 16 U.S.C. 742a-742J), as amended:** Establishes a comprehensive fish and wildlife policy and directs the Secretary of the Interior to provide continuing research; extension and conservation of fish and wildlife resources.

**Fish and Wildlife Improvement Act of 1978:** Improves the administration of fish and wildlife programs and amends several earlier laws, including the Refuge Recreation Act, the National Wildlife Refuge Administration Act, and the Fish and Wildlife Act of 1956. It authorizes the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out volunteer programs.

**Land and Water Conservation Fund Act (LWCFA) of 1965:** Provides funds from leasing bonuses, production royalties and rental revenues for offshore oil, gas, and sulphur extraction to the Bureau of Land Management, the U.S. Forest Service and the U.S. Fish and Wildlife Service, and state and local agencies for purchase of lands for parks, open space, and outdoor recreation.

**Migratory Bird Conservation Act of 1929 (16 U.S.C. 715-715d, 715e, 715f-715r):** Establishes the Migratory Bird Conservation Commission, which consists of the Secretaries of the Interior (chairman), Agriculture, and Transportation, two members from the House of Representatives, and an ex-officio member from the state in which a project is located. The Commission approves acquisition of land and water, or interests therein, and sets the priorities for acquisition of lands by the Secretary for sanctuaries or for other management purposes. Under this Act, to acquire lands, or interests therein, the state concerned must consent to such acquisition by legislation. Such legislation has been enacted by most states.

**Migratory Bird Conservation Act of 1929 (16 U.S.C. 715-s, 45 Stat. 1222), as amended:** Authorizes acquisition, development, and maintenance of migratory bird refuges; cooperation with other agencies, in conservation; and investigations and publications on North American birds. Authorizes payment of 25 percent of net receipts from administration of national wildlife refuges to the country or counties in which such refuges are located.

**Migratory Bird Hunting and Conservation Stamp Act of 1934 (16 U.S.C. 718-718h; 48 Stat. 51), as amended:** The “Duck Stamp Act,” as this March 16, 1934, authority is commonly called, requires each waterfowl hunter 16 years of age or older to possess a valid federal hunting stamp. Receipts from the sale of the stamp are deposited in a special Treasury account known as the Migratory Bird Conservation Fund and are not subject to appropriations.

**Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711; 50 CFR Subchapter B), as amended:** Implements treaties with Great Britain (for Canada) and Mexico for protection of migratory birds whose welfare is a federal responsibility. Provides for regulations to control taking, possession, selling, transporting, and importing of migratory birds and provides penalties for violations.

**National and Community Service Act of 1990 (42 U.S.C. 12401; 104 Stat. 3127):** Public Law 101 610, signed November 16, 1990, authorizes several programs to engage citizens of the U.S. in full and/or part time projects designed to combat illiteracy and poverty, provide job skills, enhance educational skills, and fulfill environmental needs. Several provisions are of particular interest to the U.S. Fish and Wildlife Service.

**American Conservation and Youth Service Corps:** As a federal grant program established under Subtitle C of the law, the Corps offers an opportunity for young adults between the ages of 16 25, or in the case of summer programs, 15 21, to engage in approved human and natural resources projects which benefit the public or are carried out on federal or Indian lands.

To be eligible for assistance, natural resources programs will focus on improvement of wildlife habitat and recreational areas, fish culture, fishery assistance, erosion, wetlands protection, pollution control and similar projects. A stipend of not more than 100 percent of the poverty level will be paid to participants. A Commission established to administer the Youth Service Corps will make grants to states, the Secretaries of Agriculture and Interior and the Director of ACTION to carry out these responsibilities.

**Thousand Points of Light:** Creates a non profit Points of Light Foundation to administer programs to encourage citizens and institutions to volunteer in order to solve critical social issues, and to discover new leaders and develop institutions committed to serving others.

**National Historic Preservation Act of 1966 (16 U.S.C. 470 470b, 470c 470n):** Public Law 89 665, approved October 15, 1966, (80 Stat. 915) and repeatedly amended, provides for preservation of significant historical features (buildings, objects and sites) through a grant in aid program to

the states. It establishes a National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation (16 U.S.C. 468 468d).

The Act establishes an Advisory Council on Historic Preservation, which was made a permanent independent agency in Public Law 94 422, approved September 28, 1976 (90 Stat. 1319). That Act also creates the Historic Preservation Fund. Federal agencies are directed to take into account the effects of their actions on items or sites listed or eligible for listing in the National Register.

As of January 1989, 91 historic sites on national wildlife refuges have been placed on the National Register. There are various laws for the preservation of historic sites and objects:

**Antiquities Act (16 U.S.C. 431 433):** The Act of June 8, 1906, (34 Stat. 225) authorizes the President to designate as National Monuments objects or areas of historic or scientific interest on lands owned or controlled by the United States. The Act required that a permit be obtained for examination of ruins, excavation of archaeological sites and the gathering of objects of antiquity on lands under the jurisdiction of the Secretaries of Interior, Agriculture, and Army, and provided penalties for violations.

**Archaeological Resources Protection Act (16 U.S.C. 470aa 470ii):** Public Law 96 95, approved October 31, 1979, (93 Stat. 721): Largely supplants the resource protection provisions of the Antiquities Act for archaeological items.

This Act establishes detailed requirements for issuance of permits for any excavation for or removal of archaeological resources from federal or Indian lands. It also establishes civil and criminal penalties for the unauthorized excavation, removal, or damage of any such resources; for any trafficking in such resources removed from federal or Indian land in violation of any provision of federal law; and for interstate and foreign commerce in such resources acquired, transported or received in violation of any state or local law.

**Public Law 100 588, approved November 3, 1988, (102 Stat. 2983):** Lowers the threshold value of artifacts triggering the felony provisions of the Act from \$5,000 to \$500, makes attempting to commit an action prohibited by the Act a violation, and requires the land managing agencies to establish public awareness programs regarding the value of archaeological resources to the Nation.

**Archeological and Historic Preservation Act (16 U.S.C. 469 469c):** Public Law 86 523, approved June 27, 1960, (74 Stat. 220) as amended by Public Law 93 291, approved May 24, 1974, (88 Stat. 174) to carry out the policy established by the Historic Sites Act (see below), directed federal agencies

to notify the Secretary of the Interior whenever they find a federal or federally assisted, licensed or permitted project may cause loss or destruction of significant scientific, prehistoric or archaeological data. The Act authorizes use of appropriated, donated and/or transferred funds for the recovery, protection and preservation of such data.

**Historic Sites, Buildings and Antiquities Act (16 U.S.C. 461 462, 464 467):** The Act of August 21, 1935, (49 Stat. 666) popularly known as the Historic Sites Act, as amended by Public Law 89 249, approved October 9, 1965, (79 Stat. 971) declares it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provides procedures for designation, acquisition, administration and protection of such sites. Among other things, National Historic and Natural Landmarks are designated under authority of this Act. As of January 1989, 31 national wildlife refuges contained such sites.

**National Environmental Policy Act of 1969 (P.L. 91 190, 42 U.S.C. 4321 4347, January 1, 1970, 83 Stat. 852) as amended by P.L. 94 52, July 3, 1975, 89 Stat. 258, and P.L. 94 83, August 9, 1975, 89 Stat. 424):** Declares national policy to encourage a productive and enjoyable harmony between humans and their environment. Section 102 of that Act directs that “to the fullest extent possible:

- The policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this Act, and
- All agencies of the federal government shall...insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision making along with economic technical considerations...”

Section 102(2)c of NEPA requires all federal agencies, with respect to major federal actions significantly affecting the quality the quality of the human environment, to submit to the Council on environmental Quality a detailed statement of:

- the environmental impact of the proposed action;
- any adverse environmental effect which cannot be avoided should the proposal be implemented;
- alternatives to the proposed action;
- the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and

- any irreversible and irretrievable commitments of resources which would be involved in the proposed action, should it be implemented.

**National Wildlife Refuge System Administration Act of 1966 (Public Law 89-669; 80 Stat. 929; 16 U.S.C. 668dd-668ee), as amended:**

This Act defines the National Wildlife Refuge System as including wildlife refuges, areas for protection and conservation of fish and wildlife which are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, and WPAs. The Secretary is authorized to permit any use of an area provided such use is compatible with the major purposes for which such area was established. The purchase consideration for rights-of-way go into the Migratory Bird Conservation Fund for the acquisition of lands. By regulation, up to 40 percent of an area acquired for a migratory bird sanctuary may be opened to migratory bird hunting unless the Secretary finds that the taking of any species of migratory game birds in more than 40 percent of such area would be beneficial to the species. The Act requires an Act of Congress for the divestiture of lands in the system, except (1) lands acquired with Migratory Bird Conservation Commission funds, and (2) lands can be removed from the system by land exchange, or if brought into the system by a cooperative agreement, then pursuant to the terms of the agreement.

**National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57, October 9, 1997, Amendment to the National Wildlife Refuge System Administration Act of 1966):** This Act defines the mission of the National Wildlife Refuge System:

“To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”

*Key provisions include the following:*

- A requirement that the Secretary of the Interior ensures maintenance of the biological integrity, diversity, and environmental health of the National Wildlife Refuge System;
- The definition of compatible wildlife-dependent recreation as “legitimate and appropriate general public use of the [National Wildlife Refuge] System;”
- The establishment of hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation as “priority public uses” where compatible with the mission and purpose of individual national wildlife refuges;

- The refuge managers’ authority to use sound professional judgment in determining which public uses are compatible on national wildlife refuge and whether or not they will be allowed (a formal process for determining “compatible use”@ is currently being developed); and
- The requirement of open public involvement in decisions to allow new uses of national wildlife refuges and renew existing ones, as well as in the development of comprehensive conservation plans for national wildlife refuges.

**North American Wetlands Conservation Act (103 Stat. 1968; 16 U.S.C. 4401 4412):** Public Law 101 233, enacted December 13, 1989, provides funding and administrative direction for implementation of the North American Waterfowl Management Plan and the Tripartite Agreement on wetlands between Canada, U.S. and Mexico.

The Act converts the Pittman Robertson account into a trust fund, with the interest available without appropriation through the year 2006 to carry out the programs authorized by the Act, along with an authorization for annual appropriation of \$15 million plus an amount equal to the fines and forfeitures collected under the Migratory Bird Treaty Act.

Available funds may be expended, upon approval of the Migratory Bird Conservation Commission, for payment of not to exceed 50 percent of the United States share of the cost of wetlands conservation projects in Canada, Mexico, or the United States (or 100 percent of the cost of projects on federal lands). At least 50 percent and no more than 70 percent of the funds received are to go to Canada and Mexico each year.

**Refuge Recreation Act of 1962:** Authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the area’s primary purposes. It authorizes construction and maintenance of recreational facilities and the acquisition of land for incidental fish and wildlife oriented recreational development or protection of natural resources. It also authorizes the charging of fees for public uses.

**Refuge Recreation Act of 1966 (Public Law 87-714; 76 Stat. 653-654; 16 U.S.C. 460k et seq.):** Authorizes appropriate, incidental, or secondary recreational use on conservation areas administered by the Secretary of the Interior for fish and wildlife purposes.

**Refuge Revenue Sharing Act (16 U.S.C. 715s):** Section 401 of the Act of June 15, 1935, (49 Stat. 383) provides for payments to counties in lieu of taxes, using revenues derived from the sale of products from refuges.

**Public Law 88 523, approved August 30, 1964, (78 Stat. 701)** makes major revisions by requiring that all revenues received from refuge products, such as animals, timber and minerals, or from leases or other privileges, be deposited in a special Treasury account and net receipts distributed to counties for public schools and roads.

**Public Law 93 509, approved December 3, 1974, (88 Stat. 1603)** requires that moneys remaining in the fund after payments be transferred to the Migratory Bird Conservation Fund for land acquisition under provisions of the Migratory Bird Conservation Act.

**Public Law 95 469, approved October 17, 1978, (92 Stat. 1319)** expands the revenue sharing system to include National Fish Hatcheries and Service research stations. It also includes in the Refuge Revenue Sharing Fund receipts from the sale of salmonid carcasses. Payments to counties were established as:

1. On acquired land, the greatest amount calculated on the basis of 75 cents per acre, three fourths of one percent of the appraised value, or 25 percent of the net receipts produced from the land; and
2. On land withdrawn from the public domain, 25 percent of net receipts and basic payments under Public Law 94 565 (31 U.S.C. 1601 1607, 90 Stat. 2662), payment in lieu of taxes on public lands.

This amendment also authorizes appropriations to make up any difference between the amount in the Fund and the amount scheduled for payment in any year. The stipulation that payments be used for schools and roads was removed, but counties were required to pass payments along to other units of local government within the county which suffer losses in revenues due to the establishment of Service areas.

**Refuge Trespass Act of June 28, 1906 (18 U.S.C. 41; 43 Stat. 98, 18 U.S.C. 145):** Provides first federal protection for wildlife on national wildlife refuges. This Act makes it unlawful to hunt, trap, capture, willfully disturb, or kill any bird or wild animal, or take or destroy the eggs of any such birds, on any lands of the United States set apart or reserved as refuges or breeding grounds for such birds or animals by any law, proclamation, or executive order, except under rules and regulations of the Secretary. The Act also protects government property on such lands.

**Refuge Trespass Act of June 25, 1948 (18 U.S.C. 41. Stat 686) B Section 41 of the Criminal code, title 18:** Consolidates the penalty provisions of various acts from January 24, 1905 (16 U.S.C. 684-687; 33 Stat. 614), through March 10, 1934 (16 U.S.C. 694-694b; 48 Stat. 400) and restates the intent of Congress to protect all wildlife within federal

sanctuaries, refuges, fish hatcheries and breeding grounds. The Act provides that anyone (except in compliance with rules and regulations promulgated by authority of law) who hunts, traps or willfully disturbs any wildlife on such areas, or willfully injures, molest or destroys any property of the United States on such lands or waters, shall be fined, imprisoned, or both.

**Rehabilitation Act of 1973 (29 U.S.C. 794 ), as amended:** Title 5 of P.L. 93-112 (87 Stat. 355), signed October 1, 1973, prohibits discrimination on the basis of handicap under any program or activity receiving federal financial assistance.

**Transfer of Certain Real Property for Wildlife Conservation purposes Act of 1948:** Provides that upon determination by the Administrator of the General Services Administration, real property no longer needed by a federal agency can be transferred, without reimbursement, to the Secretary of the Interior if the land has particular value for migratory birds, or to a state agency for other wildlife conservation purposes.

**Wilderness Act of 1964:** Public Law 88-577, approved September 3, 1964, directs the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within National Wildlife Refuge and National Park Systems for inclusion in the National Wilderness Preservation System.

Administration of national wildlife refuges is governed by bills passed by the United States Congress and signed into law by the President of the United States, and by regulations promulgated by the various branches of the government. Following is a brief description of some of the most pertinent laws and statues establishing legal parameters and policy direction for the National Wildlife Refuge System:

**Fish and Wildlife Conservation Act of 1980 (Public Law 96-366, September 29, 1980, 16 U.S.C. 2901-2911, as amended 1986, 1988, 1990 and 1992):** Creates a mechanism for federal matching funding of the development of state conservation plans for non-game fish and wildlife. Subsequent amendments to this law require that the Secretary monitor and assess migratory nongame birds, determine the effects of environmental changes and human activities, identify birds likely to be candidates for endangered species listing, and identify conservation actions that would prevent this from being necessary. In 1989, Congress also directed the Secretary to identify lands and waters in the Western Hemisphere, the protection, management or acquisition of which would foster conservation of migratory nongame birds. All of these activities are intended to assist the Secretary in fulfilling the Secretary's responsibilities under

the Migratory Bird Treaty Act and the Migratory Bird Conservation Act, and provisions of the Endangered Species Act implementing the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere.

**Refuge Revenue Sharing Act of 1978 (Public Law 95-469, October 17, 1978, [amended 16 U.S.C. 715s]; 50 CFR, part 34):** Changes the provisions for sharing revenues with counties in a number of ways. It makes revenue sharing applicable to all lands administered by the Service, whereas previously it was applicable only to areas in the National Wildlife Refuge System. The new law makes payments available for any governmental purpose, whereas the old law restricted the use of payments to roads and schools. For lands acquired in fee simple, the new law provides a payment of 75 cents per acre, 3/4 of 1 percent of fair market value or 25 percent of net receipts, whichever is greatest, whereas the old law provided a payment of 3/4 of 1 percent adjustment cost or 25 percent of net receipts, whichever was greater. The new law makes reserve (public domain) lands entitlement lands under Public Law 94-565 (16 U.S.C. 1601-1607, and provides for a payment of 25 percent of net receipts.

The new law authorizes appropriations to make up any shortfall in net receipts, to make payments in the full amount for which counties are eligible. The old law provided that if net receipts were insufficient to make full payment, payment to each county would be reduced proportionality.

**Section 401 of the Federal Water Pollution Control Act of 1972 (Public Law 92-500; 86 Stat. 816, 33 U.S.C. 1411):** Requires any applicant for a federal license or permit to conduct any activity which may result in a discharge into navigable waters to obtain a certification from the state in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over navigable waters at the point where the discharge originates or will originate, that the discharge will comply with applicable effluent limitations and water quality standards. A certification obtained for construction of any facility must also pertain to subsequent operation of the facility.

**Section 404 of the Federal Water Pollution Control Act of 1972 (Public Law 92-500, 86 Stat. 816):** Authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits, after notice and opportunity for public hearing, for discharge of dredged or fill material into navigable waters of the United States, including wetlands, at specified disposal sites. Selection of disposal sites will be in accordance with guidelines developed by the Administrator of the Environmental Protection Agency in conjunction with the Secretary of the Army. Furthermore, the Administrator can

prohibit or restrict use of any defined area as a disposal site whenever she/he determines, after notice and opportunity for public hearings, that discharge of such materials into such areas will have an unacceptable adverse effect on municipal water supplies, shellfish beds, fishery areas, wildlife, or recreational areas.

### Regulations:

**National Wildlife Refuge Regulations for the most recent fiscal year (50 CFR 25-35, 43 CFR 3103.2 and 3120.3-3):** Provides regulations for administration and management of national wildlife refuges including mineral leasing, exploration, and development.

**Rights-of-Way General Regulations (50 CFR 29.21; 34 fr 19907, December 19, 1969): Provides for procedures for filing applications.** Provides terms and conditions under which rights-of-way over, above, and across lands administered by the Service may be granted.

**Use of Off-Road Vehicles on Public Lands (Executive Order 11644, Federal Reg. Vol. 37, No. 27, February 9, 1972):** Provides policy and procedures for regulating off-road vehicles.

**Wilderness Preservation and Management] (50 CFR 35; 78 Stat. 890; 16 U.S.C. 1131-1136; 43 U.S.C. 1201):** Provides procedures for establishing wilderness units under the Wilderness Act of 1964 on units of the National Wildlife Refuge System.

# Appendix C

## *Public Involvement*

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### **Public Scoping**

Public scoping was completed in December 2004. A public meeting was held in Martin South Dakota on November 20, 2004.

Ten people attended these meeting and in addition 13 written comments were received during the open comment period. Comments received identified biological, social, and economic concerns regarding management.

### **List of Recipients**

The following list of recipients was developed for this CCP.

#### **Federal Officials**

U.S. Representative Stephanie Herseth,  
Washington DC,  
Rapid City, SD, Area Director

U.S. Senator Tim Johnson, Washington, DC,  
Rapid City, SD, Area Director

U.S. Senator John Thune, Washington, DC  
Rapid City, SD, Area Director

#### **Federal Agencies**

Oglala Sioux Tribal Council, Pine Ridge, SD

Rosebud Sioux Tribal Council, Rosebud, SD

U.S. Geological Survey, Northern Prairie Research  
Center, Jamestown, SD

U.S. Geological Survey, Fort Collins Science  
Center, Fort Collins, CO

U.S. Fish and Wildlife Service, Ecological Services,  
Pierre SD

U.S. Fish and Wildlife Service, SD, Sand Lake  
NWR and WMD Huron, WMD, Lake Andes NWR  
and WMD, Karl Mundt NWR, Madison WMD,  
Waubay NWR and WMD

USDA, Forest Service, Chadron, NE

USDA, Natural Resources Conservation Service,  
Martin Service Center, Martin, SD

Badlands National Park, Interior, SD

#### **South Dakota State Officials**

Representative Cooper Garnos, Presho

Representative Barry Jensen, White River

Representative Jim Bradford, Pine Ridge

Representative, Paul Valandra, Pine Ridge

Senator, Theresa Two Bulls, Pine Ridge

Senator, John Koskan, Wood

Governor Mike Rounds, Pierre

#### **State Agencies**

Department of Agriculture, Pierre

Department of Emergency Management, Pierre

Department of Environment and Natural  
Resources, Pierre

Department of Game, Fish and Parks, Pierre

Division of Water Rights, Pierre

State Historic Preservation Officer, Pierre

State Conservationist, Pierre

Farm Bureau Federation, Huron, SD

#### **Local Agencies**

City of Martin South Dakota, SD

Bennett and Shannon County Conservation  
District, Martin, SD

Bennett County Government, Martin, SD

#### **Media**

Organizations, Business and Civic Groups

Universities and Colleges

Individuals (15 persons)



# Appendix D

## *Planning Team and Contributors*

### ***Planning Team***

This plan is the result of the efforts by members of the planning team for Lacreek NWR. The draft Comprehensive Conservation Plan and Environmental Assessment were written by refuge staff and the refuge planning with input from other team members.

<i>Name</i>	<i>Title</i>	<i>Agency</i>
Linda Kelly	Planning Team Leader	USFWS
Tom Koerner	Project Leader	USFWS
Shilo Comeau-Kingfisher	Refuge Biologist	USFWS
Matt Sprenger	Assistant Refuge Manager	USFWS
Ann Harris	Administrative Support	USFWS
Mark Ely	Regional Office GIS Specialist	USFWS
Bob Barrett	Refuge Supervisor	USFWS
Tom Beck	Conservation Officer	South Dakota Game, Fish and Parks
Benny Ayres	Heavy Equipment Operator	USFWS
Pat Harty	Prescribed Fire Specialist	USFWS
Joe Nichols	Private Lands Biologist	USFWS
Ryan Mueller	Maintenance Worker	USFWS
Bill Kocourek	Tractor Operator	USFWS
Steve Nueharth	Tractor Operator	USFWS

### ***Other Contributors***

The Service would like to acknowledge the efforts of the following individuals toward the completion of this CCP.

<i>Name</i>	<i>Title</i>	<i>Area of Expertise</i>
Murray Laubhan	Ecologist	USGS, Jamestown, ND
Rachael Lubhan	Biologist	USFWS, Jamestown, ND
Meg Van Ness	Regional Archaeologist	USFWS, Lakewood, CO
Mimi Mather	Planner	Shapins Associates, Boulder, CO
Tom Gibney	Planner	Shapins Associates, Boulder, CO
Melvie Uhland	Outdoor Recreation Planner	USFWS, Lakewood, CO
Cindy Souders	Outdoor Recreation Planner	USFWS, Lakewood, CO
Galen Green	Fire Ecologist	USFWS, Lakewood, CO



# **Appendix E**

## *Black Tailed Prairie Dog Management Plan, Lacreek National Wildlife Refuge*

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# DRAFT

## BLACK-TAILED PRAIRIE DOG MANAGEMENT PLAN

### LaCreek National Wildlife Refuge

Written in 2005 by

**Tom Koerner, Refuge Manager,**

**Shilo Comeau, Wildlife Biologist,  
&**

**Matt Sprenger, Assistant Refuge Manager**

#### *Approvals and Concurrence*

LaCreek National Wildlife Refuge:

##### ***Refuge Manager***

Tom Koerner \_\_\_\_\_  
Signature Date

##### ***Regional Wildlife Biologist:***

Wayne King \_\_\_\_\_  
Signature Date

Mountain-Prairie Regional Office:

##### ***National Wildlife Refuge System***

***Refuge Supervisor, Nebraska, Kansas, Colorado, and LaCreek NWR:***

David Wiseman \_\_\_\_\_  
Signature Date

## **BLACK-TAILED PRAIRIE DOG MANAGEMENT PLAN**

LaCreek National Wildlife Refuge

Martin, South Dakota

### **INTRODUCTION**

In July 1998, the National Wildlife Federation petitioned the U.S. Fish and Wildlife Service (USFWS) to list the black-tailed prairie dog as threatened under the Endangered Species Act. In March of 1999, a moratorium of all black-tailed prairie dog control on U.S. Fish and Wildlife Service lands was issued by the Director. In May 2000, the USFWS concluded that this species warranted listing, but was precluded from being listed due to other higher priority species concerns and resource constraints. In August of 2004, an updated evaluation of the best available scientific information led the U.S. Fish and Wildlife Service to determine that the black-tailed prairie dog should be removed as a candidate for listing.

In March of 2005, the South Dakota legislature passed Senate Bill 216. This measure sets forth conditions under which prairie dogs will be considered pests by the State. It also outlines a formalized complaint process by which private landowners may file complaints against adjacent landowners. If the adjacent private landowner does not comply with controlling a 1 mile buffer or mutually agreed to buffer, then the County Weed Board may be authorized to enter onto private lands to control prairie dogs and bill the landowner for that work. The State Department of Agriculture will attempt to negotiate control measures on federal and Tribal lands where formal complaints are received from adjacent private landowners.

During this same 1999-2005 period, a severe drought hit western South Dakota. A cessation of all control activities on federal lands combined with a severe drought precipitated a rapid increase in total acres occupied by black-tailed prairie dogs in southwestern South Dakota. The number of occupied acres on LaCreek National Wildlife Refuge (NWR) showed a similar trend, and increased an estimated 343 percent% from 1997 to 2004 and the number of individual prairie dog towns increased from 3 in 1997 to 10 in 2004 (refuge files).

LaCreek NWR is currently completing a Comprehensive Conservation Plan (CCP). Recent emphasis by refuge staff on prairie restoration and management has raised some interesting dilemmas with regards to prairie dog towns on LaCreek NWR. One of the most effective means available for control of noxious weeds such as Canada thistle and replacement of monotypic stands of crested wheatgrass and smooth brome grass in previously farmed sites is to farm for 3 to 5 years and then reseed. Future seedings will include 100+ species of locally collected grass, sedge, and forb species. The inability to control prairie dogs and plow through these sites in order to remove undesirable plants and prepare a seedbed for high diversity seeding would necessarily cause staff to table attempts at prairie restoration utilizing this technique. The alternatives listed for upland management in the CCP would need to be revised to reflect this. The scoping process for this CCP also identified prairie dog management as one of the major issues for adjacent landowners and residents of Bennett County. These facts have led us to believe a management plan is needed to guide us in management of black-tailed prairie dogs on LaCreek NWR.

Establishing Authority for LaCreek NWR:

*Executive Order, August 26, 1935* “...as a refuge and breeding ground for migratory birds and other wildlife...”

*Migratory Bird Conservation Act* “...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.”

*Refuge Recreation Act* “...for public recreation on...developments adjacent to conservation areas in existence.”

### **Historical Occurrence of Black-tailed Prairie Dogs on LaCreek NWR**

Records indicate that black-tailed prairie dogs were present at the time of acquisition of the Refuge in 1935. The Annual Narrative Report for the Refuge in 1976 stated that black-tailed prairie dogs were absent from the Refuge from about 1940 until the middle 1960's. Aggressive control of prairie dogs was conducted during this period. A memo in the refuge files indicates that 2 towns “with 12 burrows and mounds of dirt” were detected in the summer of 1967. By 1969, 2 towns of 2.3 acres each were recorded in Units 9NW-1 and 6E-4. A significant reduction in control efforts occurred starting in 1972 due to the issuance of Presidential Executive Order 11643 by President Nixon, which prohibited toxicant use on federal lands with federal funds. This Executive Order was rescinded in 1975. By 1979, 4 prairie dog towns had become well established on Units LCN-6b (10 acres), LCN-2f (350 acres), 9NW-1 (75 acres), and 10 NW-1 (50 acres). Aggressive control efforts began again in 1979 which eliminated the towns in Units LCN-6b and LCN-2f. The dog towns in Units 9NW-1 and 10 NW-1 were reduced, with zinc phosphide oats and sodium nitrate gas cartridges, to 55 and 40 acres. Throughout the 1980's and into the 1990's, prairie dogs were controlled to keep these 2 towns about the same size and prevent new ones from establishing. All control efforts were halted in 1999 and black-tailed prairie dogs have been allowed to expand to the current estimate of 11 towns totaling 501.7 acres in March of 2005.

### **Importance of Prairie Dogs**

The Refuge Manual addresses our requirements as refuge managers to “focus on native species and natural communities...” and to “strive to maintain populations of breeding individuals that are genetically viable and functional.” under 601 FW 3, Biological Integrity, Diversity, and Environmental Health. This policy outlines that refuges that currently support black-tailed prairie dogs should strive to maintain viable populations.

Black-tailed prairie dogs are an integral part of the wildlife community and it is appropriate to maintain a viable population on LaCreek NWR. Many wildlife species associate with or depend upon prairie dogs during some portion of their life cycle. Over 167 vertebrate species have been documented using prairie dog towns (Campbell and Clark 1981, Clarke et al. 1982, Knowles 1994, Reading et al. 1989, Sharps and Uresk 1991). Some species feed on prairie dogs, but others utilize the burrow systems or the unique habitat to fulfill their needs. Vacant burrows are used by cottontail rabbits, several species of small rodents, tiger salamanders (Kolbe et al. 2002), prairie rattlesnakes (Knowles 1994), bull snakes, and by burrowing owls (refuge files). Our most active towns have had successful nesting by burrowing owls and as the size and number of dog

towns has increased, so has the documented sightings of burrowing owls on the Refuge. Many other passerine species, such as meadowlarks, grasshopper sparrows, lark buntings, McCown's longspurs, and horned larks prefer the sparsely vegetated habitat created on dog towns due to the greater visibility of seeds and insects (Agnew et al. 1986). In addition to their importance to other wildlife species, prairie dogs are also important to wildlife observers and photographers.

### **SITE DESCRIPTION**

LaCreek NWR is located in the Lake Creek Valley in southern Bennett County on the northern edge of the Nebraska Sandhills. The refuge covers 16,410 acres. The original refuge (9,362 acres) was acquired in 1935 primarily as waterfowl nesting habitat. In 1972, the 6,665 acre Brown Ranch was added to the refuge. In 1981 a clear title was received to the 223 acre Little White River Recreation Area, and the 160 acre Charles Emley inholding was purchased in 1985.

The uplands are composed of approximately 4,560 acres of native grasses, 5,500 acres of restored/introduced grasslands, and a mixture of croplands, non-commercial forest, seasonally and semi-permanently flooded basins, and the choppy sandhills. The primary water sources are Lake Creek, Cedar Creek, Elm Creek, and several smaller spring-fed creeks that flow from the sandhills.

### **Soils**

Dominant soil types at LaCreek NWR as listed in the Bennet County Soil Survey:

**Marsh (Ma)** – 0-2% slope, VIIIw1 = Marshes having more than 50% vegetation not suited for grazing. Best suited for wildlife and recreation.

**Valentine fine sand – rolling (VaC)** – VIIe7 = Deep, sandy and very sandy soils on gently undulating to rolling (2-15% slope) uplands. These soils have very severe wind erosion hazards. They are not suited for cultivation.

**Valentine fine sand – hilly (VaD)** – VIIe1 = Deep, very sandy soils on rolling to very hilly (9-50% slope) uplands. These soils have a very severe wind erosion hazard.

#### **Mosher –Minatare Complex (Mm) –**

**Mosher part IVs2** = moderately well drained soils with 4-10 inches of friable, loamy surface layers over dense, very slowly permeable, claypan subsoils that contain salts. They occur in nearly level (0-2% slope) upland swales and on uplands.

**Minatare part VI-s1** = Moderately well to poorly drained soils on nearly level to sloping (0-9%) uplands or in depressions. Dense, compact subsoils near the surface, salts, or ponding, or a combination of these limitations make these soils generally unsuitable for cultivation.

**Minatare (Me) VI-s1** Moderately well to poorly drained soils on nearly level to sloping (0-9%) uplands or in depressions. Dense, compact subsoils near the surface, salts, or ponding, or a combination of these limitations make these soils generally unsuitable for cultivation.

**Loup fine sandy loam – (Lo) Vw3** = Very poorly drained and poorly drained sandy soils in depressions and on bottoms with water tables at or near the surface during much of the growing season. These soils are too wet for crops but may be suited to tame grasses.

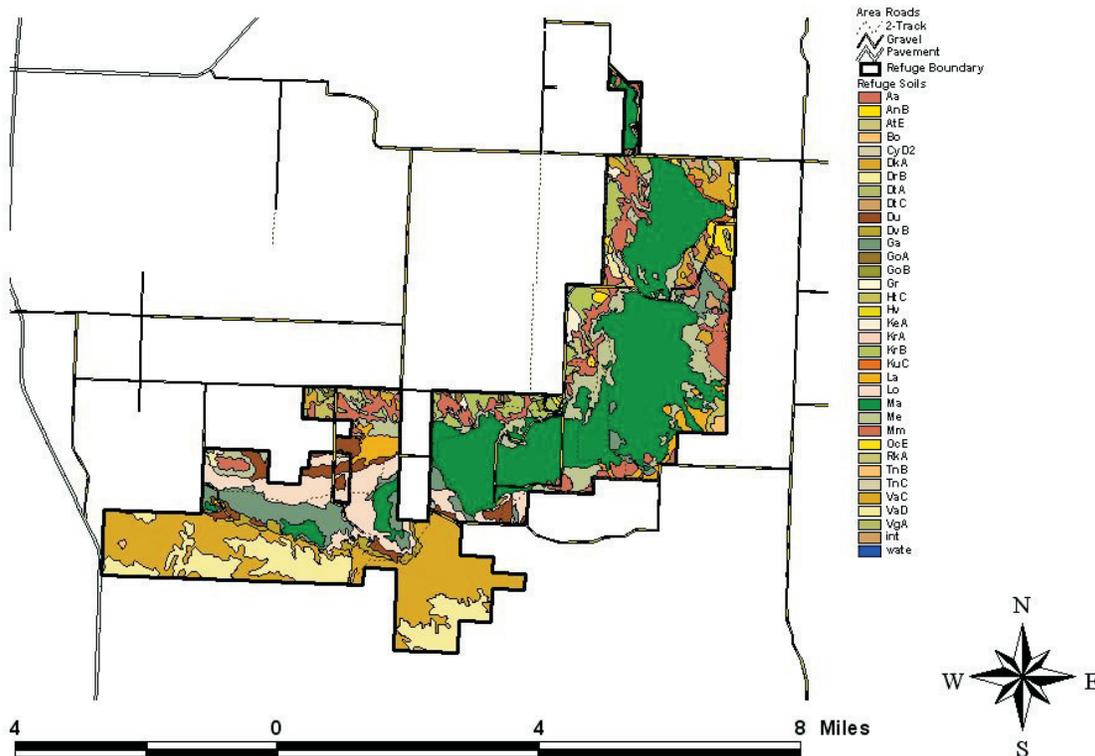
**Gannett fine sandy loam – (Ga) Vw3** = Very poorly drained and poorly drained sandy soils in depressions and on bottoms with water tables at or near the surface during much of the growing season. These soils are too wet for crops but may be suited to tame grasses.

**Keith-Rosebud silt loams – (KrB) II-c2** = Deep, and moderately deep, loamy, well drained soils on nearly level (0-2%) uplands. Moisture is inadequate in most years and these soils have a slight to moderate wind erosion hazard.

**Dunday and Elsmere loamy fine sands (Du)**

Dunday part VI-e7 = Deep, sandy and very sandy soils on gently undulating to rolling (2-15%) uplands. These soils have very severe wind erosion hazards. Not suited for cultivation.

# LaCreek NWR Soils Units



## Compatible Soils and Potential Habitat for Black-tailed Prairie Dogs

Soil type is a significant factor in determining where towns may exist (Koford 1958). Sandy soils are unsuitable for maintaining an extensive burrow system. Hydric soils also are unsuitable, as the burrows would extend below the groundwater table in most places on LaCreek NWR. An evaluation of soil types in 2002 indicated that a total of 4,086 acres or 25% of LaCreek NWR's total acres contain compatible soil types and likely could support black-tailed prairie dog towns. They lie in a relatively narrow band primarily on the north and east sides of the refuge and most are adjacent to private land. It is also important to recognize that nearly 70% of the refuge contains soils unsuitable for prairie dog towns, and historically never supported prairie dogs.

## Surrounding Land Uses

The major industry and source of income throughout Bennett County is livestock production and dryland farming. Native mixed grass prairie, planted cool season grasses, and alfalfa make up the majority of the pasture and hayland. The major crops planted are winter wheat, hay, proso, and sorghum millet, and sunflowers. During wet years, some dryland corn and soybeans are also planted. Farmsteads are sparsely scattered across Bennett County. The main community is

Martin located 12 miles to the northwest (1,100 residents). No moratorium on black-tailed prairie dog control was imposed on private lands. It is unknown how many acres of private land in Bennett County contain prairie dogs, however staff have observed a number of active towns on private rangelands within 3 miles of the refuge. Extensive acreages of black-tailed prairie dog towns currently exist on both the Pine Ridge and Rosebud Indian Reservations adjacent to Bennett County.

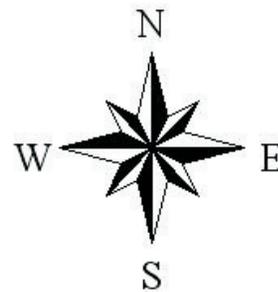
**Current Black-tailed Prairie Dog Population Estimates and Distribution on LaCreek NWR**

Both the size and number of prairie dog towns has rapidly expanded during the last six years on LaCreek NWR. No estimates have been made of the total number of individual black-tailed prairie dogs on LaCreek NWR, however we plan to begin estimating population size in 2005. A survey completed in March of 2005 by refuge staff indicated there were 11 active prairie dog towns covering 501.7 acres. This is an increase of 55.1 acres from April 2004 to March 2005. Two towns merged into one town and 2 additional towns started during this period (refuge files).

# 2004 LaCreek NWR Mapped Black-tailed Prairie Dog Towns

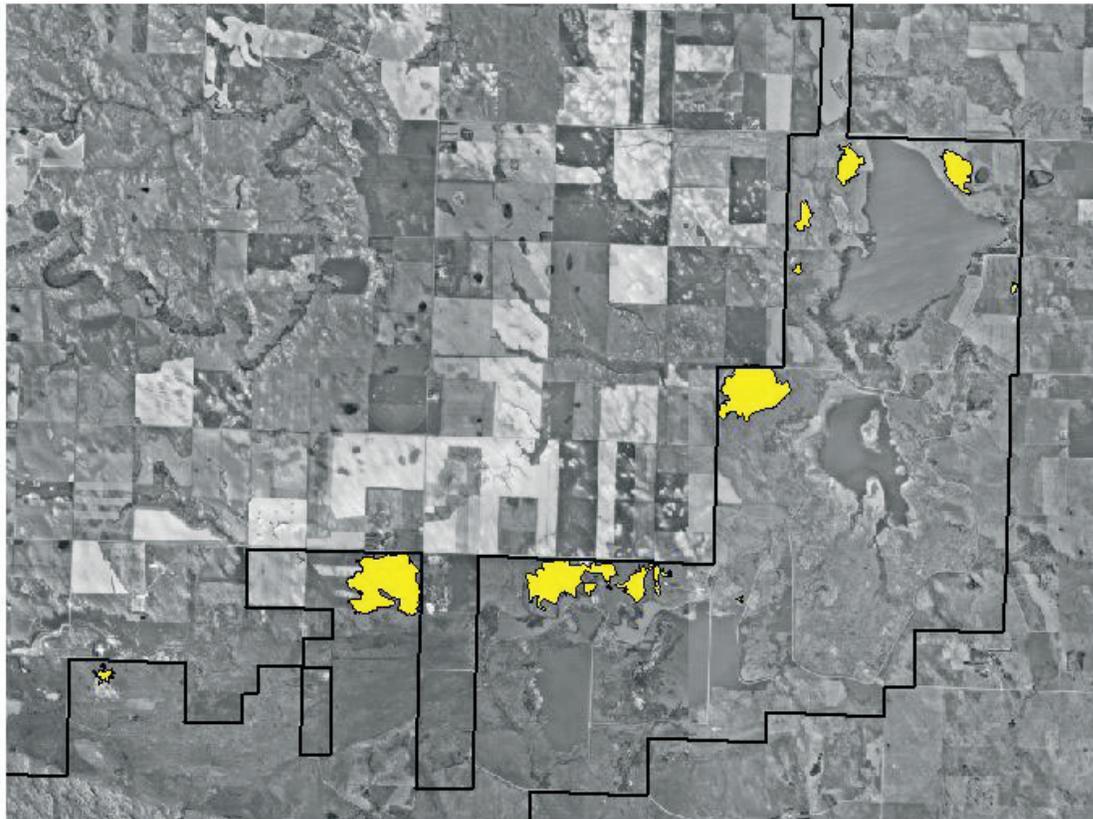


3 0 3 6 Miles

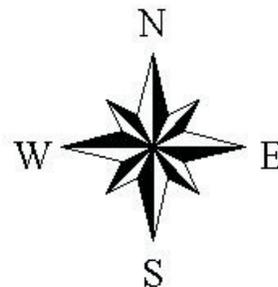


2004 prairie dog towns.shp  
Lckunits.shp

## March - 2005 Mapped Prairie Dog Towns LaCreek National Wildlife Refuge



3000 0 3000 6000 Miles



 Lckown\_line.shp  
 Prairiedog05.shp

## Issues

LaCreek NWR held scoping meetings in conjunction with initiation of its Comprehensive Conservation Plan (CCP). A number of issues with regards to black-tailed prairie dog management were identified and explored during this process. Several issues related to potential conflicts with current and planned future management and restoration. Many of the issues related to adjacent private lands. A more detailed discussion of these issues follows.

### **High Diversity Seedings (Prairie Restoration)**

As mentioned earlier, plans for prairie restoration present refuge staff with a dilemma. A significant portion of the uplands in what would be considered mixed grass prairie was farmed prior to acquisition or during the early years of the refuge. These areas were typically seeded to crested wheatgrass, smooth brome grass, and/or intermediate wheatgrass and may have contained alfalfa, sweetclover, or other legume. Over time, these stands deteriorated and many were invaded by Canada thistle, Kentucky bluegrass, and other introduced species. Management of these introduced grasslands has utilized periodic grazing, haying, and prescribed burning. Significant effort is targeted towards control of Canada thistle and other invasive species. The Draft CCP includes objectives and strategies which address this, including:

**Upland Subgoal:** Restore and enhance the mixed grass plant community to create a mosaic that reflects the habitat requirements for grassland dependent birds of management concern.

In the uplands, greater than 20 percent of the habitats will be in each of the tall/medium/short categories and less than 5 percent in native fire tolerant shrubs.

**Upland Objective A (tall):** In 5 to 10 years, increase floristic quality assessment index by 10-25% in patches  $\geq 50$  hectares, with vegetation structures  $>40$  cm in height, as measured during the nesting season within these patches, and  $>50$  m from trees  $>5$  meters in height.

**Upland Objective B (medium):** In 5 to 10 years, increase floristic quality assessment by 10-25% in patches  $\geq 50$  hectares with vegetation structures ranging from 15 cm to 40 cm in height, as measured during the nesting season, within these patches, and  $>50$  m from trees  $>5$  meters in height.

**Upland Objective C (short):** In 5 to 10 years increase floristic quality assessment index by 10% in patches  $>100$  hectares with vegetation structures from ranging from 5 cm to 15 cm in height, as measured during the nesting season, and 100 meters from trees  $>5$  meters in height.

### **Strategies:**

1. Seed 100-300 acres/year of formerly cropped or exotic grass dominated uplands totaling 2,000 – 3,000 acres to  $>100$  species of native grasses, sedges, and forbs.
2. Within designated grassland patches  $\geq 50$  hectares, remove trees  $> 5$  meters in height and all non native trees.
3. Interseed 100-300 acres/year of existing grasslands totaling 1,500 – 3,000 acres to  $>100$  species of native grasses, sedges, and forbs.

4. Conduct 200 to 1,500 acres of prescribed burning in upland habitats each year to encourage/promote increased FQA and plant structure.
5. Conduct 200 to 1,500 acres of prescribed grazing in upland habitats each year to encourage/promote increased FQA and plant structure.
6. Continued use of IPM strategies to reduce noxious weeds and other invasive species.

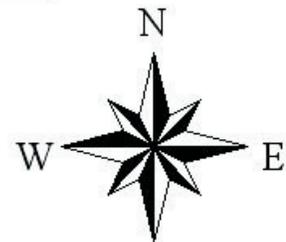
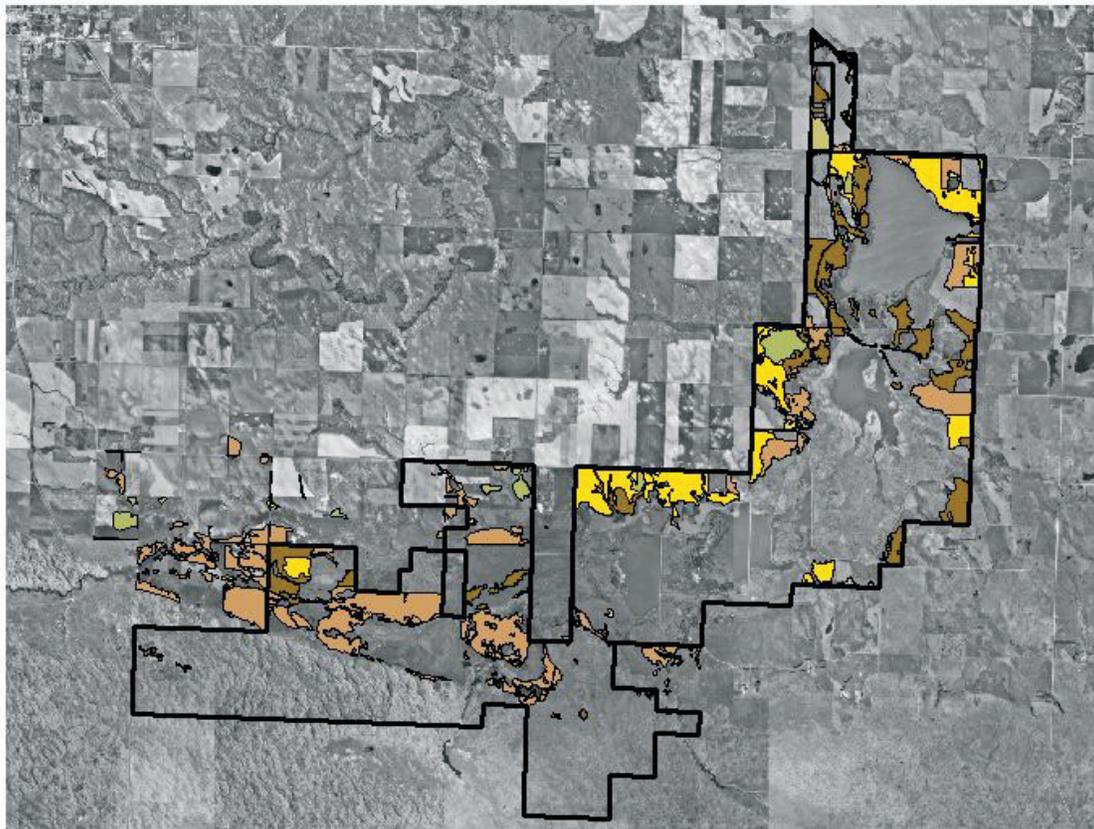
During the last 7 years, refuge staff have converted several of these fields to native grasses. The fields were farmed for one or more years to prepare a seedbed and control Canada thistle, crested wheatgrass, and smooth brome grass. The fields were seeded to 5 to 7 native warm and cool season grasses. Follow-up treatment included prescribed burning and herbicide applications. No forbs were included in the mix, due to the uncertainty of how much follow-up herbicide spraying would be needed, which would have killed most forbs. These fields currently have little Canada thistle and any noxious weeds that are present can be spot sprayed. They are relatively low in species diversity, and are primarily composed of 2 or 3 native grass species.

Refuge Staff believe that farming remaining stands of exotic grasses for 3 to 5 years will remove the majority of invasive species. The sites could be treated by spot spraying after seeding, allowing for the incorporation of a larger number of native species, including forbs, in the seeding mix. During 2004, 114 grass, sedge, and forb species were harvested to be included in 2005 seedings on the refuge. Based on past results, we believe that enough seed can be harvested to plant up to 200 acres each year with 100+ native species.

The majority of prairie dog towns have established on the refuge in these prior farmed exotic grasslands. A similar pattern was also noted on Badlands National Park (Doug Albertson, personal communication). Several publications have indicated that prairie dogs are often associated with old farmsteads or areas where the ground has previously been disturbed (Koford 1958, Smith 1967, Cincotta 1985). The inability to remove prairie dogs prior to farming a site would lead to rapid re-establishment of prairie dogs. Significant dispersal of prairie dogs onto adjacent private lands would also be likely as a result of the tillage. The inability to farm these exotic grasslands after removal of prairie dogs would almost certainly lead to the failure to remove exotic grass and invasive species from the site.

Many of the 11 towns currently established are a small part of larger fields to be restored. Farming everything except the small part of the field containing prairie dog burrows would lead to expansion into the newly tilled fields. Annual tillage would restrict the rate of expansion, however once the field is seeded, the opportunity for rapid town expansion would exist. Follow-up treatments of mowing and prescribed burning needed to assist with native species establishment may further encourage expansion and establishment of prairie dog towns.

# LaCreek NWR Cool Season Exotics



-  IWR Boundary
- Lnwr\_veg27.shp**
-  *Agropyron cristatum* - (*Pascopyrum smithii*, *Hesperostipa comata*) Semi-natural Herbaceous Vegetation
-  *Agropyron intermedium* Semi-Natural Herbaceous Vegetation
-  Blacktailed Prairie Dog Town Grassland Complex
-  *Bromus inermis* - (*Pascopyrum smithii*) Semi-natural Herbaceous Vegetation
-  *Cirsium arvense* - Weedy Forb Great Plains Herbaceous Vegetation (Provisional)
-  *Poa pratensis* - (*Pascopyrum smithii*) Semi-natural Herbaceous Vegetation

**Management for Grassland Dependent Bird Species**

Although these introduced grasslands do provide migratory bird habitat (Finkbeiner 2002), the extensive weed control required and the very simple plant community make the areas less attractive to the suite of grassland dependent species found on the refuge. Refuge staff recognize that a diverse grassland plant community will support diverse grassland bird populations.

We also know that vegetative height, structure, and residual cover are important factors to consider for many species of grassland birds (Table 1.) (Skinner 1975, Ryan 1986, Renken and Dinsmore 1987, Kantrud and Higgins 1992, Volkert 1992, and Bakker 2003). Providing a mix of short, medium, and tall grassland through prescribed burning, grazing, and haying provide a mix of habitat for the suite of grassland birds encountered on the refuge. We know that prairie dog towns typically lack medium and tall emergent grassland vegetation and have little residual cover due to the foraging and burrowing activities of the prairie dogs (M.S. Sid, et al. 1991). One study determined that over 80% of the forage (standing and residual vegetation) was removed by prairie dogs by August (Knowles 1986). Under the current management scenario of no direct control, prairie dogs may occupy a majority the grasslands north of Lake Creek and limit the available habitat for species requiring tall or medium grassland cover with residual vegetation.

Table 1. Nesting and foraging habitat requirements for selected grassland birds.

Species	Vegetation height	litter	Patch size	Distance from trees
Bobolink	25 to 45 cm	3.4 to 9.1 cm	40 ha	45 m
Burrowing owl	<13 cm	minimal	4 ha	>100 m
Dickcissel	21 to 100 cm	1.6 cm	10 ha	Prevent woody encroachment
Long-billed Curlew	<30 cm	minimal	42 ha	Avoids areas with high density trees and shrubs
Grasshopper sparrow	20 to 60 cm	Not available	8 ha	50 m
Sharp-tailed grouse	15 to 40 cm	Use areas that are idle for several years	60 ha	>50 m
Short-eared owl	30 to 60 cm	2-8 yrs. of residual cover	74 ha	Not available
Upland sandpiper	3 to 60 cm	2.3 cm	100 ha	100 m

**Burning, Grazing, Mowing**

A document titled Management of Black-tailed Prairie Dogs on Fish and Wildlife Service Lands (November 24, 2003) issued by the Regional Office, along with comments received by neighbors, partners, and reviewers of previous drafts of this plan indicate that burning, grazing, and mowing should not be completed on or adjacent to dog towns. The bare ground/low vegetation created may encourage prairie dog expansion. If this were incorporated into management as a hard and fast rule, management for grassland health would become more difficult on much of the refuge.

When prescribed fire is used as a management tool, typically units are burned with the safest boundaries, utilizing roads, field edges, open water, etc. to safely conduct a burn. A 3 acre prairie dog town in the middle of a burn unit plus a buffer around the town would require the unit to be split into many units to burn separately. The firebreaks utilized would no longer be determined by safety considerations. There is no guarantee that prairie dogs will not move and establish new towns, no matter how large a buffer that is created.

Burning or grazing conducted to improve the vigor and health of native vegetation may actually increase the vegetative height and discourage prairie dog expansion in certain situations. An evaluation completed by Matt Sprenger in 2002 looked at this management dilemma. He found that the dog towns which had expanded at the greatest rates actually had no management conducted. It appears that applying restrictions on management with a broad brush may not be the best strategy.

We believe that management should continue to be directed towards maintaining and/or improving plant health, which often includes prescribed burning or grazing. The cessation of the most effective grassland management tools available will almost certainly lead to a continual decline in the health of the grassland community, while providing a limited deterrent to prairie dog expansion.

We must also recognize that the expansion of prairie dog towns may in fact be encouraged by prescribed burning, grazing or mowing on some sites. Particularly during extended droughts in exotic grasslands that do not recover quickly following management. This will be factored into planning efforts for grazing, mowing, and prescribed burning.

### **Human Health and Safety Concerns**

Local residents have expressed a number of human health and safety concerns associated with the occurrence of black-tailed prairie dogs. While concerns regarding human health and safety are real and are taken seriously by the USFWS, the refuge staff and visitors do not believe it is a current issue for Lacreek NWR for reasons discussed below.

Prairie rattlesnakes are generally only observed on or near black-tailed prairie dog towns at LaCreek NWR by refuge staff. Although human bites have not been reported, several hunting dogs were reported to have been bitten on or near towns adjacent to the Refuge. Prairie rattlesnakes do use prairie dog burrows as winter hibernaculum, especially where no quality denning sites in rock outcrops are available (Knowles 1994). This phenomenon is observed on LaCreek NWR, as concentrations of rattlesnakes are observed in September and October on several towns used as hibernaculum. The abundance of small mammals on prairie dog towns may also attract rattlesnakes (Agnew et al 1987). These factors may lead to an increase in human and rattlesnake encounters, especially adjacent to occupied farmsteads during the fall denning period.

Prairie rattlesnakes are a native species found throughout the mixed and short grass prairies. Allowing rattlesnakes to exist in suitable habitat on LaCreek NWR is supported by current policy and management. We do believe, however, that increased human-rattlesnake encounters are

likely to occur when prairie dog towns lie adjacent to occupied residences. The U.S. Forest Service also recognizes this in its management of prairie dog towns on National Grasslands adjacent to occupied residences, and actively controls prairie dogs in these areas (Greg Schenbeck, personal communication).

The possibility of humans contracting sylvatic plague due to the presence of prairie dogs is frequently cited as a concern. People usually get plague from being bitten by a rodent flea that is carrying the plague bacterium or by handling an infected animal. Black-tailed prairie dogs are known to be flea carriers. In the United States, the last urban plague epidemic occurred in Los Angeles in 1924-25. Since then, human plague in the United States has occurred as mostly scattered cases in rural areas (an average of 10 to 15 persons each year) (Center For Disease Control Website: [www.cdc.gov/](http://www.cdc.gov/))

Modern antibiotics are effective against plague, but if an infected person is not treated promptly, the disease is likely to cause illness or death. Early detection may be difficult, as flu like symptoms are commonly reported, and infected individuals may not realize the seriousness of the illness. Most human cases in the United States occur in two regions: 1) northern New Mexico, northern Arizona, and southern Colorado; and 2) California, southern Oregon, and far western Nevada (Center For Disease Control Website: [www.cdc.gov/](http://www.cdc.gov/)). According to the South Dakota Department of Health, there has not been a case of human plague reported in South Dakota since 1923. It appears that the possibility of a human contracting plague from fleas associated with prairie dogs is extremely remote. For some individuals, however, the concern still exists.

Monkey pox was recently a high profile news story with regards to prairie dogs. The origin of the outbreak was traced to a shipment of prairie dogs in the pet trade. These prairie dogs then infected humans which handled them. USDA APHIS immediately placed restrictions on the trade and handling of prairie dogs. It does not appear that this disease is established in wild populations of prairie dogs.

The burrowing activities associated with dog towns frequently raises concern within the local community. While not a direct human health and safety issue, horseback riding in dog towns may become difficult as horses may stumble due to the mounds and holes created. Riders may be thrown from the horse as it stumbles. Livestock are also widely reported to suffer injury due to stepping in holes. This is not well documented in the literature, however it is widely circulated in local discussions. These are not concerns on the refuge, however they become a concern to neighboring landowners when prairie dogs on the refuge are perceived to or in fact do re-populate dog towns that have been controlled on adjacent private lands.

We also have one cemetery that lies as an in holding within the refuge boundary. We expect that left unmanaged, prairie dogs will expand onto private hayland adjacent to this cemetery. The owners of the cemetery and family members of the deceased will not likely tolerate prairie dog burrowing activities within the cemetery and will look to the refuge for relief. The U.S. Forest

Service also recognizes this in its management of prairie dog towns on National Grasslands adjacent to cemeteries, and actively controls prairie dogs in these areas (Greg Schenbeck, personal communication). Preventing prairie dog towns from expanding to areas immediately adjacent to the cemetery, using a combination of tools, is needed.

### **Local Perceptions and Attitudes**

The general local perception and attitude towards prairie dogs appears to be consistent with recent research conducted on the subject (Lamb and Kline, 2003). Those having more direct experience with prairie dogs tend to focus on the adverse effects of and need to control prairie dogs. The most common opinions expressed emphasize the competition with livestock for grazing, changes in plant communities (grass to annual forbs) due to burrowing (Coppock 1981), and soil erosion caused by bare ground and burrowing activities. Lamb and Kline also indicate that those with little direct contact with prairie dogs tend to place more value on prairie dogs and their role in the ecosystem.

Another indication of local perceptions of prairie dogs is the recent Senate Bill 216 passed by the South Dakota Legislature. This Bill outlines when prairie dogs may be considered pests. Legal requirements have been included that would require control up to 1 mile from your boundary, with penalties enforced for non compliance, when official complaints are filed against a private landowner.

### **Damage to Private Rangelands**

There have been numerous studies concerning the competition for grazing between livestock and prairie dogs. Research findings have shown that the competition is minimal (O'Meilia et al. 1982). Compensatory factors such as increased forage quality and nutrient cycling offset the above ground grazing and forage clipping done by prairie dogs (Whicker and Detling 1988). The fact that prairie dogs burrow and create bare ground and that they clip vegetation to the ground either to eat, store as hay, or to reduce visual obstruction is readily apparent to the casual observer. This has also been confirmed in many studies (Agnew et al. 1986, Sid et al. 1991, Knowles 1994). It is an illogical argument to most private landowners that there is little to no competition between prairie dogs and cattle for grazing, however prairie dogs remove up to 80% of the forage.

Private rangeland adjacent to the refuge is primarily used for livestock grazing and hay production. The burrowing, clipping, and grazing are primary factors given for control of prairie dogs on private lands. Mounds created make haying difficult to nearly impossible and the standing hay crop is nearly eliminated where prairie dogs are established. The level of control varies from landowner to landowner, but in general tolerance is low for any newly establishing towns or for towns that have expanded across ownership boundaries.

### **Drought**

Climactic data indicates that Bennett County has been in an extended drought. During above average precipitation years in mixed grass prairies, increased vegetative growth may limit

expansion of existing towns and the establishment of new towns. During periods of below average precipitation, expansion rates may increase dramatically. This is the pattern that appears to have been repeated in western South Dakota. We expect that during extended droughts, increases in direct prairie dog management may be needed. During periods of average to above average precipitation, less direct control will be required. We also expect that the level and frequency of grassland management through prescribed burning, grazing, and haying may need adjustment during a drought.

### MANAGEMENT

Management includes any activity conducted to control the size of a prairie dog town, maintain the habitat suitability for black-tailed prairie dogs, and/or ensure the long term viability of black-tailed prairie dogs on LaCreek NWR.

It is our belief that the significant increase in occupied acres on the Refuge is due to a combination of many factors. The cessation of all control activities, an extended drought, and the presence of suitable soil types have been major contributors. The refuge also contains large areas of monotypic stands of exotic grasses, which have shallow root systems and grow little during droughts, compared to native prairie species. This favors the expansion of existing prairie dog towns and the establishment of new towns. We recognize that black-tailed prairie dogs are a keystone species and their presence supports other species of concern such as burrowing owls and ferruginous hawks. In the Draft CCP, we have recognized this and included the following goal, objective, and strategies:

**Prairie Dog Subgoal:** Maintain a viable population of black-tailed prairie dogs within the boundary of LaCreek NWR.

**Prairie Dog Objective A:** Upon approval of a station specific prairie dog management plan, support a minimum of 300 acres of occupied black-tailed prairie dog towns within the biologically and socially compatible zone over the next 15 years.

#### **Strategies:**

1. Fully implement an approved station black-tailed prairie dog management plan.
2. Within the socially incompatible zone, control will be considered for use as part of mixed grass prairie restoration efforts.
3. Within the biological/social compatible zone, prairie restoration will utilize herbicide, interseeding, burning, grazing, and other habitat restoration techniques not requiring farming.
4. Conduct grazing, mowing and prescribed burning activities adjacent to black-tailed prairie dog towns in biological/social compatible zones when the occupied acres fall below 300 acres.
5. Work cooperatively with Bennett County Weed Board and the State of South Dakota on management of black-tailed prairie dogs on the refuge.

6. If black tailed prairie dogs are extirpated within the boundaries of LaCreek NWR, and do not re-establish passively within 3 years, planning for translocating will be initiated.

7. Establish buffer zones for prairie dog towns that are located along the exterior boundaries of the refuge adjacent to private range and hay land or private residences. Coordinate with adjacent landowners on control efforts.

We also recognize that left unmanaged, black-tailed prairie dogs will continue to colonize additional sites and existing towns will likely continue to expand. Based upon an analysis of soil types alone, black-tailed prairie dogs could potentially occupy up to 25% of the total refuge acreage, which comprises over 70% of our mixed grass acres. At this level, we would not be reaching our objectives of providing habitat for the suite of grassland species requiring tall and medium height grassland structure with residual cover, such as dickcissel, bobolink, and lark sparrow (Sinner 1975, Ryan 1986, Volkert 1992, Allen and Johnson 2003).

### **Proposed Management Scenario**

The map below illustrates a proposed management scenario at LaCreek NWR. Listed on the map are buffers around residences and adjacent private rangeland, soils which are believed to be incompatible for prairie dogs, and an area believed to be biologically and socially compatible with prairie dog occupation. Nearly 11,000 acres on the refuge are considered incompatible for prairie dog colonization due to soils or hydrology. These areas include the Sandhills, wetlands, and meadows where the water table is near the surface at some point during the year.

A buffer area around residences will provide the opportunity for mixed grass prairie restoration efforts and reduce conflicts. The buffer placed adjacent to private rangeland will serve to reduce the occurrence of prairie dogs established on the refuge expanding to adjacent private lands. Buffers were not placed next to agricultural land adjacent to the refuge because prairie dogs have not been noted to cause intolerable damage to adjacent cropland due to the annual tillage. After removing these areas, 1,787 acres have been identified as being biologically and socially compatible for prairie dog colonies. This acreage is over 3 times the area (501.7 acres) that was occupied by prairie dogs during the spring 2005 mapping.

It is unknown what range of acreage of occupied prairie dog towns may have historically existed on the refuge. Some speculation has been made that from 3% to 10% of large regions were occupied by prairie dogs (Flath and Clark 1986, Clark 1989). The current level of 501 acres of prairie dog towns is 3% of the total acreage of the refuge (16,410 acres) and 12% of the total area containing compatible soil types (4,086 acres). The proposed minimum level of 300 acres is 7% of the total area containing compatible soil types. The prairie dog compatible zone (1,787 acres) identified on the map below is 11% of the total refuge acreage and 44% of the total area containing compatible soil types.

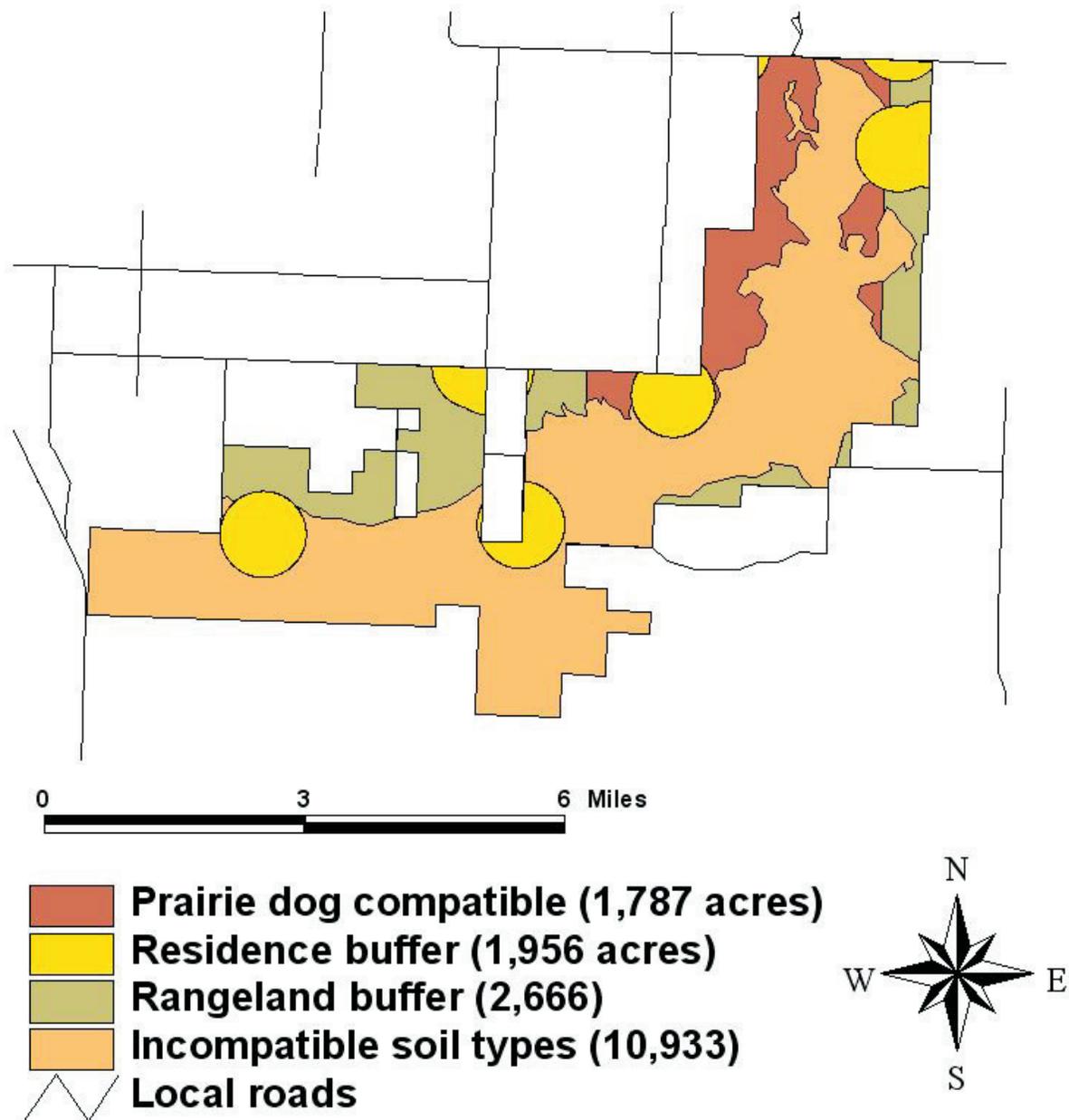
A minimum acreage of 300 acres was determined based on the speculation of historically occupied acres by Flath and Clark. Research and staff observations also indicates that this level would support a sustainable population that could also support associated species such as burrowing owls and ferruginous hawks. This level will allow for control measures to be

implemented to address the existing conflicts with adjacent landowners. It will also allow for planned prairie restoration to move forward.

Existing and newly established towns outside of the prairie dog compatible zones could be considered for active control methods using one or more of the tools described below. The need for direct control measures would be considered on a case by case basis. Considerations would include conflicts with planned prairie seedings and management, location relative to occupied residences and private rangeland, or other conflicts with management. A unit by unit listing of towns to be controlled and what method(s) to be used has not been given due to the evolving nature of our prairie restoration program, experience to be gained with control techniques, and the dynamic establishment of towns on the refuge. This will allow more flexibility where, when, and how control measures are taken and will allow us to adjust when conditions warrant. These details will be addressed in our Annual Habitat Work Plans.

Existing and newly established towns inside of the prairie dog compatible zone would be allowed to expand and contract without the use of direct control measures. Changes in agricultural practices on adjacent private lands within the compatible zone, such as the planting of alfalfa or other tame grasses for a hay crop on fields that had been farmed annually, may require control measures adjacent to these fields.

## Proposed Prairie Dog Management Scenario



### **Management Options For Black-Tailed Prairie Dogs**

Many strategies and techniques were considered for the management of black-tailed prairie dogs. They were evaluated based on a review of available literature, staff experience and knowledge, adjacent neighbor's and partner's experience, available budget, and compliance with laws, regulations, and policies related to refuge management. We will strive to maintain a minimum of 300 acres of occupied black-tailed prairie dog towns on the refuge, however actual acreages may far exceed that within the compatible zone.

### **Toxicants**

The use of toxicants has been shown to be one of the most effective methods of control for prairie dogs. Staff do not believe that prairie dog management can be effectively completed without the availability of toxicants as a tool in the toolbox. Several toxicants are currently labeled for use which have no secondary poisoning effects when label instructions are followed, and typically provide up to 90% control with the 1<sup>st</sup> treatment. One or more follow-up treatments may be needed for 100% control. Timing of the application is critical to reduce impacts to nontarget species (Tom Beck, personal communication).

Zinc-phosphide coated oats were developed and approved by the U.S. Fish and Wildlife Service as a control agent for prairie dogs (Tietjen 1976). They have been used successfully on LaCreek NWR prior to the moratorium. Proper pre-baiting and timing are critical to ensure that treated grain is consumed by prairie dogs and does not remain available to non-target animals. All label instructions will be followed by certified applicators. Prairie dogs eating zinc phosphide treated oats typically die slowly enough that they retreat into burrow systems and are not left on the surface. Zinc phosphide is extremely toxic to waterfowl and granivorous birds (Knowles 1994). It rapidly decomposes in the environment when exposed to moisture. The most likely non-target species to be affected on LaCreek NWR would be granivorous birds commonly observed on prairie dog towns such as western meadowlarks, red-winged blackbirds, and horned larks. Late fall and early winter are considered ideal times for control due to the fact that most granivorous birds, burrowing owls, and other sensitive species are not present. Also, prairie dogs more readily take the treated grain, as little to no green forage is available (Tom Beck, personal communication).

PhosFume is another toxicant labeled for use in prairie dog control. It is widely used to fumigate grain bins and is also labeled for use on burrowing rodents, including prairie dogs. It comes in a tablet form that is dispensed into holes and then the holes are covered. A chemical reaction is initiated by exposure to atmospheric moisture and phosphine gas is released throughout the burrow system. This phosphine gas is highly toxic to insects, birds, and mammals. Timing again is critical, as any non-target animals in the burrows will also be killed. The best time to treat with PhosFume is from fall to late winter, after all burrowing owls have departed. The State of South Dakota has treated adjacent prairie dog towns with PhosFume and report >90% control with the first treatment (Tom Beck, personal communication). A certified contractor will be hired to make application of this toxicant. Current Refuge policy will be followed by completion of an approved Pesticide Use Proposal for both.

## Shooting

Recreational shooting of black-tailed prairie dogs is not allowed on LaCreek NWR, and we propose to leave this closure in place. This decision was made based upon the fact that a significant amount of opportunity for this activity occurs on adjacent State and private lands. Most of the Refuges dog towns also are used for wildlife observation. Control through selective shooting by Refuge staff was considered. Experience has shown that this is a very labor intensive and relatively ineffective method of control. Therefore, this method will not be considered for use.

## Trapping

The use of cage traps, leg hold traps, snares, and connibear traps were considered. The publication Prevention and Control of Wildlife Damage produced by the University of Nebraska Wildlife Extension Service discusses the merits of each. In general, cage traps and snares have been shown to be labor intensive, relatively ineffective, and expensive on a large scale. Small leg hold traps and #120 Connibear or equivalent traps have been shown to be quite effective for control in very small towns. We plan to use leg hold and/or Connibear traps placed in burrow entrances to control small towns less than 5 acres in size. Upon removal of animals, the burrows will be filled in to discourage re-colonization.

We are considering the use of live trapping to support the recovery efforts for black-footed ferrets. Long term management of established towns may require periodic repeated control to limit population size within a town and prevent expansion (Knowles 1986). One option we are considering is to live trap a portion of these towns and provide as a food source for black footed ferrets. This would reduce or eliminate the need for long term toxicant use on remaining prairie dog towns. This would depend on the demand for live prairie dogs, ability to secure clearances for transport, support received for supplies and labor to capture, quarantine, and transport, etc.

## Visual Barriers/Deterrents

The placement of hay bales, fences, and perches have been reported in the literature as control techniques (Hynstrom 1988). The theory is that visual barriers and perches placed to encourage raptor and mammalian predator use will discourage the use of an area by prairie dogs. Although, all three methods have been tried on and adjacent to LaCreek NWR in recent years, no noticeable affect has been observed. This control technique may be more effective on newly established towns containing only a small number of animals.

Some success has been reported with the use of visual fence barriers at other locations. Any material that withstands deterioration by sunlight and precipitation can be used. Reef Industries is the manufacturer of Griffolyn, which is promoted as a barrier for prairie dogs (<http://www.reefindustries.com>).

Information on the design and installation of this barrier material is available at the following website [http://www.ci.boulder.co.us/openspace/nature/pdogs\\_management.htm#fencing](http://www.ci.boulder.co.us/openspace/nature/pdogs_management.htm#fencing) . We

will purchase and install this visual barrier on at least one site at the time other control methods are completed. The effectiveness of this visual barrier will be evaluated and if effective, will be used for other similar situations.

### **Physical Barriers**

Placement of physical barriers has been used with varying success. The South Dakota Game, Fish, and Parks recently installed a single strand of electric fence placed 2” to 5” above the ground surface in an attempt to prevent damage to a windbreak planted adjacent to a dog town. Kochia and other annual weeds grew on the opposite side of the fence. These tall weeds caused the prairie dogs to cease attempts at expansion of the town, at least on the side with the electric fence, for one year. By the second year, some prairie dogs had moved past the electric fence (Tom Beck, personal communication).

Snow fence and fences made of other materials have been placed to make a physical barrier to dog town expansion. Some have reported good success, while others report that prairie dogs dig under the fence or climb over without problems. There may be some situations, where installation of a temporary electric fence or snow fence may be warranted to prevent prairie dogs from moving. An example of a situation where this could be useful would be on a newly seeded prairie restoration adjacent to an established dog town. A temporary fence may allow annual weeds to grow, preventing prairie dogs from re-occupying the site. We will install a physical barrier fence on at least one site in coordination with other control activities and evaluate its effectiveness. If this technique proves effective, we will increase its use on other sites.

### **Farming/Leveling Holes**

To prevent re-establishment, holes and mounds may be bladed, disked, or otherwise smoothed. If the field will be farmed after treatment, disking and other farming operations will level and smooth the mounds. Small towns may be smoothed with a small tractor mounted blade.

### **Seeding**

Nearly all prairie dog towns on the refuge established in fields that had a cropping history, and therefore the native plant community was lost. Currently, many of these towns are dominated by annual weeds such as kochia (*Kochia scoparia*) and Russian thistle (*Salsola iberica*), both of which are commonly referred to as tumbleweeds. After the growing season, bare ground is present and severe wind erosion may occur. The native plant community to be expected on a well established dog town in the mid grass prairie would be more representative of the short grass prairie. This would include species such as blue grama, buffalo grass, elk sedge, sideoats grama, western wheatgrass and other low growing and drought tolerant species. In order to establish a plant community tolerant of repeated prairie dog grazing and burrowing, established dog towns that remain will be over seeded with blue grama, buffalo grass, western wheatgrass, elk sedge and other locally collected native species. This will help with both the long term viability of the town and reduce wind erosion that occurs with the increased amount of bare soil.

**Disease Monitoring**

Staff will be informed of the potential for plague and other infectious diseases associated with prairie dogs through periodic safety meetings, e-mails, and memos. Any individual animals that appear to be sick or injured will be monitored. If appropriate, one or more animals will be collected by qualified staff member using appropriate personal protective equipment and sent to the disease lab for analysis. The Regional Biologist will be contacted along with the Center for Disease Control for consultation prior to any animal or flea collection. Upon confirmation that plague has been confirmed on LaCreek NWR, Regional External Affairs will be contacted to formulate a response plan.

**Translocating**

The only likely scenario to cause the long term loss of most/all prairie dogs on LaCreek NWR would be an outbreak of plague. In the event that a total loss of prairie dogs occurs on LaCreek NWR, monitoring will continue for at least 3 years. If after 3 years prairie dogs have not begun to re-establish on their own, consideration will be given to translocating black tailed prairie dogs into an existing town within the compatible zone. Other measures could also be attempted, such as increasing the frequency and duration of livestock grazing on previously occupied towns in the compatible zone.

**Population Monitoring**

The reintroduction of black-footed ferrets into South Dakota prompted the need to estimate population densities of black-tailed prairie dogs with some certainty because they are an essential food source for ferrets. Several techniques were developed that include: 1) counting active burrows using transects (Biggins et al. 1993), 2) visual counts in a defined area, 3) and using aerial photographs (Severson and Plumb 1998). All these techniques were tested during a mark/recapture study by Severson and Plumb and it was determined that using visual counts in a defined area correlated more closely to the actual numbers than other methods.

The number and size of prairie dog towns on Lacreek NWR has remained relatively small with the exception of the past few years (1999 – 2005). Because of this, monitoring has been a low priority for the Refuge and was not part of the wildlife inventory plan. With the recent expansion, estimating densities has become important. The Refuge currently maps the number of acres on Lacreek NWR and identifies newly formed or recolonized areas, but no density estimates have been completed. Prairie dog surveys will be incorporated into the Refuges wildlife inventory plan with the first survey scheduled for 2005 and results available in early 2006.

The Refuge will use the protocol outlined by Severson and Plumb (1998). This technique consists of counting individuals three times in 4-hec plots for 3 consecutive days using the maximum number counted as the final estimate. Visual counts will be conducted from an elevated area e.g., a blind or hill, early morning using binoculars. The surveys will be conducted from mid to late June after the young-of-the-year have emerged and yearlings are dispersing.

Additionally, the Refuge will continue to map complex boundaries using GPS and identify any newly formed or recolonized areas.

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### **Fire: A Critical Natural Process**

Fire, whether set or caused by lightning, has been a part of the prairie for thousands of years. Fire provides one or more benefits to a prairie. It can remove dead vegetation that hinders new growth; it can release nutrients to enrich the soil; it can reduce invader plants and encourage native species; and, it can create habitats attractive to wildlife. The significance of fire in natural grasslands has been well established. Frequent, light fires on bluestem grasslands, for example, result in an increase in biomass and may also stimulate flower production. When fire is suppressed from these grasslands, native species may lose their competitive edge. . In addition, accumulations of fuels often change fire regime characteristics and have created the potential in some areas for uncharacteristically severe wildfires. These catastrophic wildfires often pose risks to public and firefighter safety, as well as threaten property and resource values such as wildlife habitat.

Historically, grasslands in the northern Great Plains coevolved with various disturbance regimes such as fire and large-scale grazing. The use of prescribed fire in most ecosystems is essential for healthy vegetation and for maintaining or improving wildlife habitat. When integrated back into an ecosystem, fire can help restore and maintain healthy systems and help reduce the risk of wildfires. To facilitate fire's natural role in the environment, fire must be integrated into land and resource management plans and activities on a broad scale. Prescribed fire can:

- Improve wetlands by reducing the density of vegetation and accumulated plant litter, thereby increasing the amount of surface water available to wildlife
- Sustain biological diversity by reducing invader species and encouraging native species
- Add to the effectiveness of an Integrated Pest Management Program
- Improve soil fertility
- Improve quality and amount of livestock forage
- Reduce the susceptibility of plants to insects and disease caused by moisture and nutrient stress

### **Wildland Fire Management Policy and Guidance**

The 2001 Federal Wildland Fire Management Policy directs federal agencies to balance suppression to protect life, property, and resources with fire use to regulate fuels and maintain healthy ecosystems. The policy directs agencies to utilize the appropriate management response for all wildland fires regardless of the ignition source. In addition, the policy provides eight guiding principles that are fundamental to the success of the fire management program:

- Firefighter and public safety is the first priority in every fire management activity
- The role of wildland fires as an essential ecological process and natural change agent will be incorporated into the planning process
- Fire management plans, programs, and activities support land and resource management plans and their implementation
- Sound risk management is a foundation for all fire management activities
- Fire management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives
- Fire management plans and activities are based upon the best available science
- Fire management plans and activities incorporate public health and environmental quality consideration, federal, state, tribal, local, interagency, and international coordination and cooperation are essential
- Standardization of policies and procedures among federal agencies is an ongoing objective

Based on this guidance, it is essential to include fire management into land use resource plans such as the CCP. The fire management plan for Lacreek NWR is a stepdown plan from the CCP and habitat management plan. The fire management plan contains significantly more detail on fire suppression, fire use, and fire management activities, while incorporating the above policy and guidance..

## ***Fire Program Management Goal***

All wildfires on Lacreek NWR will be safely suppressed in order to protect life, property, and other resources. Prescribed fire will be utilized within the context of ecosystem management for habitat management purposes, and to protect public and private property through fuel reduction activities, especially in areas with a high proportion of adjacent residences. All fire management activities will be conducted in a manner consistent with applicable laws, policies, and regulations. A fire management plan will be maintained and updated as needed or at least every 10 years.

## ***Fire Management Objectives and Strategies:***

### **Fire Management Objective #1**

Use prescribed fire in a safe and professional manner to accomplish habitat management strategies in uplands, wet meadows, and developed wetlands.

***Upland Habitat Strategy:*** Conduct 200 to 1,500 acres of prescribed burning in upland habitats each year to encourage/promote increased plant structure.

***Wet Meadow Habitat Strategy:*** Conduct 200 to 1,500 acres of prescribed burning in wet meadow habitats each year to encourage/promote increased and plant structure.

Integrate prescribed burning and prescribed grazing management techniques.

***Developed Wetland Habitat Strategy:*** Conduct 200 to 1,500 acres of prescribed burning each year in developed wetland to: reduce plant litter depths; encourage germination and growth of desirable species; injure root systems of aggressive perennial wetland plants; and improve effectiveness of grazing and IPM in these habitats.

### **Fire Management Objective #2**

All wildfires occurring on or threatening Lacreek NWR will be suppressed in: a safe and professional manner; coordination with all cooperating agencies; and accordance with all applicable laws, regulations, and policies.

***Strategy:*** Use the Lacreek Fire Management Plan for specific details on the use of prescribed fire as a management tool, and the suppression of wildfires on or threatening Lacreek NWR.

# Appendix G

## *Species List*

The following plant list was compiled from species collected on Lacreek NWR and located in herbariums at Lacreek NWR, South Dakota State University, University of South Dakota, and University of Nebraska at Chadron. Additional species were added by staff members at Lacreek NWR from specimens that had been keyed but were not included in herbarium collections. A “D” following the common name indicates this is a Desirable species for consideration in Developed Wetland Objectives A, B, and C. I = Introduced, N = Native

### Plants

<i>Scientific Name</i>	<i>Common Name</i>	<i>Origin</i>
<i>Acer negundo</i>	Box elder	N
<i>Achillea millefolium</i> ssp. <i>lanulosa</i>	Yarrow	N
<i>Agropyron caninum</i>	Slender wheatgrass D	N
<i>Agropyron cristatum</i>	Crested wheatgrass	I
<i>Agropyron intermedium</i>	Intermediate wheatgrass	I
<i>Agropyron repens</i>	quackgrass	I
<i>Agropyron smithii</i>	Western wheatgrass D	N
<i>Agrostis hyemalis</i>	Ticklegrass D	N
<i>Agrostis stolonifera</i>	Redtop	I
<i>Alisma plantago-aquatica</i>	Water plantain D	N
<i>Alisma subcordatum</i>	Water plantain D	N
<i>Allium textile</i>	Wild onion	N
<i>Alopercus arundinacea</i>	Creeping foxtail	I
<i>Amaranthus retroflexus</i>	pigweed	N
<i>Amaranthus tuberculatus</i>	Tall water hemp D	N
<i>Ambrosia artemesifolia</i>	Common ragweed D	N
<i>Ambrosia psilostachya</i>	Western ragweed D	N
<i>Ammannia robusta</i>	Ammannia D	N
<i>Amorpha canescens</i>	Leadplant	N
<i>Amorpha fruticosa</i>	False indigo D	N
<i>Andropogon gerardii</i>	Big bluestem D	N
<i>Andropogon hallii</i>	Sand bluestem	N
<i>Andropogon scoparius</i>	Little bluestem	N
<i>Antennaria neglecta</i>	Pussytoes	N
<i>Apocynum sibiricum</i>	Prairie dogbane D	N
<i>Arctium lappa</i>	Great burdock	I
<i>Argemone polyanthemos</i>	Pricklypoppy	N
<i>Aristida purpurea</i>	Red three-awn	N
<i>Artemesia biennis</i>	Biennial wormwood	I
<i>Artemesia campestris</i>	Green sagewort	N
<i>Artemesia frigida</i>	Fringed sage	N
<i>Artemesia ludoviciana</i>	White sage	N
<i>Asclepias arenaria</i>	Sand milkweed	N
<i>Asclepias incarnata</i>	Swamp milkweed	N
<i>Asclepias pumila</i>	Dwarf milkweed	N
<i>Asclepias speciosa</i>	Showy milkweed	N
<i>Asclepias syriaca</i>	Common milkweed D	N
<i>Asclepias verticiflora</i>	Green milkweed	N
<i>Asclepias verticillata</i>	Whorled milkweed	N
<i>Asparagus officianalis</i>	asparagus	I
<i>Aster ericoides</i>	Heath aster D	N
<i>Aster falcatus</i>	White prairie aster D	N
<i>Aster simplex</i>	Panicled aster D	N
<i>Astragalus ceramicus</i>	Bird’s-egg milkvetch	N

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<i>Scientific Name</i>	<i>Common Name</i>	<i>Origin</i>
<i>Astragalus crassicaarpus</i>	Groundplum milkvetch	N
<i>Astragalus racemosus</i>	Racemed poisonvetch	N
<i>Beckmania syzigachne</i>	American sloughgrass D	N
<i>Berteroa incana</i>	Hoary alyssum	I
<i>Berula erecta</i>	Water parsnip	N
<i>Bidens cernua</i>	Nodding beggar-ticks D	N
<i>Bidens comosa</i>	Beggar-ticks D	N
<i>Bidens coronata</i>	Tickseed sunflower D	N
<i>Bidens frondosa</i>	Beggar-ticks D	N
<i>Bidens vulgate</i>	Beggar-ticks D	N
<i>Bouteloua curtipendula</i>	Side-oats grama	N
<i>Bouteloua gracillis</i>	Blue-grama	N
<i>Bouteloua hirsuta</i>	Hairy grama	N
<i>Brassica kaber</i>	Wild mustard	I
<i>Bromis inermis</i>	Smooth bromegrass	I
<i>Bromus japonicus</i>	Japanese bromegrass	I
<i>Bromus porteri</i>	Nodding bromegrass	N
<i>Bromus tectorum</i>	cheatgrass	I
<i>Buchloe dactyloides</i>	Buffalo grass	N
<i>Calamagrostis canadensis</i>	Canada bluejoint D	N
<i>Calamagrostis stricta</i>	Northern reedgrass D	N
<i>Calamovilfa longifolia</i>	Prairie sandreed	N
<i>Calylophus serrulatus</i>	Yellow evening primrose	N
<i>Camelina microcarpa</i>	Smallseed falseflax	I
<i>Carduus acanthoides</i>	Plumeless thistle	I noxious
<i>Carduus nutans</i>	Musk thistle	I noxious
<i>Carex atherodes</i>	Slough sedge D	N
<i>Carex brevoir</i>	Fescue sedge D	N
<i>Carex comosa</i>	Sedge D	N
<i>Carex eleocharis</i>	Needleleaf sedge	N
<i>Carex filifolia</i>	Threadleaf sedge	N
<i>Carex hystericina</i>	Bottlebrush sedge D	N
<i>Carex lanuginosa</i>	Wooly sedge D	N
<i>Carex nebraskensis</i>	Nebraska sedge D	N
<i>Carex preagracilis</i>	Clustered field sedge D	N
<i>Carex stipata</i>	Saw-beak sedge D	N
<i>Carex vulpinoidea</i>	Fox sedge D	N
<i>Celtis occidentalis</i>	Hackberry	N
<i>Cenchrus longispinus</i>	Sandbur	N
<i>Ceratophyllum demersum</i>	Coontail D	N
<i>Chenopodium rubrum</i>	Red goosefoot D	N
<i>Chrysopsis villosa</i>	Hairy goldaster	N
<i>Cicuta maculata</i>	Water hemlock	N
<i>Cirsium arvense</i>	Canada thistle	I noxious
<i>Cirsium undulatum</i>	Wavyleaf thistle	N
<i>Cirsium vulgare</i>	Bull thistle	I
<i>Cleome serrulata</i>	Rocky mountain beeplant	N
<i>Convolvulus arvensis</i>	Creeping jenny	I
<i>Conyza canadensis</i>	Horseweed	I
<i>Coreopsis tinctoria</i>	Plains coreopsis	N
<i>Cornus stolonifera</i>	Red osier dogwood D	N
<i>Coryphantha vivipara</i>	Purple pincushion	N
<i>Cyperus esculentus</i>	Yellow nutsedge D	N
<i>Dactylis glomerata</i>	Orchardgrass	I
<i>Dalea candida</i>	White prairie clover	N
<i>Dalea purpurea</i>	Purple prairie clover	N
<i>Dalea villosa</i>	Silky prairie clover	N
<i>Delphinium virescens</i>	Prairie larkspur	N
<i>Descurainia pinnata</i>	Tansymustard	I
<i>Desmodium canadense</i>	Canada tickclover	N
<i>Desmodium canadense</i>	Canada tickclover	N
<i>Dicanthelium oligosanthes var. scribnerianum</i>	Scribner's panicum	N

<i>Scientific Name</i>	<i>Common Name</i>	<i>Origin</i>
<i>Distichlis spicata</i>	Inland saltgrass D	N
<i>Dyssodia papposa</i>	Fetid marigold	N
<i>Echinacea angustifolia</i>	Purple coneflower	N
<i>Echinochloa crusgalli</i>	Barnyard grass D	I
<i>Echinochloa muricata</i>	Rough barnyardgrass D	N
<i>Eleagnus angustifolia</i>	Russian olive	I
<i>Eleocharis aciculais</i>	Spikerush D	N
<i>Eleocharis compressa</i>	Spikerush D	N
<i>Eleocharis palustris</i>	Creeping spikerush D	N
<i>Elodea canadensis</i>	Elodea D	N
<i>Elymus canadensis</i>	Canada wildrye D	N
<i>Epilobium ciliatum</i>	Willow herb D	N
<i>Epilobium leptophyllum</i>	Narrow-leaved willow herb D	N
<i>Equisetum leavigatum</i>	Smooth scouring rush	N
<i>Eragrostis cilianensis</i>	Stinkgrass	I
<i>Eragrostis trichoides</i>	Sand lovegrass	N
<i>Erigeron bellidiastrum</i>	Western fleabane	N
<i>Erigeron strigosus</i>	Daisy fleabane	N
<i>Eriogonum annuum</i>	Annual wild buckwheat	N
<i>Eriophorum gracile</i>	Slender cottongrass D	N
<i>Erysium asperum</i>	Western wallflower	N
<i>Eupatorium maculatum</i>	Spotted joe-pye weed D	N
<i>Euphorbia esula</i>	Leafy spurge	I noxious
<i>Euphorbia marginata</i>	Snow-on-the-mountain	I
<i>Euthamia graminifolia</i>	Grass-leaved goldenrod	I
<i>Fraxinus pennsylvanica</i>	Green ash D	I
<i>Froelichia gracilis</i>	Cottonweed D	I
<i>Galium aparine</i>	Catchweed bedstraw D	I
<i>Galium trifidum</i>	Small bedstraw D	I
<i>Gaura coccinea</i>	Scarlet gaura	I
<i>Gaura parviflora</i>	Velvet gaura	I
<i>Gentiana andrewsii</i>	Bottle gentian D	N
<i>Geum aleppicum</i>	Yellow avens	N
<i>Gleditsia triacanthos</i>	Honey locust	N
<i>Glyceria grandis</i>	Tall managrass D	N
<i>Glyceria striata</i>	Fowl managrass D	N
<i>Glycyrrhiza lepidota</i>	Wild licorice D	N
<i>Grindelia squarrosa</i>	Curlycup gumweed	N
<i>Gutierrezia sarothrae</i>	Broom snakeweed	N
<i>Haplopappus spinulosus</i>	Cutleaf ironplant	N
<i>Helianthus annuus</i>	Annual sunflower D	N
<i>Helianthus grosseratus</i>	Sawtooth sunflower D	N
<i>Helianthus maximiliani</i>	Maximilian sunflower D	N
<i>Helianthus nuttallii</i>	Nuttall's sunflower D	N
<i>Helianthus petiolaris</i>	Plains sunflower	N
<i>Helianthus rigidus</i>	Stiff sunflower	N
<i>Helianthus tuberosus</i>	Jerusalem artichoke D	N
<i>Heliopsis helianthoides</i>	False sunflower D	N
<i>Hesperis matronalis</i>	Damesrocket	I
<i>Hordeum jubatum</i>	Foxtail barley D	N
<i>Hordeum pusillum</i>	Little barley D	N
<i>Hymenopappus tenuifolius</i>	Slimleaf hymenopappus	N
<i>Impatiens capensis</i>	Spotted touch-me-not D	N
<i>Ipomoea leptophylla</i>	Bush morning glory	N
<i>Ipomopsis longiflora</i>	White trumpet flower	N
<i>Iva xanthifolia</i>	Marshelder	N
<i>Juncus balticus</i>	Baltic rush D	N
<i>Juncus bufonis</i>	Toad rush D	N
<i>Juncus dudleyi</i>	Dudley rush D	N
<i>Juncus interior</i>	Inland rush D	N
<i>Juncus marginatus</i>	Grassleaf rush D	N
<i>Juncus nodosus</i>	Knotted rush D	N
<i>Juncus torreyi</i>	Torrey's rush D	N

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<i>Scientific Name</i>	<i>Common Name</i>	<i>Origin</i>
<i>Juniperis virginiana</i>	Red cedar	N
<i>Kocia scoparia</i>	Kocia	I
<i>Koeleria macrantha</i>	Prairie junegrass	N
<i>Kuhnia eupatorioides</i>	False boneset	N
<i>Lactuca oblongifolia</i>	Blue lettuce	N
<i>Lathyrus polymorphus</i>	Hoary vetchling	N
<i>Leersia oryzoides</i>	Rice cutgrass D	N
<i>Lemna minor</i>	Duckweed D	N
<i>Lemna trisulca</i>	Star duckweed	N
<i>Lespedeza capitata</i>	Round headed bushclover	N
<i>Leucocrinum montanum</i>	Starlily	N
<i>Liatris punctata</i>	dotted gayfeather	N
<i>Liatris squarrosa</i>	Scaly blazingstar	N
<i>Lithospermum canescens</i>	Hoary puccoon	N
<i>Lithospermum incisum</i>	Wavyleaf puccoon	N
<i>Lonicera tatarica</i>	Tartarian honeysuckle	I
<i>Lotus corniculatus</i>	Birdsfoot trefoil	I
<i>Lotus purshianus</i>	American deervetch	N
<i>Lycopus americanus</i>	American bugleweed	N
<i>Lygodesmia juncea</i>	Rush skeleton weed	N
<i>Lysimachia ciliate</i>	Fringed loosestrife D	N
<i>Maianthemum stellatum</i>	False solomon' seal	N
<i>Medicago sativa/falcata</i>	Alfalfa	I
<i>Melilotus alba</i>	White sweetclover	I
<i>Melilotus officinalis</i>	Yellow sweetclover	I
<i>Mentha arvensis</i>	Mint D	N
<i>Mentzelia decapatala</i>	Ten petaled mentzelia	N
<i>Mirabilis hirsute</i>	Hairy four-o'clock	N
<i>Mirabilis nyctaginea</i>	Wild four-o'clock	N
<i>Monarda fistulosa</i>	Bee balm	N
<i>Muhlenbergia pungens</i>	Sand muhly	N
<i>Muhlenbergia racemosa</i>	Marsh muhly	N
<i>Nepeta cataria</i>	Catnip	I
<i>Oenothera biennis</i>	Common evening primrose	N
<i>Oenothera nuttallii</i>	White stemmed evening primrose	N
<i>Oenothera rhombipetala</i>	Fourpoint evening primrose	N
<i>Onoclea sensibilis</i>	Sensitive fern D	N
<i>Onosmodium molle</i>	False gromwell	N
<i>Opuntia fragilis</i>	Fragile prickly pear	N
<i>Opuntia polycantha</i>	Prickly pear	N
<i>Oryzopsis hymenoides</i>	Indian ricegrass	N
<i>Oxalis dillenii</i>	Gray-green woodsorrel	N
<i>Oxytropis lambertii</i>	Lambert's crazyweed	N
<i>Panicum cappillare</i>	Witchgrass	N
<i>Panicum dichotomiflorum</i>	Fall panicum D	N
<i>Panicum virgatum</i>	Switchgrass D	N
<i>Paspalum setaceum</i>	Knot grass	I
<i>Penstemon albidus</i>	White beardtongue	N
<i>Penstemon angustifolius</i>	Narrowleaf beardtongue	N
<i>Penstemon glaber</i>	Smooth beardtongue	N
<i>Penstemon gracilis</i>	Slender beardtongue	N
<i>Penstemon grandiflorus</i>	Shell-leaf penstemon	N
<i>Phalaris arundinacea</i>	Reed canarygrass	I/N
<i>Phleum pretense</i>	Timothy	I
<i>Phlox andicola</i>	Plains phlox	N
<i>Phlox hoodii</i>	Hood's phlox	N
<i>Phragmites australis</i>	Phragmites	N/I
<i>Physalis pumila</i>	Prairie ground cherry	N
<i>Physalis virginiana</i>	Ground cherry	N
<i>Physostegia parviflora</i>	Obedient plant	N
<i>Pilea fontana</i>	Clearweed	N
<i>Plantago patagonica</i>	Indianwheat	N
<i>Poa compressa</i>	Canada bluegrass	I

<i>Scientific Name</i>	<i>Common Name</i>	<i>Origin</i>
<i>Poa pratensis</i>	Kentucky bluegrass	I
<i>Polanisia jamesii</i>	James clammyweed	N
<i>Polygala alba</i>	Milkwort	N
<i>Polygonum amphibium</i>	Water smartweed D	N
<i>Polygonum coccineum</i>	Swamp smartweed D	N
<i>Polygonum convolvulus</i>	Black bindweed	I
<i>Polygonum lapathifolium</i>	Annual smartweed D	N
<i>Polygonum pennsylvanicum</i>	Pennsylvania smartweed D	N
<i>Polygonum persicaria</i>	Lady's-thumb D	N
<i>Polygonum punctatum</i>	Water smartweed D	N
<i>Polygonum sagittatum</i>	Arrow smartweed D	N
<i>Populus deltoids</i>	Plains cottonwood	N
<i>Potamogeton foliosus</i>	Leafy pondweed D	N
<i>Potamogeton nodosus</i>	Longleaf pondweed D	N
<i>Potamogeton pectinatus</i>	Sago pondweed D	N
<i>Potamogeton pusillus</i>	Small pondweed D	N
<i>Potamogeton richardsonii</i>	Claspingleaf pondweed D	N
<i>Prunella vulgaris</i>	Healall D	N
<i>Prunus americana</i>	Wild plum	N
<i>Prunus pumila</i>	Sandcherry	N
<i>Prunus virginiana</i>	Chokecherry	N
<i>Psoralea argophylla</i>	Silverleaf scurfpea	N
<i>Psoralea digitata</i>	Palmleaf scurfpea	N
<i>Psoralea tenuiflora</i>	Slimflower scurfpea	N
<i>Ranunculus longistris</i>	White water-crowfoot D	N
<i>Ratibida columnifera</i>	Upright prairie coneflower	N
<i>Redfieldia flexuosa</i>	Blowout grass	N
<i>Ribes odoratum</i>	Buffalo currant	N
<i>Rorippa palustris</i>	Bog yellow cress D	N
<i>Rosa acicularis</i>	Prickly rose	N
<i>Rosa arkansana</i>	Prairie rose	N
<i>Rudbeckia hirta</i>	Black-eyed susan	N
<i>Rumex crispus</i>	Curly dock D	I
<i>Rumex maritimus</i>	Golden dock D	N
<i>Rumex occidentalis</i>	Western dock D	N
<i>Rumex stenophyllus</i>	Dock D	I
<i>Rumex venosus</i>	Wild begonia	N
<i>Sagittaria cuneata</i>	Arrowhead D	N
<i>Sagittaria latifolia</i>	Arrowhead D	N
<i>Salix amygdaloides</i>	Peach-leaved willow	N
<i>Salix exigua</i>	Sandbar willow D	N
<i>Salix petiolaris</i>	Meadow willow D	N
<i>Salsola iberica</i>	Russian thistle	I
<i>Schizachyrium scoparium</i>	Little bluestem	N
<i>Scirpus acutus</i>	Hard-stem bulrush D	N
<i>Scirpus fluviatilis</i>	River bulrush D	N
<i>Scirpus maritimus</i>	Prairie bulrush D	N
<i>Scirpus pallidus</i>	Pale bulrush D	N
<i>Scirpus pungens</i>	Chairmakers rush D	N
<i>Senecio integerrimus</i>	Lambstonge groundsel	N
<i>Senecio riddellii</i>	Riddell's ragwort	N
<i>Seteria glauca</i>	Yellow foxtail	I
<i>Seteria verticillata</i>	Bristly foxtail	I
<i>Seteria viridus</i>	Green foxtail	I
<i>Shepherdia argentea</i>	Buffaloberry	N
<i>Solanum rostratum</i>	Buffalo bur	N
<i>Solidago canadensis</i>	Canada goldenrod	N
<i>Solidago gigantea</i>	Giant goldenrod	N
<i>Solidago missouriensis</i>	Missouri goldenrod	N
<i>Solidago mollis</i>	Soft goldenrod	N
<i>Solidago rigida</i>	Stiff goldenrod	N
<i>Sonchus arvensis</i>	Perennial sowthistle	I
<i>Sorghastrum nutans</i>	Indiangrass D	N

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<i>Scientific Name</i>	<i>Common Name</i>	<i>Origin</i>
<i>Sparganium eurycarpum</i>	Burreed D	N
<i>Spartina pectinata</i>	Prairie cordgrass D	N
<i>Sphaeralcea coccinea</i>	Scarlet globemallow	N
<i>Sporobolus airoides</i>	Alkali sacaton	N
<i>Sporobolus asper</i>	Tall dropseed	N
<i>Sporobolus cryptandrus</i>	Sand dropseed	N
<i>Stachys palustris</i>	Marsh hedgenettle D	N
<i>Stipa comata</i>	Needle-and-thread	N
<i>Stipa viridula</i>	Green needlegrass	N
<i>Symphoricarpos occidentalis</i>	Western snowberry	N
<i>Sysymbrium altissimum</i>	Tumble mustard	I
<i>Sysymbrium loeselli</i>	Tallhedge mustard	I
<i>Taraxicum officianale</i>	Dandelion	I
<i>Teucrium canadense</i>	American germander D	N
<i>Thelypteris palustris</i>	Marsh fern D	N
<i>Thlaspi arvense</i>	Field pennycress	I
<i>Toxicodendron rydbergii</i>	Poison ivy	N
<i>Tradescantia bracteata</i>	Bracted spiderwort	N
<i>Tradescantia occidentalis</i>	Prairie spiderwort	N
<i>Tragopogon dubius</i>	Goatsbeard	I
<i>Trifolium pretense</i>	Red clover	I
<i>Triodana leptocarpa</i>	Lookingglass	N
<i>Triodanus perfoliata</i>	Venus lookingglass	N
<i>Typha angustifolia</i>	Narrowleaf cattail	N
<i>Typha latifolia</i>	Common cattail	N
<i>Ulmus americana</i>	American elm	N
<i>Ulmus pumila</i>	Siberian elm	I
<i>Urtica dioica</i>	Stinging nettle D	N
<i>Verbascum thapsus</i>	Common mullein	I
<i>Verbena hastata</i>	Blue vervain D	N
<i>Verbena stricta</i>	Woolly verbena	N
<i>Vernonia fasciculata</i>	Ironweed D	N
<i>Veronica americana</i>	Brooklime speedwell D	N
<i>Veronica anagallis-aquatica</i>	Water speedwell D	N
<i>Veronica peregrine</i>	Purslane speedwell D	N
<i>Vicia Americana</i>	American vetch	N
<i>Viola nuttallii</i>	Nuttall's violet	N
<i>Viola pratensis</i>	Meadow violet	N
<i>Vulpia octoflora</i>	Six weeks fescue	N
<i>Xanthium strumarium</i>	Cocklebur	N
<i>Yucca glauca</i>	Yucca	N
<i>Zannichellia palustris</i>	Horned pondweed D	N
<i>Zizania aquatica</i>	Wild rice D	N

## Herpetofauna

<i>Scientific Name</i>	<i>Common Name</i>
<b>Salamanders</b>	
<i>Ambystoma tigrinum</i>	Blotched tiger salamander
<b>Frogs</b>	
<i>Bufo woodhousei</i>	Woodhouse's Toad
<i>Pseudacris triseriata</i>	Western chorus frog
<i>Rana catebeiana</i>	Bullfrog
<i>Rana pipiens</i>	Leopard frog
<i>Scaphiopus bombifrons</i>	Plains spadefoot toad
<b>Turtles</b>	
<i>Chelydra serpentina</i>	Common snapping turtle
<i>Chrysemys picta</i>	Western painted turtle
<i>Terrapene ornate</i>	Western box turtle
<b>Lizards</b>	
<i>Cnemidophorus sexlineatus</i>	Prairie racerunner
<i>Eumeces multivirgatus</i>	Many-lined skink
<i>Holbrookia maculata</i>	Northern earless lizard
<i>Sceloporus undulates</i>	Northern prairie lizard
<b>Snakes</b>	
<i>Coluber constrictor</i>	Eastern yellow-bellied racer
<i>Crotalus viridis</i>	Prairie rattlesnake
<i>Heterodon nasicus</i>	Western hognose snake
<i>Pituophis melanoleucus</i>	Bull snake
<i>Thamnophis radix</i>	Plains garter snake
<i>Thamnophis sirtalis</i>	Red-sided garter snake

\*Contents of this table taken from The Herpetofauna of Lacreek National Wildlife Refuge, Luis Maralet, 1975.

## Mammals

<i>Scientific Name</i>	<i>Common Name</i>
<i>Antilocarpa americana</i>	Pronghorn
<i>Canis latrans</i>	Coyote
<i>Castor canadensis</i>	Beaver
<i>Cynomys ludovicianus</i>	Black-tailed prairie dog
<i>Dipodomys ordii</i>	Ord's kangaroo rat
<i>Erethizin dorsatum</i>	Porcupine
<i>Felis rufus</i>	Bobcat
<i>Geomys bursarius</i>	Plains pocket gopher
<i>Lepus californicus</i>	Black-tailed jackrabbit
<i>Lepus townsendii</i>	White-tailed jackrabbit
<i>Mephitis mephitis</i>	Striped skunk
<i>Microtus ochrogaster</i>	Prairie vole
<i>Microtus pennsylvanicus</i>	Meadow vole
<i>Mus musculus</i>	House mouse
<i>Mustela frenata</i>	Long-tailed weasel
<i>Mustela nivalis</i>	Least weasel
<i>Mustela vison</i>	Mink
<i>Odocoileus hemionus</i>	Mule deer
<i>Odocoileus virginianus</i>	White-tailed deer
<i>Ondatra zibethicus</i>	Muskrat
<i>Onychomys leucogaster</i>	Northern grasshopper mouse
<i>Perognathus fasciatus</i>	Olive-backed pocket mouse
<i>Perognathus flavescens</i>	Plains pocket mouse
<i>Perognathus hispidus</i>	Hispid pocket mouse
<i>Peromyscus leucopus</i>	White-footed mouse
<i>Peromyscus maniculatus</i>	Deer mouse
<i>Procyon lotor</i>	Raccoon
<i>Reithrodontomys megalotis</i>	Western harvest mouse
<i>Reithrodontomys montanus</i>	Plains harvest mouse
<i>Sorex cinerius</i>	Masked shrew

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<i>Scientific Name</i>	<i>Common Name</i>
<i>Spermophilus tridecemlineatus</i>	Thirteen-lined ground squirrel
<i>Spermophilus franklinii</i>	Franklin's ground squirrel
<i>Spilogale putorius</i>	Eastern spotted skunk
<i>Sylvilagus audubonii</i>	Desert cottontail
<i>Sylvilagus floridanus</i>	Eastern cottontail
<i>Taxidea taxus</i>	Badger
<i>Vulpes velox</i>	Swift fox
<i>Vulpes vulpes</i>	Red fox
<i>Zapus hudsonius</i>	Meadow jumping mouse

\*Table lists mammals documented as occurring on Lacreek NWR (Wilhelm et al. 1981)

**Birds**

<i>Scientific Name</i>	<i>Common Name</i>
<i>Accipiter cooperii</i>	Cooper's hawk
<i>Accipiter gentilis</i>	Northern goshawk
<i>Accipiter striatus</i>	Sharp-shinned hawk
<i>Actitis macularia</i>	Spotted sandpiper
<i>Aechmophorus occidentalis</i>	Western grebe
<i>Agelaius phoeniceus</i>	Red-winged blackbird
<i>Aix sponsa</i>	Wood duck
<i>Ammodramus leconteii</i>	LeConte's sparrow
<i>Ammodramus savannarum</i>	Grasshopper sparrow
<i>Anas acuta</i>	Northern pintail
<i>Anas americana</i>	American widgeon
<i>Anas clypeata</i>	Northern shoveler
<i>Anas creca</i>	Green-winged teal
<i>Anas cyanoptera</i>	Cinnamon teal
<i>Anas discors</i>	Blue-winged teal
<i>Anas platyrhynchos</i>	Mallard
<i>Anas rubripes</i>	American black duck
<i>Anas strepera</i>	Gadwall
<i>Anser albifrons</i>	Greater white-fronted goose
<i>Anthus rubescens</i>	American pipit
<i>Anthus spragueii</i>	Sprague's pipit
<i>Aquila chrysaetos</i>	Golden eagle
<i>Archilochus colubris</i>	Ruby-throated hummingbird
<i>Ardea alba</i>	Great egret
<i>Ardea herodias</i>	Great blue heron
<i>Arenaria interpres</i>	Ruddy turnstone
<i>Asio flammeus</i>	Short-eared owl
<i>Asio otus</i>	Long-eared owl
<i>Athene cunicularia</i>	Burrowing owl
<i>Aythya affinis</i>	Lesser scaup
<i>Aythya americana</i>	Redhead
<i>Aythya collaris</i>	Ring-necked duck
<i>Aythya marila</i>	Greater scaup
<i>Aythya valisineria</i>	Canvasback
<i>Bartramia longicauda</i>	Upland sandpiper
<i>Bombycilla cedrorum</i>	Cedar waxwing
<i>Bombycilla garrulus</i>	Bohemian waxwing
<i>Botaurus lentiginosus</i>	American bittern
<i>Branta Canadensis</i>	Canada goose
<i>Bubo virginianus</i>	Great horned owl
<i>Bubulcus ibis</i>	Cattle egret
<i>Bucephala albeola</i>	Bufflehead
<i>Bucephala clangula</i>	Common goldeneye

<i>Scientific Name</i>	<i>Common Name</i>
<i>Buteo jamaicensis</i>	Red-tailed hawk
<i>Buteo lagopus</i>	Rough-legged hawk
<i>Buteo lineatus</i>	Red-shouldered hawk
<i>Buteo platypterus</i>	Broad-winged hawk
<i>Buteo regalis</i>	Ferruginous hawk
<i>Buteo swainsoni</i>	Swainson's hawk
<i>Butorides virescens</i>	Green heron
<i>Calamospiza melanocorys</i>	Lark bunting
<i>Calcarius lapponicus</i>	Lampan longspur
<i>Calcarius mccownii</i>	McCown's longspur
<i>Calcarius ornatus</i>	Chestnut-collared longspur
<i>Calidris alba</i>	Sanderling
<i>Calidris bairdii</i>	Baird's sandpiper
<i>Calidris himantopus</i>	Stilt sandpiper
<i>Calidris mauri</i>	Western sandpiper
<i>Calidris melanotos</i>	Pectoral sandpiper
<i>Calidris minutilla</i>	Least sandpiper
<i>Calidris pusilla</i>	Semipalmated sandpiper
<i>Callidris fuscicollis</i>	White-rumped sandpiper
<i>Cardinalis cardinalis</i>	Northern cardinal
<i>Carduelis flammea</i>	Common redpoll
<i>Carduelis pinus</i>	Pine siskin
<i>Carduelis tristis</i>	American goldfinch
<i>Carpodacus purpureus</i>	Purple finch
<i>Cathartes aura</i>	Turkey vulture
<i>Catharus fuscescens</i>	Veery
<i>Catharus guttatus</i>	Hermit thrush
<i>Catharus minimus</i>	Gray-cheeked thrush
<i>Catharus ustulatus</i>	Swainson's thrush
<i>Catoptrophorus semipalmatus</i>	Willet
<i>Ceryle alcyon</i>	Belted kingfisher
<i>Charadrius melodus</i>	Piping plover
<i>Charadrius semipalmatus</i>	Semipalmated plover
<i>Charadrius vociferous</i>	Killdeer
<i>Chen caerulescens</i>	Snow goose
<i>Chen rossii</i>	Ross's goose
<i>Chilidonias niger</i>	Black tern
<i>Chondestes grammacus</i>	Lark sparrow
<i>Chordeiles minor</i>	Common nighthawk
<i>Circus cyaneus</i>	Northern harrier
<i>Cistothorus palustris</i>	Marsh wren
<i>Cistothorus platensis</i>	Sedge wren
<i>Coccothraustes vespertinus</i>	Evening grosbeak
<i>Coccyzus americanus</i>	Yellow-billed cuckoo
<i>Coccyzus erythrophthalmus</i>	Black-billed cuckoo
<i>Colaptes auratus</i>	Northern flicker
<i>Columba livia</i>	Rock dove
<i>Contopus virens</i>	Eastern wood-pewee
<i>Corvus brachyrhynchos</i>	American crow
<i>Coturnicops noveboracensis</i>	Yellow rail
<i>Cyanocitta cristata</i>	Blue jay
<i>Cygnus buccinator</i>	Trumpeter swan
<i>Cygnus columbianus</i>	Turndra swan
<i>Dendroica coronata</i>	Yellow-rumped warbler
<i>Dendroica magnolia</i>	Magnolia warbler
<i>Dendroica palmarum</i>	Palm warbler
<i>Dendroica pensylvanica</i>	Chestnut sided warbler
<i>Dendroica petechia</i>	Yellow warbler

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<i>Scientific Name</i>	<i>Common Name</i>
<i>Dendroica striata</i>	Blackpoll warbler
<i>Dolichonyx oryzivorus</i>	Boblink
<i>Drumetella carolinensis</i>	Gray catbird
<i>Egretta caerulea</i>	Little blue heron
<i>Egretta thula</i>	Snowy egret
<i>Empidonax minimus</i>	Least flycatcher
<i>Empidonax traillii</i>	Willow flycatcher
<i>Eremophila alpestris</i>	Horned lark
<i>Euphagus carolinus</i>	Rusty blackbird
<i>Euphagus cyanocephalus</i>	Brewer's blackbird
<i>Falco columbarius</i>	Merlin
<i>Falco mexicanus</i>	Prairie falcon
<i>Falco peregrinus</i>	Peregrine falcon
<i>Falco rusticolus</i>	Gyr Falcon
<i>Falco sparverius</i>	American kestrel
<i>Fulica americana</i>	American coot
<i>Gallinago gallinago</i>	Common snipe
<i>Geothlypis trichas</i>	Common yellowthroat
<i>Grus americana</i>	Whooping crane
<i>Grus canadensis</i>	Sandhill crane
<i>Guiraca caerulea</i>	Blue grosbeak
<i>Haliaeetus leucocephalus</i>	Bald eagle
<i>Himantopus mexicanus</i>	Black-necked stilt
<i>Hirundo rustica</i>	Barn swallow
<i>Icteria virens</i>	Yellow-breasted chat
<i>Icterus galbula</i>	Baltimore oriole
<i>Icterus spurius</i>	Orchard oriole
<i>Ictobrychus exilis</i>	Least bittern
<i>Junco hyemalis</i>	Dark-eyed junco
<i>Lanius excubitor</i>	Northern shrike
<i>Lanius ludovicianus</i>	Loggerhead shrike
<i>Larus delawarensis</i>	Ring-billed gull
<i>Larus glaucescens</i>	Glaucous-winged gull
<i>Larus Philadelphia</i>	Bonaparte's gull
<i>Larus pipixcan</i>	Franklin's gull
<i>Leucosticte atrata</i>	Black rosy-finch
<i>Limnodromus griseus</i>	Short-billed dowitcher
<i>Limnodromus scolopaceus</i>	Long-billed dowitcher
<i>Limosa fedoa</i>	Marbled godwit
<i>Limosa haemastica</i>	Hudsonian godwit
<i>Llarus argentatus</i>	Herring gull
<i>Lophodytes cucullatus</i>	Hooded merganser
<i>Melanerpes erythrocephalus</i>	Red-headed woodpecker
<i>Melanitta fusca</i>	White-winged scoter
<i>Meleagris gallopavo</i>	Wild turkey
<i>Melospiza Georgiana</i>	Swamp sparrow
<i>Melospiza lincolni</i>	Lincoln's sparrow
<i>Melospiza melodia</i>	Song sparrow
<i>Mergus merganser</i>	Common merganser
<i>Mergus serrator</i>	Red-breasted merganser
<i>Mimus polyglottos</i>	Northern mockingbird
<i>Mniotilta varia</i>	Black-and-white warbler
<i>Molothrus ater</i>	Brown-headed cowbird
<i>Myadestes townsendi</i>	Townsend's solitaire
<i>Myiarchus crinitus</i>	Great crested flycatcher
<i>Numenius americanus</i>	Long-billed curlew
<i>Nyctanassa violacea</i>	Yellow-crowned night-heron
<i>Nyctea scandiaca</i>	Snowy owl

<i>Scientific Name</i>	<i>Common Name</i>
<i>Nycticorax nycticorax</i>	Black-crowned night-heron
<i>Otus asio</i>	Eastern screech owl
<i>Oxyura jamaicensis</i>	Ruddy duck
<i>Pandion haliaetus</i>	Osprey
<i>Parula Americana</i>	Northern parula
<i>Passer domesticus</i>	House sparrow
<i>Passerculus sandwichensis</i>	Savannah sparrow
<i>Passerella iliaca</i>	Fox sparrow
<i>Passerine amoena</i>	Lazuli bunting
<i>Passerine cyanea</i>	Indigo bunting
<i>Pelecanus erythrorhynchos</i>	American white pelican
<i>Perdix perdix</i>	Gray partridge
<i>Petrochelidon pyrrhonota</i>	Cliff swallow
<i>Phalacrocorax auritus</i>	Double-crested cormorant
<i>Phalaropus lobatus</i>	Red-necked phalarope
<i>Phalaropus tricolor</i>	Wilson's phalarope
<i>Phasianus colchicus</i>	Ring-necked pheasant
<i>Pheucticus ludovicianus</i>	Rose-breasted grosbeak
<i>Pheucticus melanocephalus</i>	Black-headed grosbeak
<i>Pica pica</i>	Black-billed magpie
<i>Picoides pubescens</i>	Downy woodpecker
<i>Picoides villosus</i>	Hairy woodpecker
<i>Pipilo maculatus</i>	Spotted towhee
<i>Piranga olivacea</i>	Scarlet tanager
<i>Plectrophenax nivalis</i>	Snow bunting
<i>Plegadis chihi</i>	White-faced ibis
<i>Pluvialis dominica</i>	American golden plover
<i>Pluvialis squatarola</i>	Black-bellied plover
<i>Podiceps nigricollis</i>	Eared grebe
<i>Podilymbus podiceps</i>	Pied-billed grebe
<i>Poecile atricapillus</i>	Black-capped chickadee
<i>Poocetes gramineus</i>	Vesper sparrow
<i>Porzana carolina</i>	Sora
<i>Progne subis</i>	Purple martin
<i>Quiscalus quiscula</i>	Common grackle
<i>Rallus Limicola</i>	Virginia rail
<i>Recurvirostra Americana</i>	American avocet
<i>Regulus calendula</i>	Ruby-crowned kinglet
<i>Regulus satrapa</i>	Golden-crowned kinglet
<i>Riparia riparia</i>	Bank swallow
<i>Salpinctes obsoletus</i>	Rock wren
<i>Sayornis phoebe</i>	Eastern phoebe
<i>Sayornis saya</i>	Say's phoebe
<i>Seiurus aurocapillus</i>	Ovenbird
<i>Seiurus noveboracensis</i>	Northern waterthrush
<i>Setophaga ruticilla</i>	American redstart
<i>Sialia currucoides</i>	Mountain bluebird
<i>Sialia sialis</i>	Eastern bluebird
<i>Sitta canadensis</i>	Red-breasted nuthatch
<i>Sitta carolinensis</i>	White-breasted nuthatch
<i>Sphyrapicus varius</i>	Yellow-bellied sapsucker
<i>Spiza Americana</i>	Dickcissel
<i>Spizella arborea</i>	American tree sparrow
<i>Spizella pallida</i>	Clay-colored sparrow
<i>Spizella passerine</i>	Chipping sparrow
<i>Spizella pusilla</i>	Field sparrow
<i>Stelgidopteryx serripennis</i>	Northern rough-winged swallow

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<i>Scientific Name</i>	<i>Common Name</i>
<i>Sterna hirundo</i>	Common tern
<i>Sturnella magna</i>	Eastern meadowlark
<i>Sturnella neglecta</i>	Western meadowlark
<i>Sturnus vulgaris</i>	European starling
<i>Tachycineta bicolor</i>	Tree swallow
<i>Tachycineta thalassina</i>	Violet-green swallow
<i>Toxostoma rufum</i>	Brown thrasher
<i>Tringa flavipes</i>	Lesser yellowlegs
<i>Tringa melanoleuca</i>	Greater yellowlegs
<i>Tringa solitaria</i>	Solitary sandpiper
<i>Troglodytes aedon</i>	House wren
<i>Turdus migratorus</i>	American robin
<i>Tympanuchus cupido</i>	Greater prairie-chicken
<i>Tympanuchus phasianellus</i>	Sharp-tailed grouse
<i>Tyrannus forficatus</i>	Scissor-tailed flycatcher
<i>Tyrannus tyrannus</i>	Eastern kingbird
<i>Tyrannus verticalis</i>	Western kingbird
<i>Tyto alba</i>	Barn owl
<i>Vermivora celata</i>	Orange-crowned warbler
<i>Vermivora peregrine</i>	Tennessee warbler
<i>Vireo olivaceus</i>	Red-eyed vireo
<i>Vireo bellii</i>	Bell's vireo
<i>Vireo gilvus</i>	Warbling vireo
<i>Wilsonia pusilla</i>	Wilson's warbler
<i>Xanthocephalus xanthocephalus</i>	Yellow-headed blackbird
<i>Zenaida macroura</i>	Mourning dove
<i>Zonotrichia albicollis</i>	White-throated sparrow
<i>Zonotrichia leucophrys</i>	White-crowned sparrow
<i>Zonotrichia querula</i>	Harris's sparrow

\*List compiled from refuge records. An additional 32 species have been observed on the refuge, but were excluded from this list as they were considered to be accidental.

# Appendix H

## *Refuge Operating Needs System*

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<i>Project Number</i>	<i>Project Description</i>	<i>First Year Need (\$1,000)</i>	<i>Recurring Base Need (\$1,000)</i>	<i>Personnel FTE</i>
00002	Complete high diversity seedings to restore native mixed grass and wet meadow habitat.	\$152K	0	0
00003	Create migratory bird habitat	\$156K		2



# Appendix I

## Maintenance Management System

<i>MMS Number</i>	<i>Description</i>	<i>Cost (\$1,000)</i>
<b>Deferred Maintenance</b>		
04005	Replace Quarters #14	262
93002	Rehabilitate water control structure on trout pond #2	96
<b>Large Construction</b>		
04004	Replace Quarters #2	262
SAMMS # 01117103	Little White River Dam Rehabilitation Phase III	4,142
<b>Heavy Equipment</b>		
94004	Replace loader/backhoe	93
01018	Replace Case 2090 Tractor	69
01019	Replace 1983 Case Articulating Loader	105
01003	Replace 1981 D6 Bulldozer	131
01008	Replace 1981 Road Grader	148
01017	Replace 1968 Lorain Dragline	137
01009	Replace 2000 F-450 Fire Truck	37
01012	Replace 1988 GMC Stakebody Truck	44
01015	Replace John Deere 6400 Tractor	66
01020	Replace John Deer 7410 Tractor	74
05001	Replace 2004 Freightliner Dump truck	91
<b>Small Equipment</b>		
01004	Replace Dodge Minivan	25
00005	Replace 1991 Chevy Pickup	31
01002	Replace 1997 Ford Pickup	33
01005	Replace 1999 Chevrolet Pickup	31
01006	Replace 2000 Chevrolet Pickup	31
01007	Replace 2001 Ford Super duty Pickup	31
01016	Replace John Deere 750 Tractor/mower	13
02002	Replace 2001 B & B Herbicide Sprayer	18
02003	Replace 2002 Honda ATV	6
02005	Replace 2002 Dodge Pickup	34
02006	Replace 2001 Panther Airboat	26
02007	Replace Model 52 Fire Engine	16
03001	Replace 2003 Chevrolet Pickup	31
04008	Replace 2002 Honda Rancher ATV	6
04009	Replace 2002 Honda Rancher ATV	6
04010	Replace 1997 Honda ATV	6
04012	Replace John Deere 425 Riding Mower	8
04014	Replace Grolsz Seed Stripper	7
04015	Replace 2002 Dodge Extended Cab Pickup	30
04017	Replace John Deere Batwing Mower	14
04018	Replace 2004 Polaris Ranger 6X6	9
04019	Replace John Deere 485 Riding Mower	9
04020	Replace John Deere Batwing Mower	13
04021	Replace 2004 Warne Chemical Herbicide Sprayer	6
04022	Replace 2003 Chevy Pickup	22
05002	Replace 2005 Polaris Ranger	10
<b>Road Rehabilitation</b>		
88022B	Preliminary Engineering (Routes 10 & 11, 6.73 miles & parking lots 900, 903-06)	712
88021	Construction Route 10 & 11, 6.73 miles & parking lots 900, 903-06)	1,180
00007	Preliminary Engineering (Route 12, 4.08 miles)	123
91008	Construction Route 12, 4.08 miles	1,180





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