Marais des Cygnes National Wildlife Refuge

COMPREHENSIVE CONSERVATION PLAN

March 1998

Prepared by
U.S. Fish and Wildlife Service
Flint Hills NWR
PO Box 128
Hartford, KS 66854

Marais des Cygnes National Wildlife Refuge
COMPREHENSIVE CONSERVATION PLAN APPROVAL
U.S. FISH AND WILDLIFE SERVICE, REGION 6

SUBMITTED BY:

Jerre J. Gamble — 2/20/98

Jerre Gamble
Refuge Manager

Date

CONCUR:

Robert E. Nagel — 2-26-98

Robert Nagel
Associate Manager, Kansas/Nebraska

Date

Joe Webster — 2/26/98

Joseph Webster
Geographic Assistant Regional Director
Colorado/Kansas/Nebraska/Utah

Date

for Grady W Torres — 2/27/98

Wilbur Ladd
Programmatic Assistant Regional Director
Refuges and Wildlife

Date

APPROVE:

Ralph O. Morgenweck — 3/3/98

Ralph Morgenweck
Regional Director, Region 6

Date

Table of Contents

INTRODUCTION/BACKGROUND

The U.S. Fish and Wildlife Service is the principal agency responsible for conserving, protecting, and enhancing fish and wildlife and their habitats. The Service manages a diverse network of more than 500 National Wildlife Refuges, a system which encompasses more than 92 million acres of public land and water. National Wildlife Refuges are established for specific purposes and provide habitats for more than 5,000 species of birds, mammals, fish, and insects. The Marais des Cygnes National Wildlife Refuge (9,300 acres) is one of the newest refuges in the system. It was established to protect bottomland hardwood habitats along the Marais des Cygnes River in Linn County, Kansas.

Purpose and Need for a Plan

All units of the National Wildlife Refuge System are required to have and implement a Comprehensive Conservation Plan. A CCP describes how the purposes for which a refuge was established are to be pursued over a 10-15 year period. The plan sets goals and objectives which are based on refuge purposes, other Federal laws, National Wildlife Refuge System goals, and Fish and Wildlife Service policies. Management activities are then selected based on their efficacy in accomplishing refuge objectives.

The plan is comprehensive in the sense that it addresses all activities that occur on the refuge. However, management activities or strategies are stated broadly in the CCP. Detailed step-down plans and budgets are then prepared describing how a management strategy such as prescribed burning or grazing is to be applied. These plans are adjusted frequently (usually annually) based on monitoring results, available funds, staff, and current Service policy. The effects of management actions are documented to provide information to future managers and managers of other refuges.

This plan describes how the refuge landscape will look when the goals and objectives are accomplished. It also addresses five of the eight issues (see page 7) raised during the refuge acquisition process:

- the reduction of a bottomland hardwood habitat,
- the need to maintain habitat for state and federally-listed threatened and endangered species,
- the enhancement of habitat for migratory bird species,
- the continuance of biodiversity in a regionally unique ecosystem, and
- the restoration of natural flooding characteristics in a portion of the river's floodplain.

In 1992, the Service assessed four alternatives in an Environmental Assessment for the management of the Refuge. This plan is the implementation of the "Direct Management Alternative." Since that alternative was found not to have any significant environmental impacts, no further environmental analysis is being undertaken through this planning process. In addition, all the management techniques presented in this plan have been determined to be "categorically

excluded" from NEPA documentation because they are not major Federal actions and they have no significant impacts on the human environment, individually or cumulatively.

The EA was developed with input from a number of sources. Scoping meetings and contacts occurred with residents and landowners of Linn County, the Kansas Department of Wildlife and Parks, other agencies of the State of Kansas, conservation organizations such as The Nature Conservancy, and the cities of Pleasanton, La Cygne, and Mound City. A variety of Federal, State, and local entities were also contacted. Input on the Refuge acquisition proposal was solicited through personal contacts, phone interviews, correspondence, notices in the media, and public meetings.

Notification of the Service proposal was provided to the public in the form of a regional news release and direct contacts. The Service provided a briefing to the Linn County Commissioners in mid-October 1991. A preliminary meeting was held on November 18, 1991, in the Pleasanton High School designed specifically to address any concerns of landowners within the project boundary. Approximately 35 landowners attended that meeting. Only one landowner within the project was unable to attend. Following release of the draft EA, a public meeting was held on November 19, 1991, at the Pleasanton High School. Notification of the project and sufficient copies of the EA were provided to the Office of the Governor, State of Kansas for review and response in compliance with E. O. 12372 - Intergovernmental Review of Federal Programs.

A draft of this comprehensive plan was made available to the public for review and comment. As part of this review, an open house was held in Pleasanton, Kansas on April 29, 1997. It was attended by approximately 40 people. Most of the comments received at the open house or by letter dealt with public use of the Refuge, especially public safety during the hunting seasons. There was also concern expressed dealing with wildlife habitat.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge 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.

National Wildlife Refuge System Policies

To manage each refuge to fulfill the mission of the System, as well as the specific purposes for which that refuge was established.

Compatible wildlife-dependent recreation is a legitimate and appropriate general public use directly related to the mission of the system and the purposes of many refuges.

Compatible wildlife-dependent recreational uses are the priority general public uses of the System and shall receive priority consideration in refuge planning and management.

When a wildlife-dependent recreational use is compatible within a refuge, that activity should be facilitated, subject to such restrictions or regulations as may be necessary, reasonable and appropriate.

Key Mandates

Management actions on National Wildlife Refuges are circumscribed by many mandates (laws, Executive Orders, etc.) the latest of which is the National Wildlife Refuge System Improvement Act of 1997. The regulations that affect refuge management the most are listed below.

National Wildlife Refuge System Improvement Act of 1997: Sets the mission and administrative policy for all refuges in the National Wildlife Refuge System.

Executive Order 13007 Indian Sacred Sites (1996): Directs Federal land management agencies to: accommodate access to and ceremonial uses 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.

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 (see below). See Appendix E.

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

Native American Graves Protection and Repatriation Act (1990): Requires Federal agencies and museums to inventory, determine ownership of, and repatriate cultural items under their control or possession.

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.

Emergency Wetlands Resources Act (1986): The purpose of the Act is to promote the conservation of migratory waterfowl and to offset or prevent the serious loss of wetlands by the acquisition of wetlands and other essential habitat, and for other purposes.

Archaeological Resources Protection Act (1979) as amended: Protects materials of archaeological interest from unauthorized removal or destruction and requires Federal managers to develop plans and schedules to locate archaeological resources

American Indian Religious Freedom Act (1978): Direct agencies to consult with native traditional religious leaders to determine appropriate policy changes necessary to protect and preserve Native American religious cultural rights and practices.

Surface Mining Control and Reclamation Act (1977): Regulates the industry by designating certain areas as unsuitable for coal mining operations. Title V, Section 522(e)(1) of the Act states in part: "...no surface mining operations . . . shall be permitted -- on any lands within the boundaries of units of . . . the National Wildlife Refuge System . . . " The exclusion of refuge system lands is subject to valid existing rights.

Executive Order 11988 (1977): Requires Federal agencies to provide leadership and take action to reduce the risk of flood loss and minimize the impact of floods on human safety, and preserve the natural and beneficial values served by the flood plains.

Clean Water Act (1977): Requires consultation with the Corps of Engineers (404 permits) for major wetland modifications.

Archaeological and Historic Preservation Act (1974): Directs the preservation of historic and archaeological data in Federal construction projects.

Rehabilitation Act (1973): Requires programmatic accessibility in addition to physical accessibility for all facilities and programs funded by the Federal government to ensure that anybody can participate in any program.

Endangered Species Act (1973): Requires all Federal agencies to carry out programs for the conservation of endangered and threatened species.

Uniform Relocation Assistance and Real Property Acquisition Policies Act (1970): The purpose of the Act is to provide for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by Federal and federally-assisted programs and to establish uniform and equitable land acquisition policies for Federal and federally-assisted programs.

National Environmental Policy Act (1969): Requires the disclosure of the environmental impacts of any major Federal action significantly affecting the quality of the human environment.

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

National Historic Preservation Act (1966) as amended: Establishes as policy that the Federal Government is to provide leadership in the preservation of the nation's prehistoric and historic resources.

National Wildlife Refuge System Administration Act (1966): Defines the National Wildlife Refuge System and authorizes the Secretary to permit any use of a refuge provided such use is compatible with the major purposes for which the refuge was established.

Land and Water Conservation Fund Act (1965): Uses the receipts from the sale of surplus Federal land, outer continental shelf oil and gas sales, and other sources for land acquisition under several authorities.

Refuge Recreation Act (1962): Allows the use of refuges for recreation when such uses are compatible with the refuge's primary purposes and when sufficient funds are available to manage the uses.

Fish and Wildlife Coordination Act (1958): Allows the Fish and Wildlife Service to enter into agreements with private landowners for wildlife management purposes.

Fish and Wildlife Act (1956): Established a comprehensive national fish and wildlife policy and broadened the authority for acquisition and development of refuges.

Migratory Bird Hunting and Conservation Stamp Act (1934): Authorized the opening of part of a refuge to waterfowl hunting.

Migratory Bird Conservation Act (1929): Establishes procedures for acquisition by purchase, rental, or gifts of areas approved by the Migratory Bird Conservation Commission.

Migratory Bird Treaty Act (1918): Designates the protection of migratory birds as a Federal responsibility. This Act enables the setting of seasons, and other regulations including the closing of areas, Federal or non-Federal, to the hunting of migratory birds.

Antiquities Act (1906): Authorizes the scientific investigation of antiquities on Federal land and provides penalties for unauthorized removal of objects taken or collected without a permit.

Guiding Principles

Public Use: The Refuge System provides important opportunities for compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation, photography, environmental education and interpretation.

Habitat: Fish and wildlife will not prosper without high quality habitats, and without fish and wildlife, traditional uses of refuges cannot be sustained. The Refuge System will continue to conserve and enhance the quality and diversity of fish and wildlife habitats within refuges.

Partnerships: America's sportsmen and women were the first partners who insisted on protecting valuable wildlife habitats within wildlife refuges. Conservation partnerships with other Federal agencies, State agencies, Tribes, organizations, industry, and the general public can make significant contributions to the growth and management of the Refuge System.

Public Involvement: The public should be given a full and open opportunity to participate in decisions regarding acquisition and management of our National Wildlife Refuges.

Refuge Establishment and History

The Refuge was established in 1992 to protect bottomland hardwood habitats along the Marais des Cygnes River in Linn County (*Marais des Cygnes National Wildlife Refuge Decision Document*). Marais des Cygnes Basin, including threatened and endangered species, will be preserved in coordination with partners. Additionally, the Refuge will serve as an area for wildlife-dependent environmental education, interpretation, and compatible recreational day use.

The Refuge was purchased with approximately $5 million in Land and Water Conservation Fund money. The initial purchase was made from the Pittsburgh and Midway Coal Company, a subsidiary of Chevron U.S.A., Inc., by the Fish and Wildlife Service and The Nature Conservancy (whose land was later bought by the Service). Land was also purchased from the Midland Cattle Company. The remainder of the acquisitions have been from individual landowners.

All lands have been acquired from willing sellers. All future acquisitions will also be from willing sellers. In the last ten years, the Service has used the power of condemnation less than 0.03 percent of the time. Many refuges have existed for decades with land within the authorized boundaries still in private ownership. The Service will pay fair market value for all property acquired, based on real estate appraisals. Landowners that sell property are eligible for relocation assistance.

The Refuge was established under the Fish and Wildlife Act of 1956 and the Emergency Wetland Resources Act of 1986:

> **Emergency Wetland Resources Act:** The purpose of this Act is: "To promote the conservation of migratory waterfowl and to offset or prevent the serious loss of wetlands by the acquisition of wetlands and other essential habitat, and for other purposes." "... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions . . . "
>
> **Fish and Wildlife Act:** "... for the development advancement, management, conservation and protection of fish and wildlife resources . . . "

Planning Issues and Opportunities

The Marais des Cygnes River Basin contains a biological diversity unique in Kansas. Several species of concern occur in or around the Refuge, including Federal and State-listed endangered and threatened species. Bottomland hardwoods, upland shrub, grasslands, wetlands, and croplands provide food, cover, and nesting habitat for neotropical migrants, shorebirds, waterfowl, and resident wildlife ranging from insects to big game.

Of the estimated 215 million acres of wetlands existing in the conterminous United States at the time of European settlement, only 94 million acres (44 percent) are estimated to remain. Wetland's losses still continue at a level estimated at several hundred thousand acres each year (National Wetlands Priority Conservation Plan, 1989). The National Wetlands Priority Conservation Plan identified forested wetlands as a high priority. In addition, the Fish and Wildlife Service's Regional Wetlands Concept Plan for Region 6 has identified bottomland hardwood wetland associations along the Marais des Cygnes River as a high priority area for preservation in Kansas. A 4,000 acre tract of land adjoining the State of Kansas, Marais des Cygnes Wildlife Management Area was identified as the initial area requiring protection. After detailed study of the area was initiated, the area of interest was expanded to 9,300 acres between U.S. Highway 69 and the Missouri state line (see Map 1). Areas adjacent to the Kansas state line in Missouri are also being analyzed for possible inclusion in the Refuge.

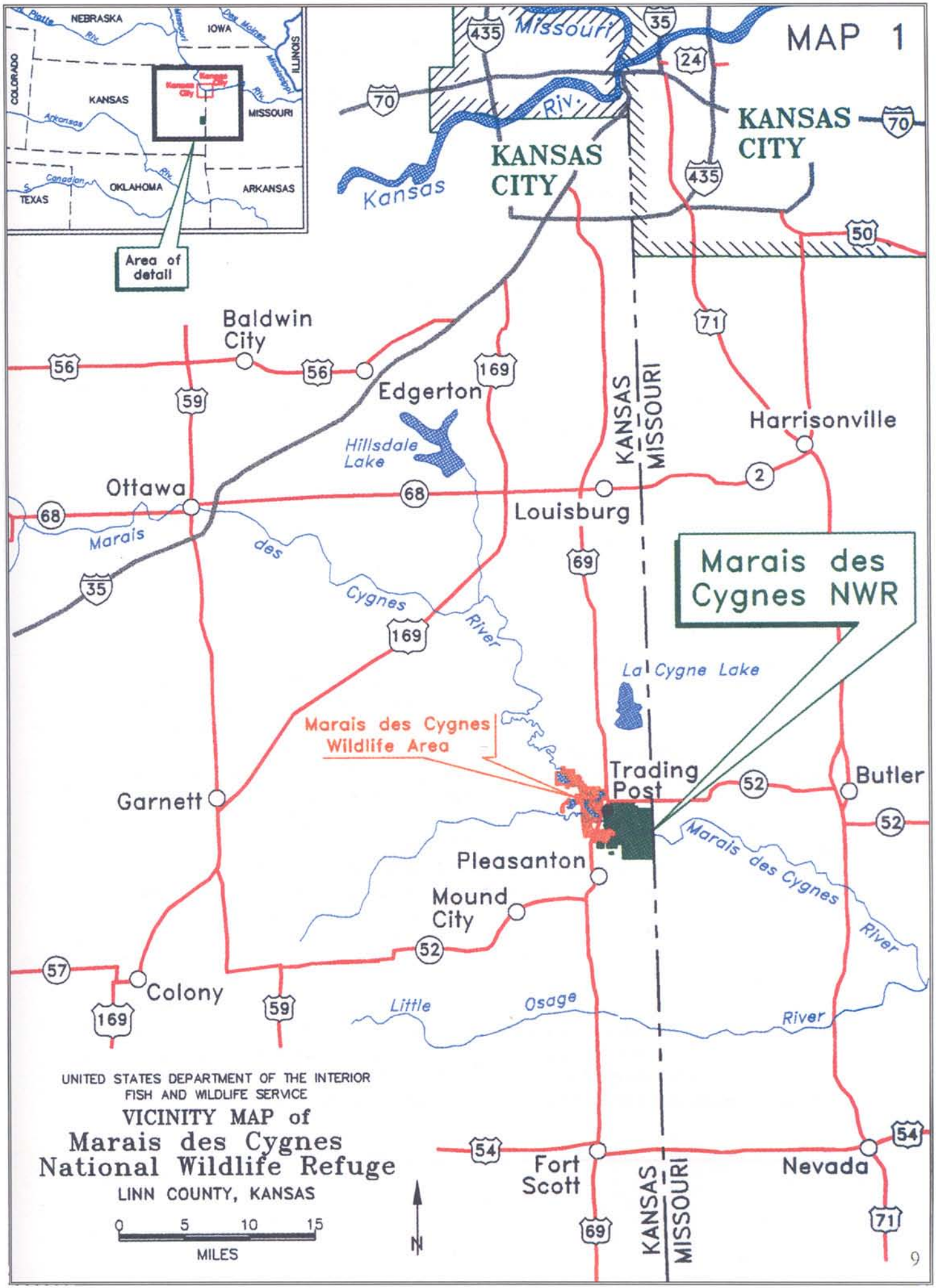
The Marais des Cygnes River, due to its proximity to Kansas City, Missouri, and certain heavy industry areas, is vulnerable to contamination and sedimentation. By closely monitoring changes in the water quality and quantity, trends in the surrounding ecosystem may be observed and managed.

Refuge management will consider and ultimately complement the operation of the adjacent 7,235 acre State-operated Marais des Cygnes Wildlife Management Area. The Area shares about 2.7 miles of boundary with the Refuge. Management of either property will affect the other Careful coordination between managers of the two properties will be essential for optimum public service and natural resource management in the Marais des Cygnes Valley.

Environmental issues relevant to the proposal area are identified below. During the public involvement process, no other significant issues were raised that altered the discussion in the final environmental analysis or indicated the need to change the Service approach to future refuge management planning documents or environmental analyses. The issues are:

- Current and future reduction of bottomland hardwood habitat in the area, and elsewhere, through conversion to agriculture, or from timber harvest.
- Alteration of land use through development for industry.
- Continued potential for development of oil, gas, and coal resources known to be present in the area.

- Need to maintain habitat for state-listed and federally-listed threatened and endangered species.
- Enhancement of habitat for migratory bird species.
- Continuance of biodiversity in a regionally unique ecosystem.
- Restoration through management of natural floodplain characteristics in that portion of the Marais des Cygnes River watershed.
- The amount of change in tax revenues to Linn County through changing ownerships.



UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

VICINITY MAP of Marais des Cygnes National Wildlife Refuge

LINN COUNTY, KANSAS

RESOURCE/REFUGE DESCRIPTION

Geographic Ecosystem Setting

In order to more effectively fulfill its mission, the Service has adopted an Ecosystem approach to fish and wildlife conservation (see Map 2). The characteristics of this approach include the preservation of natural biological diversity and ecosystem health while supporting a sustainable level of economic and recreational activity. Management decisions, in keeping with this policy, will incorporate any pertinent biological and socioeconomic parameters within the Basin boundaries. Additionally, the Refuge will concentrate on coordination with partners for the conservation of the natural biodiversity and general health of the ecosystem.

The Marais des Cygnes National Wildlife Refuge lies within the Platte/Kansas Rivers ecosystem (as delineated by the Service). The goal for this ecosystem is to "protect viable areas, improve those that are faltering, and restore those habitats critical to the river system." The four main areas of focus for the Refuge are:

- completing acquisition
- participation with landowners in bottomland hardwood conservation
- public education and communication and
- protection and restoration of species as mandated by Federal law, such as migratory birds and endangered and threatened species.

Location

The Refuge contains 9,300 acres between U.S. Highway 69 and the Missouri state line on either side of the Marais des Cygnes River (see Map 1). Immediately west of the Refuge is the 7,500 acre Marais des Cygnes Wildlife Management Area, administered by the Kansas Department of Wildlife and Parks. The Marais des Cygnes Wildlife Management Area, located six miles north of the town of Pleasanton, includes bottomland hardwoods habitat, managed waterfowl impoundments and moist soil agricultural units. Upstream and to the northwest of the state-owned area are a number of private and corporate ownerships. These lands are primarily dedicated to agriculture and are made up of a mixture of drained and diked bottomland farmed fields, remnant hardwood areas and wetlands. The upland areas fringing the river corridor are a mixture of hardwoods, agricultural lands and areas in which oil, gas, and coal development occurred in the past. Currently, the nearest development of gas fields is occurring two miles north and west of the Refuge near Sugar Creek.

Climate

Temperature

Linn County has a continental climate typical of the interior of a large land mass in the middle latitudes. Such a climate is characterized by large daily and annual variations in temperature. Winters are cold because of the frequent southerly flows of air from the polar regions. Winter lasts from December through February. Warm summer temperatures last for about six months

every year, and the transition seasons, spring and fall, are fairly short. The warm temperatures provide a long growing season for crops. Temperature data recorded at Mound City, Linn County is characterized by a winter (January) average daily temperature of 31.2°F and a summer (July) average daily temperature of 79.4°F.

Precipitation

Linn County is in the path of a fairly dependable current of moisture-laden air from the Gulf of Mexico. Precipitation is heaviest late in spring and early in summer. Much of it occurs as late-evening or nighttime thunderstorms. Although the total precipitation is generally adequate for any crop, its distribution may cause problems in some years. Prolonged dry periods of several weeks are common during the growing season. A surplus of precipitation often produces muddy fields and a delay in planting and harvesting. Precipitation averages 38.53 inches per year, with the highest monthly amounts occurring in spring and fall.

Growing Season

Elevations in Linn County are approximately 800 feet above sea level. The combination of elevation and latitude gives the area a fairly long growing season that will exceed 200 days in most years.

Minerals

Mineral resources are present on the Refuge. Oil and gas resources are being extracted in areas bordering the Refuge northwest of Pleasanton. Limestone is quarried in Linn County and is used as concrete aggregate, building stone, and riprap or is crushed for use as agricultural lime.

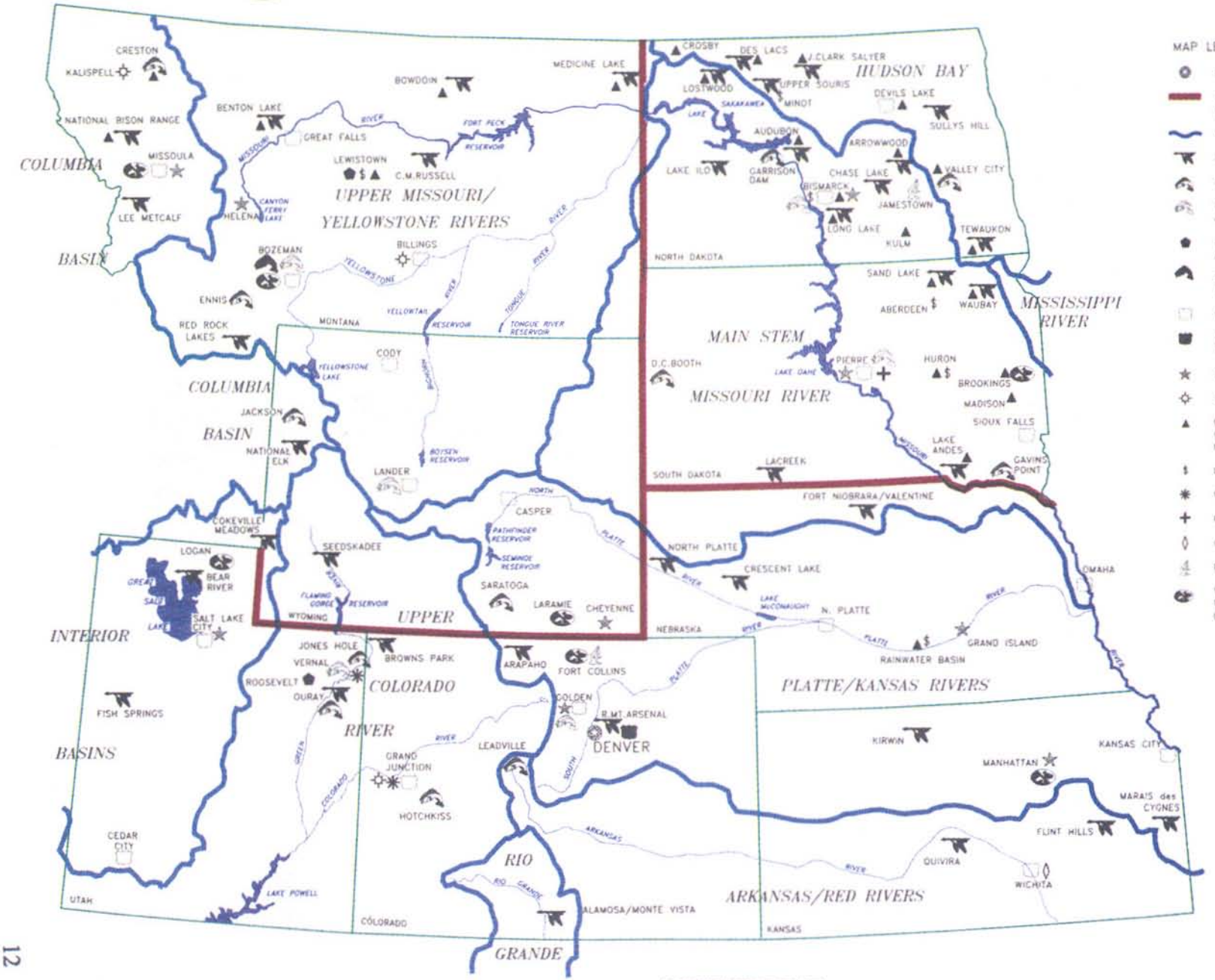
Mineral production in Linn County has been primarily centered around coal production. Coal deposits exist in several areas of the county and retrievable deposits are present throughout the Refuge. Pittsburgh and Midway Coal Mining Company had an active open pit mining operation on their ownership adjacent to the Refuge. The company discontinued its operation, which supplied coal to the La Cygne Power Plant, because of a high sulphur content that limits the coal's marketability. Coal is being marketed immediately adjacent to the Refuge in Missouri. The limitations on high-sulphur coal production occur because it's less desirable for industrial uses and creates high pollution levels. There are an estimated 15 million tons of retrievable coal beneath the Refuge. The coal seam is within 30 to 40 feet of the surface and ranges from 24 to 38 inches thick.

In 1977, the 95th Congress passed legislation regulating the coal industry in its operation of surface mines. Public Law 95-87, known as the "Surface Mining Control and Reclamation Act of 1977", further regulates the industry by designating certain areas as unsuitable for coal mining operations. Title V, Section 522(e)(1) of the Act states in part: ". . .no surface mining operations . . . shall be permitted -- on any lands within the boundaries of units of . . . the National Wildlife Refuge System. . . ." The exclusion of Refuge System lands is subject to valid existing rights.

U. S. FISH AND WILDLIFE SERVICE

PROJECT LEADER LOCATIONS

REGION 6



MAP LEGEND FOR R-6 OFFICES

- REGIONAL OFFICE (DENVER, COLORADO)
- GEOGRAPHIC ARD BOUNDARIES (MT/WY, ND/SD, CO/KS/NE/UT)
- WATERSHED ECOSYSTEM BOUNDARIES
- NATIONAL WILDLIFE REFUGE
- NATIONAL FISH HATCHERY
- FISH AND WILDLIFE MANAGEMENT ASSISTANCE OFFICE
- FISH AND WILDLIFE MANAGEMENT ASSISTANCE SUB-OFFICE
- FISH TECHNOLOGY CENTER AND FISH HEALTH CENTER
- LAW ENFORCEMENT OFFICE
- NATIONAL EAGLE AND WILDLIFE PROPERTY REPOSITORY
- ECOLOGICAL SERVICES OFFICE
- ECOLOGICAL SERVICES SUB-OFFICE
- WETLAND MANAGEMENT DISTRICT (AND WETLAND HABITAT OFFICE IN N.D. AND S.D. ONLY)
- LAND ACQUISITION OFFICE
- COLORADO RIVER FISHERY PROJECT
- MISSOURI RIVER COORDINATOR
- GREAT PLAINS NATURE CENTER
- RESEARCH LABORATORY (NBS → BRD/USGS)
- WILDLIFE AND/OR FISHERY COOPERATIVE RESEARCH UNIT (NBS → BRD/USGS)

MAP 2

EFFECTIVE DATE: JULY 22, 1996

PRJLEDR6

Soils

Soils on the Refuge are productive Class I, II, and III lands of silty loam and silty clay loam. Soils are in the Verdigris-Osage-Lanton Association. This association consists of soils on flood plains along major streams, in this case, the Marais des Cygnes River. This association makes up only about 12 percent of the soils in Linn and Miami Counties but dominates the soil types on the Refuge.

The most common soils of this association are Osage silty clay loam (Ot-IIw), Osage silty clay (Ov-IIIw) and Verdigris silt loam (Vb-IIw). All of these soils occur on the floodplain of the Marais des Cygnes River and are frequently flooded if not protected by dikes and levees. Most of the bottomland hardwood vegetation occurs within these soil types. Approximately 60 percent of the Refuge is in these soil types.

An additional soil type, the Dennis silt loam (De-IIe), occurs on the periphery of the floodplain and is an easily erodible soil. Special care must be exercised if this soil type is used for cultivated crops. It is best suited for permanent cover and pasture. Numerous severely eroded spots occur in this soil throughout the Refuge. Approximately 20 percent of the Refuge is in this soil type.

The remaining 20 percent of the soils on the Refuge do not have site-specific limitations of wetness or erodibility. Most land use practices can be exercised without consideration of these two limiting conditions.

Water Resources

Water Supplies

The principal water source in the proposal area is the Marais des Cygnes River. This river is a sub-basin of the Osage River which flows into the Missouri River near Jefferson City, Missouri. The mainstem of the Marais des Cygnes River is approximately 177 river miles in length from the Kansas-Missouri state line to its headwaters west and south of Topeka, Kansas. It drains an area of approximately 3,300 square miles with an average discharge of 2,033 cfs or 1,473,000 acre-feet per year. Major tributaries of the river are Big Sugar Creek, Big Bull Creek, Pottawatomie Creek, Dragoon Creek, and Hundred Ten Mile Creek.

The natural flow of the river has been significantly affected by construction of several major impoundments that include Pomona Lake, Melvern Lake, Hillsdale Lake, and La Cygne Lake. Another factor affecting flows is retention of overbank flows in wildlife refuge ponds at Marais des Cygnes Wildlife Management Area, operated by the State of Kansas. Retention in these ponds amounts to 5,500 acre-feet annually. In addition, the flows are affected by power developments and numerous small diversions for stock ponds and irrigation. Features of the major reservoirs are as follows:

Pomona Lake - The 3,885-acre reservoir was completed in October 1963 for the purposes of flood control and recreation. The reservoir is approximately 20 miles south of Topeka, near the towns of Vassar and Michigan Valley. The reservoir is formed by a compacted earthen dam and has a total capacity of 498,500 acre-feet at elevation 1,025 feet msl. Normal spill elevation is 974 feet msl. The reservoir is supplied by the 322 square-mile watershed of Hundred Ten Mile Creek.

Melvern Lake - The 6,877-acre reservoir was completed in July 1972 for the purposes of flood control, irrigation, and recreation. The reservoir extends approximately 12 miles westerly from the town of Melvern to the town of Reading. The reservoir is formed by a compacted earthfill dam and has a total capacity of 920,600 acre-feet at elevation 1,073 feet msl. Normal spill elevation is 1,036 feet msl. The reservoir is supplied by the 349 square-mile watershed of the upper Marais des Cygnes River.

Hillsdale Lake - The 4,566-acre reservoir was completed in September 1981 for the purposes of flood control, water supply, water quality control, fish and wildlife, and recreation. The reservoir is three miles north and west of Hillsdale near Highway I-35. The reservoir is formed by a compacted earthfill dam and has a total capacity of 315,600 acre-feet. Normal spill elevation is 917 feet msl. The reservoir is supplied by the 144 square-mile watershed of Big Bull Creek.

La Cygne Reservoir - La Cygne Reservoir is the first large Kansas reservoir designed as a cooling pond for power generation. Kansas City Power and Light Company and Kansas Gas and Electric constructed the fossil-fuel generating facility and reservoir to supply electricity for eastern Kansas and western Missouri. The reservoir covers an area of 2,420 acres and has a storage capacity of 40,000 acre-feet. Its maximum depth is 40 feet and average depth is 15.4 feet. Normal spill elevation is 840 feet msl. Through cooperative agreements, Kansas Department of Wildlife and Parks and Linn County manages 2,000 acres of wildlife land and a 1,000 acre county park surrounding the reservoir area. The reservoir is supplied by waters of Elm Creek and Sugar Creek.

Water Rights

Initial settlement and development of the State of Kansas included the adoption of the riparian system of water rights, which was completely displaced by legislation enacted in 1945 fully implementing the appropriation system as the exclusive method of acquiring water rights in the

State. From that point forward, with the exception of domestic use, a right could only be initiated by filing an application for a permit.

The Chief Engineer, State of Kansas, is directed by statute to control, conserve, regulate, allot, and aid in the distribution of the waters of the State in accordance with established rights. Once rights to use water have been adjudicated, the Division of Water Resources has the responsibility of carrying out the terms and provisions of the court's decree.

Much of the Refuge consists of former seasonal wetlands that were eliminated for agricultural purposes, by draining via "w-ditches" and retarding river flood flows via levees. These natural wetlands will be restored by plugging the outlet of the drainage ditches and utilizing the existing levees to hold water on the wetlands. When the Service utilizes and modifies the existing levees and/or constructs new works to enhance the wetlands, *Applications for Permit to Appropriate Water* will be filed with the Chief Engineer, Kansas State Board of Agriculture.

The Marais des Cygnes River has been declared over appropriated and is regulated under established minimum stream flow requirements. This means that, in most years, all appropriations approved after April 12, 1984, are restricted to no diversion during the period June through September. There is at least one significant watershed located in the center of the Refuge whose natural flows could be utilized to supplement river water. However, this is a tributary to the Marais des Cygnes River and is regulated under the same conditions, i.e., no diversion June through September, during normal water years.

The Service intent in water management is to simulate, as nearly as possible, the natural flood conditions that once existed in the Marais des Cygnes River system. Although in-stream flow regulation restricts diversions from June to September, the Service can potentially divert flows during the remaining eight months of the year into moist soil units or green timber impoundments as needs dictate. Also, flood flows in winter months could be retained on the land for wildlife and wetland habitat needs rather than being immediately pumped back into the river as is the current agriculture practice. Service demand for water during the critical period of over-appropriation would be low.

Mr. Warren Lutz of the Kansas State Board of Agriculture has advised that the capture of river flood flows in the spring could be accomplished with no restrictions by the State Appropriations from the river and all tributaries would have to comply with the minimum stream flow requirements.

Two existing water rights are located within the Refuge but do not appear to be of a size or location that would influence water management on the area.

Refuge Habitats

Vegetation - The vegetation adjacent to the Marais des Cygnes River channel is primarily bottomland hardwood. These stands of hardwoods are present in other states east and south of

Kansas but are unique in Kansas. The ecosystem is a Lowland Oak-Hickory-Bluestem Parkland association that reaches its westernmost extension in the 13 counties of eastern Kansas. Due to the extensive clearing and draining of bottomland hardwood areas no other such areas exist in the eight-state Mountain-Prairie Region of the Fish and Wildlife Service.

Uplands surrounding the drainage systems within the Refuge were historically prairie grasslands with very little woody vegetation. These grass dominated lands were broken by woody vegetation only along the bottomland and the tops of some of the higher hills in the area until the time of permanent settlement in the mid-1800's.

An 1851 Government Land Survey showed the limits of timber adjoining the river at that time. Comparisons with current photography and mapping show that of the original 3,300 acres of bottomland timber, almost 55 percent or 1,800 acres, have been converted to cropland or pasture. Much of the remaining timber has been cut at least once. On areas where regrowth has been allowed to occur, several excellent mature or near-mature stands now occur along the river.

Hardwood - Stands of hardwood include pecan, oak, mulberry, osage orange, hickory, and maple. The range of naturally occurring pecan is most common along river floodplains in the southeastern eighth of the state including the Refuge. However, a significant disjunct population is on the Missouri River floodplain on the Ft. Leavenworth Military Reservation in eastern Leavenworth County. This population of pecan is approximately 80 miles north of the Marais des Cygnes National Wildlife Refuge. Native hardwood stands are important to wildlife due to their permanent nature and high level of plant diversity. Floodplain hardwoods, being the most diverse of this group in plant species, are also the most diverse in animal species. All species of cavity dwelling birds and animals are dependent on woodlands. The hardwood bottoms are seasonally flooded by the Marais des Cygnes River and by rainfall. When flooded, the bottoms provide an important habitat type for waterfowl, especially for mallards and wood ducks. When the bottomlands are not flooded, they provide habitat for deer, quail, squirrel, turkey, and other species. The State of Kansas is considering the bottomlands area for the reintroduction of ruffed grouse.

Cropland - Crops grown in the area include soybeans, millet, wheat, and other row crops that thrive on the bottomland type soils. More than 40 percent of the croplands on the Refuge at the time of establishment, will be converted to native vegetation. The appropriateness and role of cropland will be determined during the implementation of this initial plan.

Pasture/Hayland - Pasture or hayland is found throughout the area and commonly exists in places where coal has been recently mined. These surface mined areas have been reclaimed and reseeded into cool-season grasses such as brome or fescue which have been some of the grass species recommended to be planted on the disturbed areas. These plantings are used by geese when they stage in the area during migration.

Rangeland - Rangeland generally consists of native grasses, forbs, and shrubs. This habitat type is very limited within the Refuge and is typically small (less than 20 acres in size). These areas do, however, provide prime habitat for wildlife feeding and nesting cover. Diverse plants in rangelands provide a variety of seeds and fruits for wildlife use. Over-grazing and the introduction and/or invasion by exotic plants has impacted the health of this rangeland.

Wetlands - Wetlands on the Refuge are, for the most part, the flooded timbered areas along the river. The original wetland sites were predominantly covered by hardwoods with a few open marsh sites along old oxbows where water depths discouraged woody growth. The wooded areas extended into the major lateral drainages associated with the Marais des Cygnes River into the prairie. Most of these former seasonal wetland areas have been eliminated by conversion of bottomland hardwood wetlands to agriculture. These former wetlands can be re-created by using the existing levees for water retention and also by building other dikes to control water levels. Water control can promote the growth of wetland vegetation, and provide feed and resting areas for waterfowl, marsh birds, shorebirds, and other species.

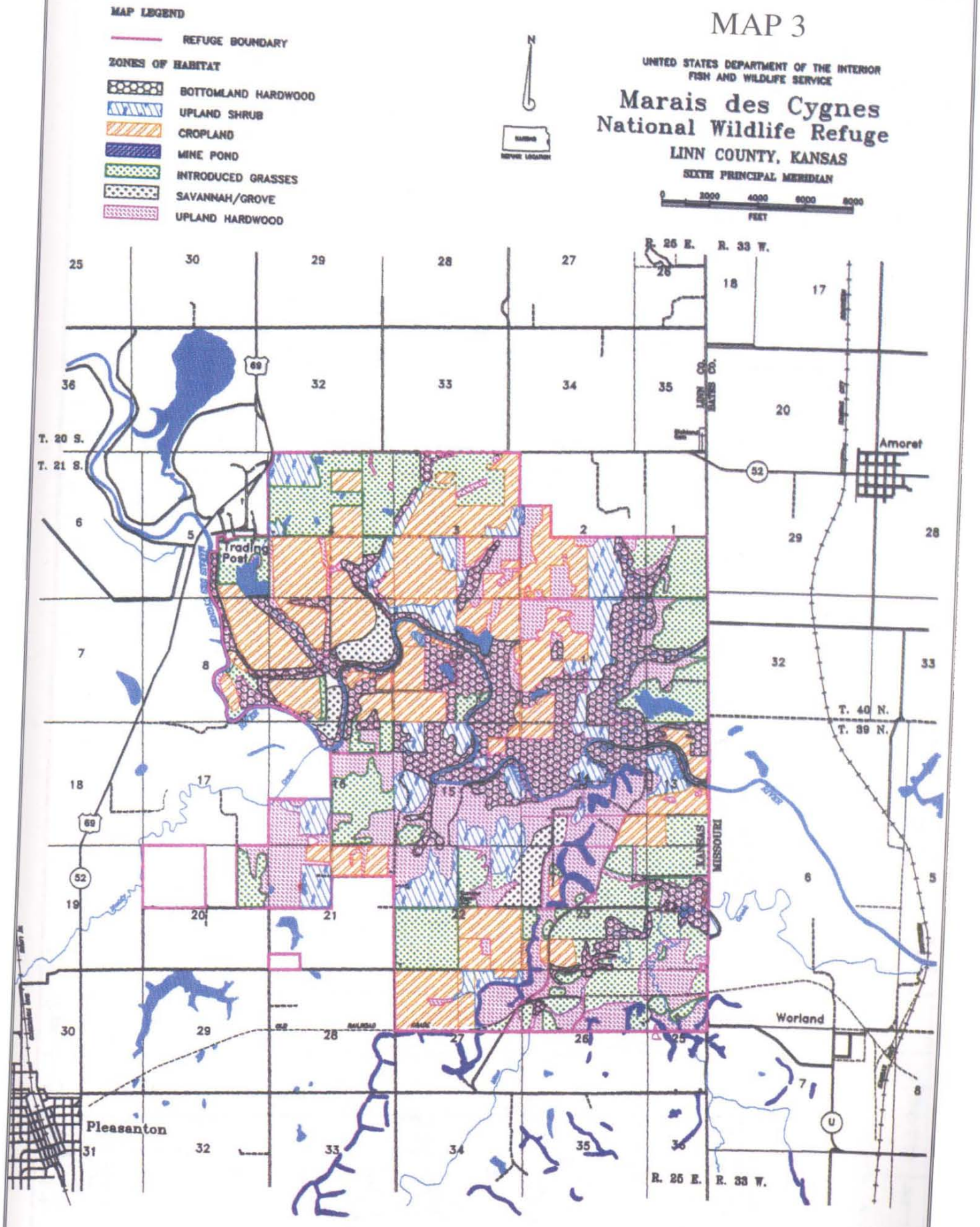
Noxious Weeds - Several, legally designated, noxious weeds are known or believed to occur on the Refuge: Johnson grass, field bindweed, and musk thistle. Other pest species that may cause problems are: Sericea lespedeza, marijuana, multiflora rose, and purple loosestrife. Purple loosestrife is currently a problem on the Marais des Cygnes Wildlife Management Area.

Figure 1 (Page 18) shows breakdown of habitat types, description, and current and planned acres. Map 3 (Page 19) shows the relative area of the six different resources within the Refuge boundaries (including both Service-owned land and inholdings). Map 4 (Page 20) shows Service and private ownership within the Refuge boundary.

FIGURE 1: Summarized below are the major habitats of the Refuge, both current and planned.

HABITAT TYPE	DESCRIPTION	CURRENT ACRES	PLANNED ACRES
OAK-HICKORY FOREST			
Bottomland hardwood	Shumard oak; pin oak; burr oak; mulberry; cottonwood; willows, spp. black, peach leaf; sandbar; green ash; silver maple; pecan; hickory; osage orange;	1,854	3,300
Upland hardwood	Maple, hickory, walnut, dogwood, sumac, Ohio buckeye, bladderpod, spicebush, Rose spp., raspberries	1,449	1,250
Upland shrubs		887	450
WETLANDS			
Riparian Woodland	Riverbanks: cottonwood, sycamore, hackberry, maple, grapes, moonseed, Dutchman's pipe, ash, pin oak	93	93
Ponds and oxbows		104	104
Moist Soil Cells	Wild millet, beggar ticks, nut sedges and smart weed	0	500
Seasonal Wetlands (low prairie)	Herbaceous: cordgrass, Carex, spikerush, Eastern grama	0	300
Water-filled Mines		94	94
NATIVE PRAIRIE - SAVANNAH			
Native Prairie	Big and little bluestem, switchgrass, Indiangrass, sideoats grama, forbs	8	1,300
Savannah Groves	Savannah: Post oak, blackjack oak, pin oak, pecan, Osage orange, native grass understory	273	750
INTRODUCED GRASSES - CROPLAND			
Introduced Grasses	including hay meadows, pastureland, and CRP: Fescue, brome, Virginia Bluestem	2,129	0
Cropland	Soybeans, milo, corn, winter wheat, sunflowers, oats clover, alfalfa	2,250	1,500 or less

MAP 3


MAP LEGEND
REFUGE BOUNDARY
ZONES OF HABITAT
BOTTOMLAND HARDWOOD
UPLAND SHRUB
CROPLAND
MINE POND
INTRODUCED GRASSES
SAVANNAH/GROVE
UPLAND HARDWOOD
N
UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Marais des Cygnes
National Wildlife Refuge
LINN COUNTY, KANSAS
SIXTH PRINCIPAL MERIDIAN
0 2000 4000 6000 8000
FEET
R. 25 E.
R. 33 W.
T. 20 S.
T. 21 S.
T. 40 N.
T. 39 N.
Trading Post
Amoret
Worland
Pleasanton
KANSAS
MISSOURI

MAP 4

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Marais des Cygnes National Wildlife Refuge

LINN COUNTY, KANSAS

SIXTH PRINCIPAL MERIDIAN

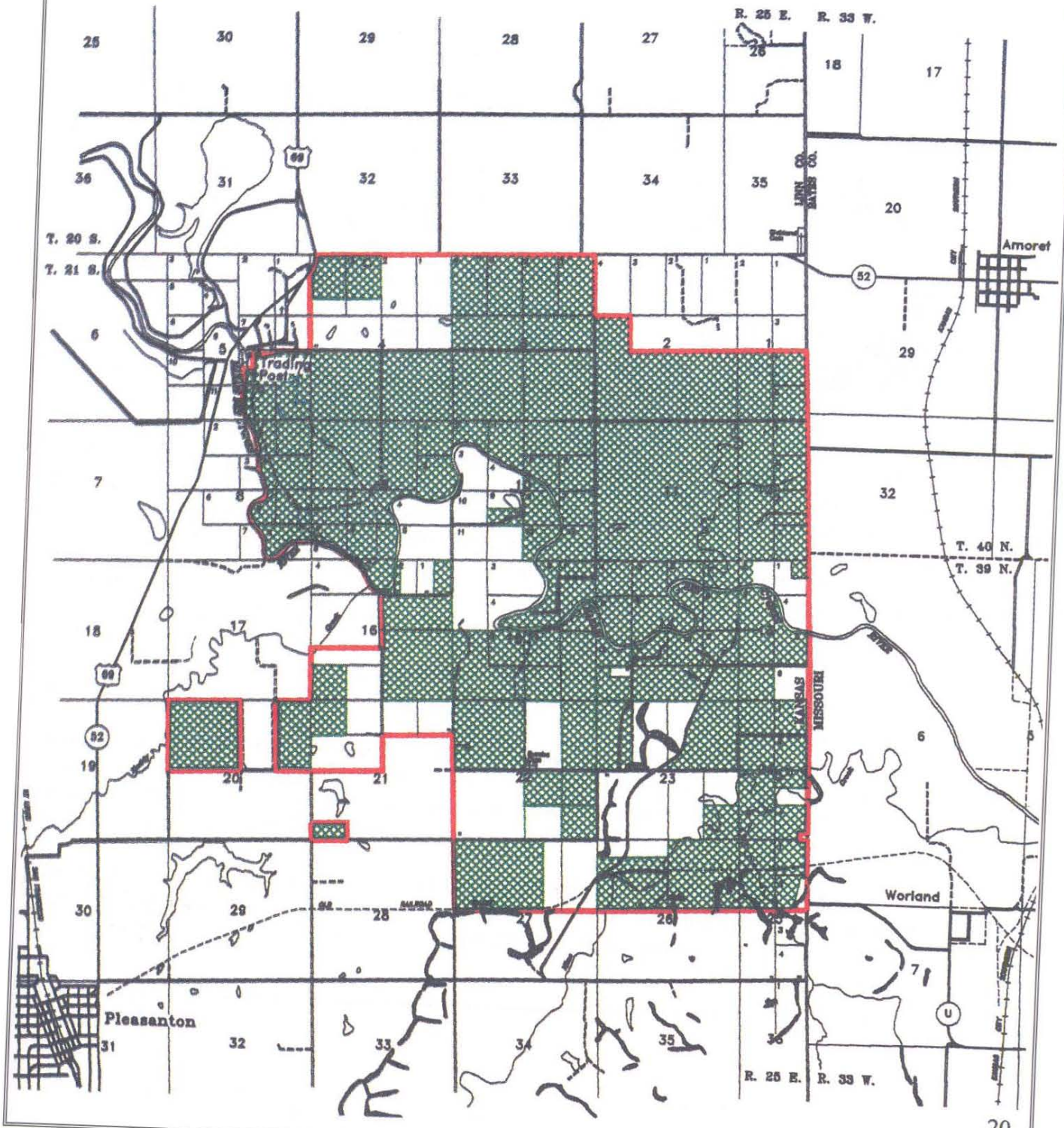
MAP LEGEND

Red: Project Boundary

Green: Acquisition through Fiscal Year 1995

White: Private Ownership

MINE TAILING PONDS



Wildlife

Many wildlife species could potentially occur on the Refuge. The following information was obtained from the University of Kansas - Museum of Natural History, the Kansas Biological Survey, literature reviews, and personal communications with staff members of State and Federal resource agencies. The information is not intended to represent or describe all species that might occur on the Refuge.

Invertebrates - A number of mussel species are present in the wetlands and flowages within the Refuge. These species are good indicators of the general health of the wetlands of the area. Populations of mussels are vulnerable to pollutants such as agricultural pesticides and industrial discharges. An additional threat to populations in Kansas, Missouri, and Oklahoma is now present from a small industry that has developed to provide mussel shell for export to the Orient. People collecting mussel shell will dredge out ponds, pits, and stream channels to remove all the mussels from an area. This practice, whether by legal or illegal methods, can critically affect populations of mussels such as the flat-floater mussel that is already limited in numbers. The flat floater mussel, formerly called the heel-splitter mussel, is a State-listed threatened mollusk located within and adjacent to the Refuge.

Fish - The Marais des Cygnes River and tributaries provides habitat for species of fish that include minnows (family Cyprinidae), catfish (family Ictaluridae), and sunfish (family Centrarchidae). These species make up the biggest part of the fish population found in the river. These fish populations provides a sport fishery for large channel catfish, bass, bluegill, carp, and buffalo fish. Success of the fishery is dependent upon the time of year, water depth, flow, type of substrate, cover, and food conditions. A listing of fish species occurring on or near the Refuge is included in Appendix B.

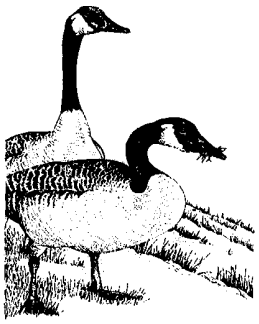
The only fish listed as a State-threatened species is the hornyhead chub (see Appendix C). It has been found in Big Sugar Creek, adjacent to the Refuge.

Reptiles and Amphibians - These groups on the Refuge includes turtles, frogs, toads, lizards, snakes, and salamanders. Approximately 39 species of reptiles and amphibians have been reported in Linn County (see Appendix B). Most of the species are restricted to certain habitat types and can probably be found where favorable conditions exist.

The Refuge provides habitat for a diversity of reptiles and amphibians. A total of 58 herpetological species (16 amphibians and 42 reptiles) have been recorded from either Linn or Miami counties (see Appendix B). Even though detailed site inventories have not been

completed, all of these species probably inhabit the Refuge or the land adjacent to it. The Kansas herpetofauna consists of 92 species. Enhancing the habitat available to these species along the Marais des Cygnes River on the Refuge could benefit up to 63 percent of the species known from the State.

Waterfowl - The area has been estimated to provide habitat for up to 250,000 mallards and 25,000 geese. Goose species are mainly snow geese and Canada geese. The adjacent State wildlife area has approximately 1,100,000 waterfowl use-days during an average year. The wildlife area typically sees 60,000 ducks and 20,000 geese a year and the extreme seasonal population have been approximately 130,000 ducks and 40,000 geese. Enhanced management within the Refuge would bring waterfowl use-days to a level equal to that now experienced on Marais des Cygnes Wildlife Management Area and numbers would likely exceed those levels due to the higher quality flooded hardwood bottoms in the Refuge. The Refuge is on the boundary of the Mississippi and Central Flyways. It provides valuable migrating and wintering habitat for waterfowl using both flyways.



Shorebirds - Shorebirds show up in large numbers during spring and fall migration when suitable habitat exists on or adjoining the area. They utilize open mudflats and shallow water pools. A listing of bird species present on or near the Refuge is included in Appendix A.

Other Birds - Many bird species occur in the area including neotropical migrants. More than 300 species of birds use the area at various times of the year and there are about 113 species reported to nest in the area (see Appendix A).

Mammals - Mammals occurring within the area are diverse and include furbearers as well as game species. Due to the varied food supply present, all species are well represented. A listing of mammal species present on or near the Refuge is included in Appendix B.

Threatened and Endangered Species

The Endangered Species Act (1973) mandates all Federal Agencies take action to benefit federally-listed species. Threatened and endangered species will receive priority consideration for any management actions taken on the Refuge. Initially, all species listed under the Act that have the potential to occur on the Refuge will be identified. T&E species have the potential to occur if their range overlaps the Refuge or they have been documented to occur in the general area and their habitat requirements are present. All management actions will be evaluated for their effects on these species and if there is a conflict between a proposed action and a species listed under the Act, the listed species needs will be a priority.

In addition to the federally-listed species, a number of species that are listed as threatened or endangered by the State of Kansas occur or potentially occur in the area (see Appendix C). At least eight species of amphibians and reptiles currently on the Kansas Endangered or Threatened

List are found within or very near to the boundaries of the Refuge. These species have special habitat requirements which include standing trees near water, organically rich oxbow ponds, and subirrigated fields with stable water tables. State listed species include:

Central newt - State Threatened. This salamander was once abundant at Pigeon Lake in Miami County near the Linn County border. It may now be extirpated from this area and, if so, is an excellent candidate for re-introduction.

Northern spring peeper - State Threatened. This frog was once abundant at Pigeon Lake in Miami County near the Linn County border. It may now be extirpated from this area and, if so, is an excellent candidate for re-introduction.

Northern crawfish frog - State Threatened. This threatened frog was recently discovered on land now within the Refuge.

Northern green frog - State Threatened. This frog was once abundant at Pigeon Lake in Miami County near the Linn County border. It may now be extirpated from this area and, if so, is an excellent candidate for re-introduction.

Broadhead skink - State Threatened. This threatened lizard prefers dead, standing trees along water, a particular habitat abundant on the Refuge.

Eastern hognose snake - State Threatened. This nonpoisonous, showy snake reaches its greatest abundance along the eastern border of Kansas, where there is plenty of water for toads. The Eastern Hognose Snake feeds exclusively on toads.

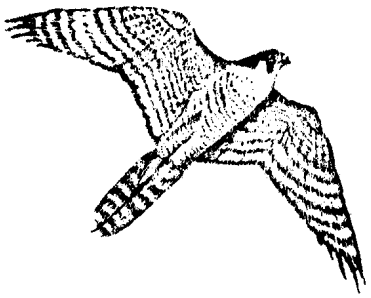
Western earth snake - State Threatened. This snake was recently discovered in Linn County. The most recent discovery was in the La Cygne Lake area, just north of the Refuge.

Northern redbelly snake - State Threatened. This small harmless snake prefers mature forests, and is dependent on this forest habitat.

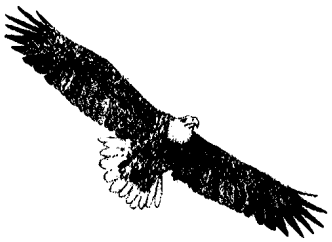
Also occurring or potentially occurring on the area are the federally listed Mead's milkweed, bald eagle, peregrine falcon, piping plover, and interior least tern.

Mead's milkweed. This federally-listed threatened plant is found in prairie haymeadow habitats in the Refuge. A draft recovery plan is being prepared for this species. There are about 140 populations of Mead's milkweed in Illinois, Iowa, Kansas, and Missouri. The Kansas Natural Heritage Inventory records 91 populations existing in Kansas. Two small populations of Mead's milkweed are known to occur on prairie hay meadows south of the Marais des Cygnes River. One of these lies within the Refuge; the other is roughly one mile southwest of the boundary. The plant has apparently ceased to exist in Indiana and Wisconsin. The plant is a perennial that usually occurs in virgin prairie as a solitary plant or

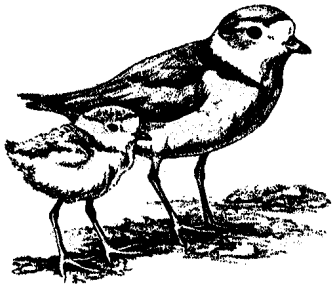
a few closely associated individuals. The habitat needed by this species is gradually being lost to agricultural expansion, detrimental agricultural practices such as overgrazing, and the general elimination of tallgrass prairie.



Peregrine falcon - Endangered. Peregrine falcons are migrants through the area. They have been recorded several times at the wildlife management area. Peregrine falcons utilize wetlands and open areas, including water bodies, crop fields and grasslands, preying primarily upon other birds. They were observed in the immediate vicinity of the Refuge in 1990-1991.



Bald eagle - Threatened. Bald eagles winter at the Marais des Cygnes wildlife management area and adjacent private lands, using the large concentrations of waterfowl. Peak counts during waterfowl censuses at the Wetland Management Area averaged 30 eagles in the middle 1970's. This was followed by a sharp decline which then increased to ten in 1988. These counts probably represent minimum bald eagle numbers because they are not actively being searched out during the waterfowl censuses.



Piping plover - Threatened. The piping plover is a small shorebird which is an uncommon seasonal spring and fall migrant in or near the Refuge. Piping plovers are associated with unvegetated shorelines, sandbars, and mudflats of wetlands and streams, utilizing aquatic invertebrates for food. They have been observed in the immediate vicinity of the Refuge in 1990-1991.

Interior least tern - Threatened. Interior least terns use similar, unvegetated wetland, habitat to piping plovers, feeding on aquatic invertebrates and small forage fish. They occur as uncommon spring and fall migrants. They have been observed in the immediate vicinity of the Refuge in 1990-1991.

The status and habitat requirements of the following species will be given primary consideration when management actions are planned and implemented (fl=Federally-listed, sl = State-listed, sc=Species of Management Concern):

Species	Status	Bottomland Hardwood	Native Prairie Uplands - Savannahs	River and Herbaceous Wetlands
Mead's milkweed	fl		X	
Flatfloater mussel	sl	X		X
Central newt	sl	X		X
Northern spring peeper	sl	X		X
Northern crawfish frog	sl	X		X
Northern green frog	sl	X		X
Broadhead skink	sl	X		X
Eastern hognose snake	sl	X		X
Western earth snake	sl	X		X
Northern redbelly snake	sl	X		
White-faced ibis	sl			X
Bald eagle	fl			X
Peregrine falcon	fl		X	X
Greater prairie-chicken	sc		X	
Yellow rail	sc			X
Whooping crane	fl			X
Snowy plover	sc			X
Piping plover	fl			X
Willet	sc			X
Eskimo curlew	sc		X	X
Hudsonian godwit	sc			X
White-rumped sandpiper	sc			X
Stilt sandpiper	sc			X

Species	Status	Bottomland Hardwood	Native Prairie Uplands - Savannahs	River and Herbaceous Wetlands
Buff-breasted sandpiper	sc		X	X
Franklin's gull	sc			X
Interior least tern	fl			X
Scissor-tailed flycatcher	sc		X	
Sprague's pipit	sc		X	
Loggerhead shrike	sc		X	
Dickcissel	sc		X	
Field sparrow	sc		X	
Baird's sparrow	sc		X	
Le Conte's sparrow	sc		X	
Nelson's sharp-tailed sparrow	sc			X
McCown's longspur	sc		X	
Smith's longspur	sc		X	

Public Uses

The Refuge is currently closed to public entry until planning, staffing, and funding can be completed. Public use permitted on the Refuge will include both non-consumptive (i.e., wildlife observation, hiking, and photography), and consumptive (hunting and fishing) recreation. Only those uses compatible with the primary purposes (see page 2) of the Refuge will be permitted.

The Refuge will provide quality, wildlife dependent recreation opportunities in coordination with adjacent Kansas Wildlife and Parks Wildlife Management Area. These uses may include hunting, fishing, environmental education, interpretation, hiking, and wildlife observation. The Refuge is expected to receive high numbers of visitors due to the close proximity (50 miles) to the Kansas City area.

Administrative Resources

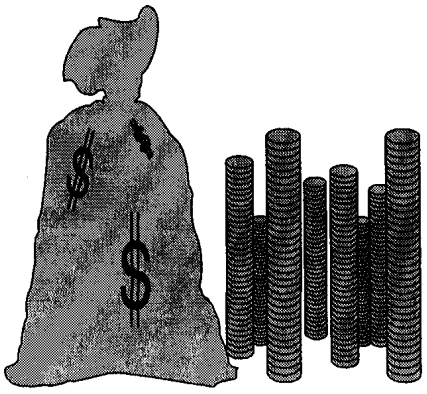
The Refuge planning and preliminary work are being performed by the Flint Hills National Wildlife Refuge staff. Flint Hills staff travels almost weekly (four hours round trip) to the Marais des Cygnes National Wildlife Refuge to oversee six permittees conducting haying, grazing, and row cropping on nearly 2,000 Refuge acres. Flint Hills staff also does law

enforcement, wetland enhancement, boundary posting, and assists realty personnel with land acquisition activities. Kansas Department of Wildlife and Parks has an office near the Marais des Cygnes National Wildlife Refuge and occasionally does law enforcement checks, as well as assisting with projects when needed.

There are several older buildings, cabins, and trailers on the Refuge, most of which are abandoned and dilapidated. There is only one house in livable condition located on a hill in the northwest corner of the Refuge. Numerous culverts, water control structures, drainage ditches, and dikes exist in various conditions, and may need extensive rehabilitation to be functional.

The original acquisition cost was estimated to be $5 million. This number is constantly changing due to continued efforts in fee title acquisitions and conservation easements. The following is a list of funded projects for the Refuge:

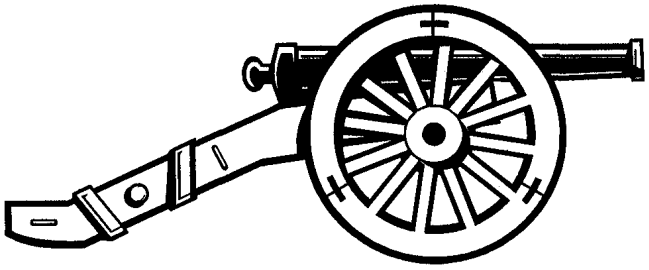
FY97	Building Repairs	$10,000
	Base Funding	$30,000
FY96	Site restoration (fence repair)	$10,000
	Asbestos abatement	$58,000
	Restore Ecosystem Hydrology	$15,000
FY95	Site cleanup	$10,000
	Planning	$10,000
	Bird Survey	$13,500*



*Note: $1,000 of this came from Kansas Department of Wildlife and Parks (Chickadee Checkoff).

Cultural Resources

Limited archeological work has been done in the Refuge. Preliminary reconnaissance work done by the Kansas State Historical Society in conjunction with development on the Marais des Cygnes Waterfowl Management Area did not yield sites of archaeological significance. However, investigators did report that studies of contour maps of the region and reports of sites located in adjacent drainages indicate the area's potential for the presence of archaeological sites. Currently, the most notable historical resource in the proposal area would be the old Fort Leavenworth-Fort Scott Military Road.



This historic road site crosses the Marais des Cygnes River in the proposal area between Sections 8 and 9, T.21 S., R.25 E., just south of the town of Trading Post. It is not known whether the actual crossing site or roadbed are still evident on the ground.

Discussions with Ft. Scott National Historic Site staff and information from the Kansas State Historical Society indicate the Refuge may have been centrally involved in the Battle of Mine Creek. This Civil War battle, the largest in Kansas, began in October 1864 near Trading Post, Kansas. Union forces attacked the retreating forces of Major General Sterling Price along the Old Military Road. The opposing forces constituted about 24,000 troops and cavalry and the battle rolled south through the Refuge to Mine Creek. There, Price's troops were routed, abandoning their wagon train as they fled south.

Evidence of human use of the Refuge for the past two thousand years has been documented, and the potential for finding evidence of older occupations exists. Resources include a prehistoric campsite, a segment of the original Military Post Road between Forts Leavenworth and Scott, historic farmsteads and coal mines, as well as fossilized plant remains.

The 1987 Kansas Prehistoric Archaeological Preservation Plan divides the state into ten physiographic units and six temporal periods. The Refuge is located within the Osage Cuestas physiographic subprovince in Kansas. Sites dating to the Archaic, circa 3500 B.C., have been identified in the Osage Cuestas. Based on the information provided in the Preservation Plan, settlement patterns for both the Archaic and Ceramic Periods were in sheltered lowlands along major and minor drainages. However, seasonal upland camps have been identified dating to the Archaic and the Early Ceramic Periods.

Site 14LN342, a prehistoric campsite assigned to the Early Ceramic Temporal Period (A.D. 1 to A.D. 1000), is located within the Refuge boundaries. The site, which covers approximately seven acres, is located within the floodplain on the north side of the River. The potential for similar sites along both sides of the river is high. The subsistence economy was based on hunting and gathering with limited agriculture. Although evidence of earlier sites in Kansas is scarce, projectile points dating to the Clovis Period, circa 10,000 B.C. have been recorded. Researchers have postulated that this paucity of remains does not reflect lack of use of the area. They believe that these earlier sites have likely been buried by geological processes.

Although the first European exploration of Kansas dates to the mid 1500's with the Spanish expeditions from Mexico, the first European settlement was by French fur traders in the mid 1700's. The American Fur Company moved into eastern Kansas in the early 1800's. In 1839, Michael Gireau established a trading post on the river. Gabriel Chouteau bought the post in 1842. The site became known as Trading Post.

Until Congress passed the Kansas-Nebraska Act in 1854, Kansas had fewer than 800 European settlers, most of whom were traders, missionaries, or associated with military posts. The areas along the Missouri-Kansas border, including the river area were the earliest areas settled after the Indian Country was opened in 1854. In the mid 1850's the border area between Kansas and

Missouri became the scene of violence between free-state and pro-slavery factions with the region being dubbed "Bleeding Kansas." The last major incident of this guerrilla warfare was the Marais des Cygnes Massacre of May 1858. Missourians captured eleven free-state men, lined them up in a ravine before a firing squad and killed five of them. The site, just south of Trading Post, is on the National Register of Historic Places.

The border wars continued during the Civil War. In 1864 Confederate forces retreated south along the military road after a battle with Union forces at Westport. The Confederate army had a wagon train of plundered items and a herd of sheep and cattle. The Union forces caught up with Price's troops at Trading Post. During their crossing of the river, the retreating Confederates lost part of their cattle and wagons and 100 men were taken captive.

The retreat ended with a Union victory at the battle of Mine Creek, approximately six miles to the south. This was the last significant Civil War battle in the west. One of the most significant remains of European settlement on the Refuge is the Military Road and southern retreat route of Price's troops from Trading Post.

The Refuge also encompasses the remains of abandoned farmsteads and two community cemeteries. Agriculture and coal mining have been important economic activities in Linn County since the mid 1800's. The Refuge lies within the Pleasanton Coal Mining District. The earliest record of coal production in the district is in 1872. Several abandoned coal mines are present on the Refuge. These include shaft and open pit mines; both large commercial operations and small family mines.

Recreational Uses

The majority of recreational uses of the area are oriented toward river recreation or waterfowl and upland game hunting. Prior to acquisition by Pittsburgh and Midway Coal Company, several duck clubs were present in the area. Some clubs continue to lease land from other private owners for hunting. Several tracts are owned by individuals solely for hunting recreation and are managed as such. Interspersed with the coal company lands along the river are seasonal and year-round residences used as a base for boating, fishing, and other river-related activities.

A variety of clubs, whose theme is outdoor-oriented recreation, visits the nearby State area and the area that is now the Refuge each year for opportunities to observe waterfowl, general birding, hiking in the natural areas, or viewing wildflowers and other plant species. These clubs travel from throughout the State of Kansas and the Midwest region to enjoy the naturalness and diversity of the area.

REFUGE GOALS, OBJECTIVES, AND STRATEGIES

Refuge Vision

When this plan is fully implemented, a diverse, productive, and enduring representation of the plant and animal communities of the Marais des Cygnes River Basin will be protected and maintained. The Refuge will contain tracts of woodlands, wetlands, and prairie. Migration habitat will be provided for about 300 species of birds, and another 100 species will nest on the Refuge. Management activities will foster the conservation of five federally-listed species and several state listed species.

Since people are a part of this ecosystem, the Refuge will provide wildlife-dependent public use opportunities, including environmental education, interpretation, and compatible recreation. In order to accommodate more than 100,000 visitors expected annually, a visitor center and interpretive route will illustrate the values of wildlife and habitat, as well as cultural and historical features of the Refuge.

Goals, Objectives, and Strategies

The objectives presented here are to be accomplished on the Marais des Cygnes National Wildlife Refuge within the 15-year horizon of the plan. The timely completion of these objectives will depend on funding and staff levels, additional land acquisition, and Service directives.

Landscape Goal: *Restore and maintain an area of Oak-Hickory Deciduous Forest/Tallgrass Prairie Ecotone in as natural a condition as possible, to provide quality habitat for federally and state-listed species and support a diverse community of native plants and animals.*

Strategies

- Gather baseline information on the quantity and quality of wildlife habitat. Inventory community species (trees, shrubs, herbaceous plants, wildlife).
- Identify the extent and distribution of existing savannah, prairie, and native cordgrass communities on the Refuge and the hydrogeomorphic factors and disturbance regimes necessary for the restoration and enhancement of these habitat types.
- Develop baseline information on the distribution and abundance of existing plant and animal species.
- Develop information on the conditions and techniques necessary for restoration, enhancement, and maintenance of native woodland, prairie, savannah, and wetland communities.

Oak-Hickory Forest Objectives: Restore and maintain a core block of bottomland hardwoods, on all adaptable sites, totaling approximately 3,300 acres along the Marais des Cygnes River and associated floodplain: to reduce fragmentation effects on breeding forest

interior birds and to provide habitat for migrating interior forest songbirds and waterbirds, as well as other native species of wildlife.

Reestablish approximately 125 acres of bottomland hardwood forest in the Trading Post slough area to provide habitat for resident and migratory songbirds, waterbirds, and other native wildlife species.

Discussion: The Refuge was established to protect the hardwood habitat of the river bottoms. Native hardwood stands are important to wildlife due to their permanent nature and high level of plant diversity. Floodplain hardwoods, being the most diverse of this group in plant species, are also the most diverse in animal species. The hardwood bottoms are seasonally flooded by the Marais des Cygnes River and by rainfall.

Federal and state-listed endangered species, waterfowl, other migratory birds, and other wildlife will benefit from the production of food sources (i.e., mast, invertebrates, vertebrates, and vegetation), improvement of water quality, and reduction of soil erosion. The northern redbelly snake prefers mature forests and is dependent on the few areas of this habitat still existing in Kansas. All species of cavity dwelling birds and animals are dependent on woodlands.

Strategies:

- Evaluate hydrologic restoration alternatives for the Trading Post slough site.
- Coordinate forest restoration with the state of Kansas to link with their forests.
- Utilize natural succession to reestablish bottomland hardwood and upland tree stands by eliminating row cropping of approximately 300 acres of bottomland hardwood forest outside the flood protection levee.
- Plant trees by direct seeding or seedlings including mass-producing species such as oaks, pecans, hickories, and walnuts in sites where the center of the field is more than 100 m from a forest edge.
- Apply forest management practices such as thinning, selective cutting and small clear cutting.
- Evaluate hardwood sites outside the core area of bottomland hardwoods as potential sites for small green-tree reservoirs.
- Study the feasibility of restoring hydrology using ditch plugs.
- Construct low-level dikes and employ pumping to enhance flooding of tree areas.
- Assist private landowners to restore bottomland hardwoods.
- Target acquisitions and easements to restore or enhance corridors linking public and private lands along the Marais des Cygnes River and associated tributaries.
- Use seeding, interseeding, sprigging, prescribed fire, tree removal, weed control, mowing, prescribed fire, and tilling to restore hardwoods.
- Based upon life-history requirements of target species; management should consider spatial arrangement of habitat patches; areas to be burned should have some form of cover immediately adjacent to them to provide adequate escape

cover and forage immediately following a burn; time of burns in regards to nesting, brooding, and other life-history requirements of target species should be explicitly considered; early successional habitats could be maintained adjacent to row crops to provide cover for depredating wildlife and make the crop fields more attractive; location of plots should consider their proximity to major highways because of concerns for smoke management.

Savannah Objective: Restore and maintain approximately 750 acres of savannah/grove habitat, consisting predominantly of post oak, blackjack oak, and pin oak with native grass understory.

Upland Shrub Objective: Maintain approximately 450 acres of upland shrub outside of the core bottomland forest to provide habitat for migrating and nesting migrating and nesting migratory birds and other native wildlife species.

Native Prairie Objectives: Restore and maintain approximately 1,300 acres of native upland prairie continuing big and little bluestem, switchgrass, Indiangrass, sideoats grama, and native forbs.

Restore and maintain 300 acres of native lowland prairie dominated by cordgrass.

Discussion: Grasslands provide food, cover, and breeding habitat for migratory birds and other grassland dependent wildlife. Mead's milkweed, a federally-listed threatened plant, is found in prairie haymeadow habitats in the Refuge. The habitat needed by this species is gradually being lost to agricultural expansion, detrimental agricultural practices such as overgrazing, and the general elimination of tallgrass prairie. In addition, the maintenance, rehabilitation, and reestablishment of native grassland communities will protect water quality and soils from the effects of erosion. A diverse mixture of native grasses and forbs will provide greater wildlife benefits in terms of food and cover than the monotypic introduced grasses that currently exist.

Strategies:

- Utilize livestock grazing and haying as grassland management tools to increase vigor and structural variation in grassland communities.
- Develop and implement a prescribed burning program.

Wetlands Objectives: Maintain 93 acres of riparian woodland habitat along Marais des Cygnes River.

Maintain 104 acres of ponds and oxbows.

Develop and maintain about 500 acres of moist-soil cells to enhance the production of natural foods for migratory birds and other wildlife.

Provide up to 300 acres of seasonal wetlands to enhance wildlife diversity in the area.

Maintain and enhance 94 acres of water-filled mines.

Discussion: These habitat types are extremely important for migratory birds (including waterfowl), endangered or threatened species of plants and animals, and resident wildlife. The piping plover (threatened) is an uncommon seasonal spring and fall migrant through the Refuge. It has been observed in the immediate vicinity of the Refuge in 1990-1991. It is associated with unvegetated shorelines, sandbars, and mudflats of wetlands and streams, utilizing aquatic invertebrates for food. Interior least terns (threatened) use similar unvegetated wetland habitat as do piping plovers, feeding on aquatic invertebrates and small forage fish. They also would occur as uncommon spring and fall migrants through the area. They have been observed in the immediate vicinity of the Refuge in 1990-1991.

The flat floater mussel is a State-listed threatened mollusk located within and adjacent to the Refuge. The only fish listed as a State-threatened species, the hornyhead chub, has been found in Big Sugar Creek, adjacent to the Refuge. Broadhead skink, a threatened lizard, prefers dead, standing trees along water, a particular habitat in abundance on the Refuge. Eastern hognose snake (State threatened) reaches its greatest abundance along the eastern border of Kansas, where there is plenty of water for toads. The eastern hognose snake feeds exclusively on toads.

Strategies:

- Emulate historic hydrologic regimes, where feasible, to benefit native plant communities and associated wildlife aggregations.
- Identify the presence, size, and flow regimes of farm field ditches, the effects of interior roads on water movement, and the land use practices on adjacent lands that affect amount and pattern of flow onto the Refuge.
- Restore natural flow of water through the bottomland forest.
- Head cutting is a major problem in this area because the river is incised. Water should be directed away from the manmade modifications that tend to capture water (road ditches and field drains) and concentrate the flow, increasing the velocity of movement. Some ditches are small and can be filled. Possibly the placement of drop structures at key locations will provide a hedge against head cutting.
- Serve on the Basin Advisory Committee (Kansas Water Office) to address issues of water rights, water quality, and water use relevant to the Basin ecosystem.
- Cooperate with Kansas by cost sharing for the Wetland and Riparian Areas Program.
- Collaborate with Kansas Department of Wildlife and Parks in fisheries management programs.
- Collaborate with Kansas Department of Health and Environment and the Department of Water Resources for water quality and stream flows.

- Restore natural drainage patterns to farmed fields.
- Plug *w*-ditches and use existing levees to hold water on the wetlands.
- Develop water management units using existing and additional low head diking with water outlet control structures.
- Develop water sources (pumping from the river or reservoirs) to inundate managed wetlands.
- Time flooding to meet specific habitat needs. For example: Shallowly flood (no more than 12 inches) 15 percent of seasonally flooded habitats beginning August 15 for early migrating blue-winged teal and shorebirds, etc.
- Evaluate the feasibility of establishing additional moist-soil units to provide additional seasonally flooded emergent wetland habitat for resident and migratory waterfowl.

Croplands Objective: Reduce the amount of farmed land to 1,500 or less.

Discussion: Croplands produce grain and browse foods to complement the natural foods available to wildlife and reduce crop depredation (which has been well documented) on private and state lands by deer and waterfowl. They may also be used as an intermediate step in restoration of native plant communities. However, croplands reduce natural diversity, breeding habitat, and use by wintering passerines.

Strategies:

- Research and demonstrate farming practices that are good for both wildlife and farmers by using sustainable agricultural practices and integrated pest management to control undesirable vegetation.
- Use sound land management practices ensuring long-term productivity of the soil and prevent damage to environmentally sensitive areas.
- Produce small grains (wheat/rye) on about 375 acres, under cooperative farming agreements to reduce crop depredations on private lands by geese.
- Produce corn or milo on about 375 acres for migratory birds and resident wildlife and reduce crop depredations by deer on adjacent private and state land.
- Produce a legume such as alfalfa or red clover on about 375 acres, for nitrogen-fixing benefits and sustainable crop rotation.
- Produce soybeans on about 375 acres for migratory and resident wildlife.
- Farm rotational crops as needed for weed control.

Recreation Goal: *Provide wildlife-dependent recreation opportunities for up to 100,000 visitors which meet Minimum Standards for Public Use on National Wildlife Refuges, emphasizing hunting, fishing, wildlife observation, photography, environmental education, and interpretation conducted in a manner compatible with the Refuge's primary purposes.*

Consumptive Recreation Objective: Provide consumptive wildlife-dependent recreation opportunities for public enjoyment while limiting disturbance to wildlife and wildlife habitat in selected areas of the Refuge.

Discussion: Wildlife-dependent recreational activities are recognized as priority uses of the National Wildlife Refuge System. The area has a long history of use by local hunters and anglers, and this tradition is expected to continue, as promised during initial acquisition. Hunting, especially for waterfowl, already exists on private lands within the Refuge boundary on the south side of the Marais des Cygnes River. Because of this situation, the Refuge located south of the river cannot be considered a viable waterfowl sanctuary. Decisions regarding areas of the Refuge open to public hunting, species to be hunted, authorized methods of hunting, and other regulations will be addressed when the Service prepares a hunting plan in the near future.

Strategies:

- Establish launch facilities on the river at the State Line Road and near the town of Trading Post to support river fishing. These facilities will be accessible to persons with mobility impairments and will be located to allow maximum usage during periods of high and low water. Parking will be provided at these sites.
- Survey mine pits for viability to sustain fish populations. If fish populations can be maintained, develop bank fishing access to these mine pits for recreational fishing.

Non-Consumptive Recreation Objective: Provide non-consumptive wildlife-dependent recreation opportunities, accessible to people of all abilities, in selected areas of the Refuge while limiting disturbance to wildlife and wildlife habitat.

Discussion: Visitors come to the Refuge with a wide range of expectations and abilities. This objective is intended to meet the broadest range of those abilities and expectations while remaining compatible with the primary purposes for which the Refuge was established.

Strategies:

- Develop foot trails that promote wildlife observation opportunities in different habitats of the Refuge. One trail would incorporate the top of the existing levee that follows the north bank of the river. This trail would offer excellent vistas and wildlife viewing opportunities. A second trail would feature the bottomland hardwood areas.
- Establish launch facilities on the river at the State Line Road and near the town of Trading Post to support boating for wildlife observation. These facilities will be accessible to persons with mobility impairments and will located to allow maximum usage during periods of high and low water, and will provide adequate parking.

Environmental Opportunities and Interpretation Goal: *Provide wildlife and ecosystem-based education by fostering partnerships, expanding outreach, demonstrating management practices, developing site-specific curriculum, and providing interpretive materials.*

Coordination Objective: Enhance the quality of the visit and appreciation of fish and wildlife populations and associated habitat by coordinating visitor information, education, and interpretive services for visitors to the Refuge and adjacent state wildlife management area.

Discussion: A potential for confusion exists because there are adjacent wildlife areas managed by two different agencies. To the extent possible, public use planning will be closely coordinated with Kansas Department of Wildlife and Parks to prevent contradiction and duplication. By developing a single point of contact for the two areas, information will be disseminated more effectively. Visitors will have easy access to information to enhance learning and the quality of the experience.

Strategies:

- Execute a Memorandum of Understanding with Kansas Department of Wildlife and Parks to develop an interagency interpretive center on Refuge lands.
- Develop a program interpreting the resources of the area.
- Construct an orientation kiosk near the future site of the interpretive center.
- Design an auto tour route, wayside exhibits and kiosks, and Refuge-specific publications.
- Develop environmental education curricula for the site.
- Develop support facilities for environmental education. This would include indoor classroom facilities in conjunction with the visitor center. An outdoor facility (pavilion) would be developed near one of the trails to focus on bottomland hardwood habitat.
- Promote refuge opportunities to schools and conservation groups with the goal of increasing support for interpretive and environmental education facilities.
- Develop all products in cooperation with Kansas Department of Wildlife and Parks so that brochures and checklists will serve both areas, or at least complement each other.

Cultural Resources Objectives: Identify, protect, and interpret cultural and paleontological resources for scientific and educational purposes while meeting natural resource and wildlife objectives.

Encourage and enhance educational, interpretive, and research opportunities for cultural resources oriented activities consistent with the natural resource objectives of the Refuge.

Discussion: Evidence of human use of the Refuge for the past two thousand years has been documented, and the potential for finding evidence of older occupations exists. Resources include a prehistoric campsite, a segment of the original Military Post Road between Forts Leavenworth and Scott, historic farmsteads and coal mines, as well as fossilized plant remains.

Strategies:

- Identify, protect, and interpret prehistoric and historic cultural resources and paleontological resources for scientific and educational purposes.
- Protect, maintain, and plan for the use of Service managed cultural resources for the benefit of present and future generations.
- Identify, evaluate the importance of, and seek the appropriate protective designation of cultural resources in accordance with existing legal requirements, regulations, and professional standards.
- Exercise caution that cultural resources are not inadvertently transferred, sold, demolished, or substantially altered as a result of Service sanctioned activities until appropriate identification, evaluation, and plans are accomplished.
- Avoid damage and deterioration to cultural resources that would result from erosion, abandonment, or benign neglect.

PLAN IMPLEMENTATION

Future development of Refuge facilities will involve potential partnerships with the State of Kansas. Due to the planned upgrading of State Highway 69 located just west of the Refuge, the construction of a rest area with facilities on Refuge land is being considered. Such a facility could serve the public as a visitor contact station and support the function and mission of three agencies:

Kansas Department of Transportation providing a safe and convenient Rest Area on public land,

Kansas Wildlife and Parks providing wildlife management and public use on the adjacent Marais des Cygnes Wildlife Management Area, and

U.S. Fish and Wildlife Service providing wildlife management and public use including environmental education and interpretation at the Marais des Cygnes National Wildlife Refuge.

Such a partnership would be in the best interest of taxpayers and would represent the most efficient way for three separate agencies to serve the public.

Projects, Funding, and Personnel Requirements

Staff:	Project leader, refuge operations specialist, two biological technicians, administrative clerk, outdoor recreational planner, 5 FTE's permanent, 2 FTE's temporary (seasonal)	
Staff Funding:	$200,000	permanent
	$ 38,000	seasonal
Other Costs:	$ 7,000	utilities (electricity, gas, phone, water, trash)
	$ 6,000	office maintenance (copier repairs, computer replacement, office supplies, brochures, etc.)
	$ 5,000	training/travel (LE refresher, regional/zone meeting, staff training, etc.)
	$ 3,000	volunteer program expenses
	$ 25,000	routine maintenance and replacement of light vehicles
	$ 25,000	routine maintenance of refuge structures/facilities/habitats (grading roads, gravel, culverts, grass and hardwood restoration, boundary posting, fencing, dike repair, interpretive trails, public access areas, a boat launch, entrance sign upkeep, etc.)

One-time Start up Costs:

Four pickups and one utility vehicle	$70,000.00
Primary and Secondary entrance signs	$15,000.00
Small and medium tractors, disk, mowers, chain saws, post hole auger, fencing supplies, tree planter	$100,000.00
Stake bed truck	$30,000.00
Boat and motor	$4,000.00
Multi-agency office/visitor center (with exhibits)	$1,500,000.00
Auto tour route/interpretive trail	$18,000.00
Maintenance facility	$500,000.00
Backhoe front end loader	$50,000.00
D-7 bulldozer	$85,000.00
Biological and law enforcement equipment	$3,000.00
Fire fighting equipment	$75,000.00
Master plan contract work	$35,000.00
Cultural Resources Inventory	$60,000.00
Wildlife Resources Inventory	$50,000.00
Maintenance equipment and tools (saws, welder, compressor, mechanic and carpentry tools, press, grinders, benches, etc.)	$30,000.00
Radio system	$20,000.00
Dike rehabilitation and water control structures	$150,000.00
TOTAL	$2,795,000.00

Step-Down Management Plans

The following is a list of potential step-down management plans. This list includes mandatory plans, and plans that need to be written as soon as practical, in order for certain management objectives to be accomplished. The preparation and execution of these plans will partially be dependent upon funding and staff time, but should be completed within three years after the Refuge is fully staffed and funded.

Habitat Management Plan

The selection of the most appropriate management strategies will occur in this step-down plan. Therefore, the strategies listed under the Refuge objectives should be considered as potential strategies. There may be others developed in the HMP and some listed in the CCP may be rejected in the HMP as inappropriate or impractical.

Safety Plan

Public Use Management Plan (Including general wildlife-oriented recreation and Search and Rescue procedures)

Law Enforcement Plan

Refuge Inventory and Monitoring Plan

A step-down refuge monitoring plan will be developed driven by refuge goals and objectives and by the HMP. Because Marais des Cygnes is a relatively new refuge, there is limited baseline information on which to base management decisions. Therefore, high

priority will be given to an inventory of the flora and fauna of the area. Monitoring will be designed to assess the impacts and effectiveness of management actions implemented to achieve refuge goals and objectives. The desired result will be an adaptive refuge management program that facilitates the improvement of resource management over time.

Fire Management Plan (including Prescribed Burn Plan)

Fires have occurred for hundreds of thousands of years in grasslands, forests, marshes, and many other types of vegetation communities. Fire is especially important in grasslands. Without fire, most grasslands would ultimately become forests or shrublands. However, the role that fire played in the natural grassland community differed for each grassland species. The fire history of the Refuge is not known at this time. Prior to the preparation of a step-down fire management plan, a study will be made to determine what role fire played in maintaining the Refuge vegetation communities. That knowledge will then be used to determine the best use of fire in managing the Refuge landscape.

Pollution Abatement Plan

Crowd Control Plan

Cultural Resources Management Plan

The limited amount of information regarding cultural resources on Marais des Cygnes is directly related to a lack of cultural resource inventory on the Refuge. The objectives under the Landscape Goal have the potential to adversely impact significant, but unidentified and/or unevaluated resources. A cultural resource inventory is proposed under the one-time start-up costs. This inventory needs to be completed prior to the development of the Cultural Resources Management Plan. The CRM Plan needs to be completed prior to implementation of the objectives that have the potential to impact significant cultural resources.

The inventory and CRM Plan should be completed within three years after the final CCP is submitted. The CRM Plan will identify areas with significant sites and develop methods of the management of these resources. It will also identify areas with a high potential for significant resources that may not have been identified during the inventory, i.e., buried sites. The CRM Plan will provide the manager information allowing them to make decisions on development that will protect value cultural resources and that may prevent costly resource mitigation programs.

Hunting Plan (in preparation)

Fishing Plan (in preparation)

Water Use Plan (or Water and Marsh Management Plan)

Integrated Pest Management Plan (and Pesticide Use Plan)

Wilderness Review

The Refuge does not conform to the definition of a wilderness, as described in the Wilderness Act of 1964. The area has been noticeably affected by humans (i.e., mining, human habitation). In addition, due to existing inholdings and rights-of-way, there are no significant areas that provide for outstanding solitude and primitive type recreation opportunities.

Designation of a wilderness area that meets the standards of the Wilderness Act (+/- 5,000 acres) would potentially conflict with other management goals because the Refuge is only about 9,300 acres in size. Therefore, there will be no wilderness area established on the Refuge.

Monitoring and Evaluation

Establish around 50 permanent vegetation and wildlife sampling plots to provide baseline information on the distribution, structure, and abundance of habitat types and on the chronology and extent of use, population size, and habitat use by migratory and resident wildlife communities.

Sample plots will be distributed in relative proportion to habitat occurrence on the Refuge, plots will be geo-referenced (i.e., GPS) and permanently marked, trees will be tagged and mapped, elevations should be determined. Management practices that occur within and adjacent to the plots will be recorded in detail, a few old fields will be sampled to determine rates of succession to forest and the composition of trees reestablishing in the field.

Resample permanent vegetation and wildlife sampling plots on a two-year cycle for the first ten years and on a five-year cycle thereafter to provide information to evaluate the effects of management and restoration techniques on plant and animal communities.

Bottomland Hardwood:
Species composition by area - every ten years
Age structure by area - every ten years

Native Prairie/uplands:
Species composition/ground cover by location and area (map) - every five years

River and Herbaceous Wetlands:
Marais des Cygnes River:
Water quality, stream flows, aquatic life would be monitored by the State of Kansas

Herbaceous Wetlands:
Monitor moist soil plants annually

Croplands:
Monitor annually:
- wildlife uses of area and crops
- use of fertilizer and herbicides and other chemicals and
- success of rotations.

Nongame Migratory Birds:
Groups of special interest on the Refuge are shorebirds, raptors, breeding neotropical migrants, and wintering and migrating song birds.

Gather information on the temporal and spatial habitat requirements of migratory and resident songbirds, waterbirds and other resident wildlife, including endangered species to provide guidance for management and restoration activities.

The first step in monitoring and evaluation will be to document the avifauna present on the Refuge. This information will include general seasonality, status, and habitat preference of the bird species. This level is commonly referred to as "baseline" and will involve acquiring and summarizing existing information and acquiring the information needed to publish a checklist for the Refuge. Appendix A reflects the current state of knowledge of birds on the Refuge.

At the second level, monitoring and evaluation will refine refuge baseline data documenting the degree, type, and amount of individual species use. For migrants, this data includes identification of the species, timing of migration, and habitats generally used as migration stopovers. For breeding species, this data will include identification of species, habitat uses, and timing. For wintering birds, this data will include identification of species, and habitat uses. This level allows us to establish the range and amounts of use on the Refuge. This level is commonly referred to as inventory data and will use methods such as area search, checklists, and atlases.

The third level is the systematic monitoring of refuge management and priority habitats and species. This level will be used to determine avian relative abundance, population trends, densities, and distribution. This level is designed to give early indications of potential problems, triggering a more intensive level of management. Standardized methods for monitoring both populations and habitats have been established in Region 6 (Stephanie Jones, *Interim Guidelines for Monitoring Nongame Landbirds*, 1996), and will be used. Priority habitats that have been determined on the Refuge are bottomland hardwood and native prairie/uplands.

The final level is the more detailed species and population monitoring or research investigating the status of selected species, species guilds, or communities. This level should be used if data on species listed under ESA or the regional special concern list is required. It will also be used to evaluate the effects of management actions on species of special concern, or to evaluate the causes of declines documented in monitoring (level three, above).

All avian monitoring and evaluation should include a similar level of vegetation and habitat assessment, as related to bird use. Standardized methods for vegetation classification and assessment will be used for this evaluation.

Public Use and Education:
Public use minimum requirement review
Annual compatibility evaluation
Annual funding evaluation
Monitor Kansas game and creel survey results (see hunting and fishing plans)
Cultural Resources - Annual Report to Congress

PREPARERS

Adam Misztal, Wildlife Biologist/Planner, U.S. Fish and Wildlife Service, Denver, Colorado: project coordination, data collection, writing, editing and public involvement.

Jerre Gamble, Project Leader Flint Hills National Wildlife Refuge, U.S. Fish and Wildlife Service, Hartford, Kansas: natural resources goals and objectives preparation and review.

Rhoda Lewis, Regional Archaeologist, U.S. Fish and Wildlife Service, Denver, Colorado: cultural resources overview and goal.

Doug Staller, Education and Visitor Services, U.S. Fish and Wildlife Service, Bismarck, North Dakota: public use goals, objectives and strategies.

Robert Schneider, Cartographic Technician, U.S. Fish and Wildlife Service, Denver, Colorado: maps.

Stephanie Jones, nongame migratory birds, U.S. Fish and Wildlife Service, Denver, Colorado: preparation of sections dealing with nongame migratory birds.

Shannon Fennell, Refuge Assistant, Flint Hills National Wildlife Refuge, U.S. Fish and Wildlife Service, Hartford, Kansas: resource analysis and preliminary goals and objectives.

Barbara Shupe, Office Automation Assistant, U.S. Fish and Wildlife Service, Denver, Colorado: document publication including graphics and editing.

Appendix A

Bird Species Listings For Marais des Cygnes NWR Area

MARAIS DES CYGNES NATIONAL WILDLIFE REFUGE

The Refuge is managed primarily for migratory birds. A secondary function is to provide an opportunity for the public to observe, study, harvest, and enjoy wildlife and plants in their natural environment.

January and February are good months to observe Bald Eagles. April and May are the best months for observing passerines, as the Refuge is an outstanding migration corridor for warblers. These months are also good for marsh birds, including egrets, herons, and shorebirds. March, October, and November are good times to observe the peak concentrations of waterfowl. During the winter, clouds of wintering sparrows can be observed in the upland areas.

CHECKLIST:
The following tabulation lists 317 birds that have been found in the area of the Refuge, including 109 species which are probably nesters on the Refuge (*).

Seasonal occurrence and relative abundance is coded as follows:

SEASONS:

S --Spring (March-May)
Su --Summer (June-August)
F --Fall (September-November)
W --Winter (December-February)

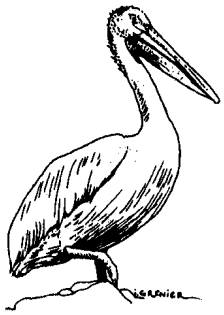
SEASONAL ABUNDANCE:

a--abundant	occurring in large numbers
c--common	certain to be seen in suitable habitat
u--uncommon	present but not certain to be seen
o--occasional	seen only a few times during a season
r--rare	seen at intervals of 2 to 5 years
x--accidental	straggler or out of normal range

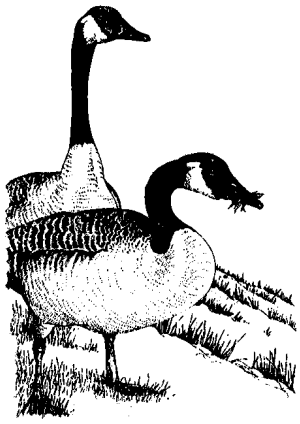
	S	Su	F	W
LOONS				
__ Common Loon	u	r	u	
GREBES				
__*Pied-billed grebe	c	o	c	o
__ Horned grebe	o	o		
__ Red-necked grebe	x			
__ Eared grebe	o	u		
__ Western grebe	r			

Grebe

	S	SU	F	W
__ Clark's grebe	x			
PELICANS				
__ American white pelican	c	o	c	
__ Brown pelican	x			
CORMORANTS				
__*Double-crested cormorant	c	u	c	
__ Neotropical cormorant	r	r	r	
__ Anhinga	x	x		
HERONS AND ALLIES				
__ American bittern	u	o	u	
__*Least bittern	o	o	r	
__*Great blue heron	c	c	c	u
__ Great egret	u	u	u	
__ Snowy egret	u	u	u	
__*Little blue heron	u	u	c	
__ Cattle egret	o	o	o	
__*Green heron	c	c	c	
__ Black-crowned night-heron	c	u	c	
__*Yellow-crowned night-heron	u	u	u	
__ White ibis	x	x		
__ White-faced ibis	r	r	r	
__ Wood stork		x		
__*Turkey vulture	u	c	u	o
__ Fulvous whistling-duck			x	
__ Black-bellied whistling-duck			x	
SWANS				
__ Tundra swan	r		r	o
GEESE				
__ Greater white-fronted goose	c	c	u	u
__ Snow goose	a	a	a	
__ Ross's goose	o		o	o
__ Brant	a		a	a
__*Canada goose	a	u	a	a
DUCKS				
__*Wood duck	c	c	c	r
__ Green-winged teal	a	o	a	o



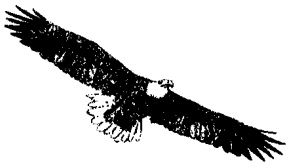
Pelican



Canada Geese

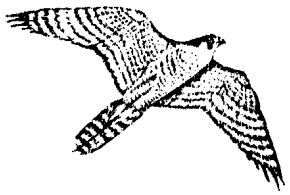
	S	SU	F	W
__ American black duck	r		r	r
__ *Mallard	a	u	a	a
__ Northern pintail	a	o	a	u
__ *Blue-winged teal	a	u	a	a
__ Cinnamon teal	x	x	x	
__ Northern shoveler	c	o	c	r
__ Gadwall	c	r	c	r
__ American wigeon	a	r	a	u
__ Canvasback	u	r	u	r
__ Redhead	c	r	c	r
__ Ring-necked duck	c	r	c	r
__ Greater scaup	r	r	r	r
__ Lesser scaup	a	r	a	r
__ Oldsquaw			x	x
__ Black scoter	r		r	
__ Surf scoter	r		r	
__ White-winged scoter	r		r	r
__ Common goldeneye	u			u
__ Bufflehead	u		u	u
__ *Hooded merganser	u	r	u	u
__ Common merganser	a	c	a	
__ Red-breasted merganser	r		r	
__ Ruddy duck	u	r	u	u
OSPREY				
__ Osprey	u	o	u	o
KITE				
__ Mississippi kite	r	r		
HAWKS, EAGLES				
__ Bald eagle	u		u	u
__ Northern harrier	c	u	c	c
__ Sharp-shinned hawk	u	r	u	u
__ Cooper's hawk	o	o	u	o
__ Northern goshawk				r
__ *Red-shoulder hawk	r	r	r	
__ *Broad-winged hawk	u	r	u	
__ *Swainson's hawk	u	o	u	
__ *Red-tailed hawk	a	a	a	a
__ Ferruginous hawk	r	r		
__ Rough-legged hawk	u	u	c	c
__ Golden eagle	o	r	o	o

Scaup

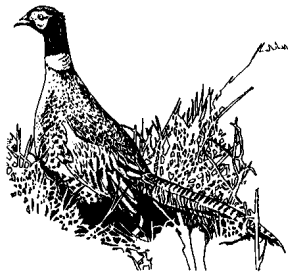


Bald Eagle

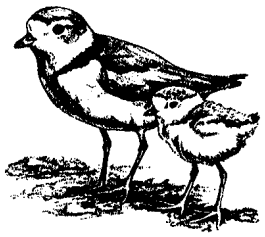
	S	SU	F	W
FALCONS				
__*American kestrel	c	c	c	c
__ Merlin	u	u	u	r
__ Peregrine falcon	r	r	r	o
__ Prairie falcon	r			r
GALLINACEOUS BIRDS				
__*Ring-necked pheasant	o	o	o	o
__ Greater prairie-chicken	c	c	c	c
__*Wild turkey	u	u	u	u
__*Northern bobwhite	a	a	a	a
RAILS				
__ Yellow rail	r		r	
__ King rail		u		
__ Virginia rail	r	u	r	r
__ Sora	c	u	c	u
__ Purple gallinule		r		
__ Common moorhen	r	r		
__*American coot	a	a	a	r
CRANES				
__ Sandhill crane	c	r	c	r
PLOVERS				
__ Black-bellied plover	u	o	o	
__ American golden-plover	u	o	u	r
__ Snowy plover	r	r		
__ Semipalmated plover	u	u	u	
__ Piping plover	r	r		
__*Killdeer	a	a	a	u
AVOCETS				
__ American avocet	c	c	c	
SANDPIPERS				
__ Greater yellowlegs	u	o	u	
__ Lesser yellowlegs	c	o	c	o
__ Solitary sandpiper	u	u		
__ Willet	o	u	o	
__ Spotted sandpiper	c	r	c	
__*Upland sandpiper	a	a	c	
__ Long-billed curlew	r	r		
__ Hudsonian godwit	u	r	r	



Peregrine Falcon



Ring-necked Pheasant



Plover

	S	SU	F	W
__ Marbled godwit	u	o	u	
__ Ruddy turnstone	x			
__ Sanderling	r	r		
__ Semipalmated sandpiper	c	r	c	
__ Western sandpiper	u	r	o	
__ Least sandpiper	c	o	c	
__ White-rumped sandpiper	u	o	u	
__ Baird's sandpiper	c	r	c	
__ Pectoral sandpiper	u	o	u	
__ Dunlin	o	r	o	
__ Stilt sandpiper	u	r	u	
__ Buff-breasted sandpiper	r	u	u	
__ Ruff	x			
__ Long-billed dowitcher	a	u	a	
__ Common snipe	c	r	c	r
__*American woodcock	r	r	r	
PHALAROPES				
__ Wilson's phalarope	c	o	c	
__ Red phalarope	r	r	r	
GULLS				
__ Franklin's gull	a	a	a	
__ Little gull	r		r	
__ Bonaparte's gull	r	r	o	
__ Ring-billed gull	c	c	c	u
__ Herring gull	u	r	u	u
__ Glaucous gull				r
TERNS				
__ Caspian tern	o	o		
__ Common tern	r		r	
__ Forster's tern	u	u	u	
__ Least tern	r	r		
__ Black tern	c	u	u	
DOVES				
__*Rock dove	u	u	u	u
__*Mourning dove	a	a	a	o

	S	SU	F	W
CUCKOOS				
__*Black-billed cuckoo	c	u	u	
__*Yellow-billed cuckoo	c	c	c	
__ Greater roadrunner	r	r	r	r
OWLS				
__*Common barn owl	o	o	u	o
__*Eastern screech owl	c	c	c	c
__*Great horned owl	a	a	a	a
__ Snowy owl				r
__ Burrowing owl	o	o		
__*Barred owl	c	c	c	c
__ Long-eared owl	u	r	r	u
__ Short-eared owl	u	u	u	
__ Northern saw-whet owl	r			r
GOATSUCKERS				
__*Common nighthawk	c	c	c	
__ Common poorwill	c	c	c	
__*Chuck-will's-widow	c	c	c	
__*Whip-poor-will	u	o	u	
SWIFTS				
__*Chimney swift	c	c	c	
HUMMINGBIRDS				
__ Magnificent hummingbird	x			
__ Ruby-throated hummingbird	u	u	u	
KINGFISHERS				
__*Belted kingfisher	c	c	c	o
WOODPECKERS				
__*Red-headed woodpecker	c	c	c	u
__*Red-bellied woodpecker	a	a	a	a
__ Yellow-bellied sapsucker	u	u	u	u
__*Downy woodpecker	a	a	a	a
__*Hairy woodpecker	c	c	c	c
__*Northern flicker	c	c	c	c
__*Pileated woodpecker	u	u	u	u

Great Horned Owl

Woodpeckers

	S	SU	F	W
FLYCATCHERS				
__ Olive-sided flycatcher	u	u	u	
__*Eastern wood-pewee	c	c	c	
__ Yellow-bellied flycatcher	r	r		
__*Acadian flycatcher	u	u	u	
__ Alder flycatcher	u	u		
__ Willow flycatcher	c	c	c	
__ Least flycatcher	c	c	c	
__*Eastern phoebe	c	c	c	
__*Great crested flycatcher	c	c	c	
__*Western kingbird	c	c	u	
__*Eastern kingbird	a	a	a	
__*Scissor-tailed flycatcher	c	c	c	
LARKS				
__*Horned lark	a	c	a	a
SWALLOWS				
__*Purple martin	c	c	c	
__*Tree swallow	c	r	c	
__*Northern rough-winged swallow	c	u	c	
__ Bank swallow	c	c	c	
__*Cliff swallow	c	c	c	
__*Barn swallow	a	a	a	
JAYS AND CROWS				
__*Blue jay	a	a	a	a
__ Pinyon jay				r
__ Clark's nutcracker	x		x	x
__*American crow	c	c	c	c
CHICKADEES				
__*Black-capped chickadee	a	a	a	a
__*Eastern Tufted titmouse	c	c	c	c
NUTHATCHES				
__ Red-breasted nuthatch	o	u		
__*White-breasted nuthatch	c	u	c	c
__ Pygmy nuthatch	x			x

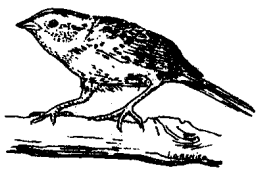
Kingbird

	S	SU	F	W
CREEPERS				
__ Brown creeper	u		u	u
WRENS				
__ Rock wren	r	r		
__*Carolina wren	c	c	c	c
__*Bewick's wren	c	r	c	
__*House wren	a	a	c	
__ Winter wren				r
__ Sedge wren	u	u	u	
__ Marsh wren	u	r	u	r
THRUSHES, BLUEBIRDS, KINGLETS				
__ Golden-crowned kinglet	c	c	c	u
__ Ruby-crowned kinglet	c	u	c	r
__*Blue-gray gnatcatcher	c	c	c	
__*Eastern bluebird	c	c	c	u
__ Mountain bluebird	u		u	u
__ Townsend's solitaire	r	r		u
__ Veery		u		
__ Gray-cheeked thrush	u			
__ Swainson's thrush	a	u	a	
__ Hermit thrush	u	u	u	r
__*Wood thrush	u	c	u	
__*American robin	a	a	a	u
THRASHERS, MOCKINGBIRD				
__*Gray catbird	c	c	c	r
__*Northern mockingbird	c	c	c	u
__*Brown thrasher	c	a	a	r
PIPITS				
__ American pipit	u		u	o
__ Sprague's pipit	u		u	r
WAXWINGS				
__ Cedar waxwing	c		c	c
SHRIKES				
__ Northern shrike				r
__*Loggerhead shrike	c	c	c	r

Loggerhead Shrike

	S	SU	F	W
STARLINGS				
__*European starling	a	a	a	a
VIREOS				
__*White-eyed vireo	u	u	o	
__*Bell's vireo	c	c	c	
__ Blue-headed vireo	c		c	
__*Yellow-throated vireo	u	u	o	
__*Warbling vireo	c	c	c	
__ Philadelphia vireo	u	o		
__*Red-eyed vireo	u		u	
WARBLERS				
__ Blue-winged warbler	r	r	r	
__ Golden-winged warbler	r		r	
__ Tennessee warbler	c	u	u	
__ Orange-crowned warbler	c	r	c	r
__ Nashville warbler	c		c	
__*Northern parula	u	r	u	
__*Yellow warbler	c	u	c	
__ Chestnut-sided warbler	u	o	u	
__ Magnolia warbler	u	o	u	
__ Cape may warbler	r			
__ Black-throated blue warbler	r		r	
__ Yellow-rumped warbler	a	r	a	r
__ Black-throated green warbler	u	o	u	
__ Blackburnian warbler	u	o	u	
__ Yellow-throated warbler	r			
__ Pine warbler	x			
__ Prairie warbler	r	r	r	
__ Palm warbler	r	r		
__ Bay-breasted warbler	r		r	
__ Blackpoll warbler	u		r	
__ Cerulean warbler	u			
__*Black-and-white warbler	c	u	c	
__ American redstart	c	r	o	
__*Prothonotary warbler	u	u	o	
__ Worm-eating warbler	x			
__ Ovenbird	c	r	c	
__ Northern waterthrush	u	o	u	
__*Louisiana waterthrush	u	r	u	
__*Kentucky warbler	u	u	u	
__ Connecticut warbler	r			
__ Mourning warbler	c		c	

	S	SU	F	W
__*Common yellowthroat	a	c	c	
__ Hooded warbler	r			
__ Wilson's warbler	c		c	
__ Canada warbler	u		u	
__*Yellow-breasted chat	u	u	u	
TANAGERS				
__*Summer tanager	u	u	u	
__ Scarlet tanager	u	r	u	
GROSBEAKS/BUNTINGS				
__*Northern cardinal	c	c	c	c
__*Rose-breasted grosbeak	c	u	c	
__ Black-headed grosbeak	u	u	u	
__*Blue grosbeak	u	u	o	
__ Lazuli bunting	u	r	u	
__*Indigo bunting	c	c	c	
__*Painted bunting	o	u	r	
__*Dickcissel	c	c	c	
TOWHEES AND SPARROWS				
__*Eastern towhee	c	u	c	u
__ American tree sparrow	a	a	a	
__*Chipping sparrow	c	c	c	
__ Clay-colored sparrow	c	u	c	
__*Field sparrow	c	u	c	r
__ Vesper sparrow	c	c	c	
__*Lark sparrow	c	c	c	
__ Savannah sparrow	c	u	c	r
__ Baird's sparrow	x		x	
__*Grasshopper sparrow	c	c	c	
__ Henslow's sparrow	r	r	r	
__ Le Conte's sparrow	u	u	u	u
__ Nelson's sharp-tailed sparrow	r			
__ Fox sparrow	u		u	u
__ Song sparrow	c	c	c	c
__ Lincoln's sparrow	c	c	c	r
__ Swamp sparrow	c		c	u
__ White-throated sparrow	c		c	u
__ White-crowned sparrow	c	u	c	c
__ Harris' sparrow	a		c	c
__ Dark-eyed junco	c	r	c	c
__ McCown's longspur	o		o	o
__ Lapland longspur	c		c	u



Le Conte's Sparrow

	S	SU	F	W
__ Smith's longspur	u		u	r
__ Chestnut-collared longspur	r		r	r
__ Snow bunting				r
BLACKBIRDS AND ORIOLES				
__ Bobolink	o	r	r	
__*Red-winged blackbird	a	a	a	a
__*Eastern meadowlark	a	a	a	a
__ Western meadowlark	u	o	o	u
__ Yellow-headed blackbird	u	u		
__ Rusty blackbird	u	u	u	
__ Brewer's blackbird	u		u	u
__*Great-tailed grackle	r	r	r	r
__*Common grackle	a	a	a	u
__*Brown-headed cowbird	a	c	a	c
__*Orchard oriole	c	c	u	
__*Baltimore oriole	a	a	u	
FINCHES				
__ Common redpoll				r
__ Purple finch	u		u	u
__*House finch	u	u	u	u
__ Pine siskin	o	r	o	u
__*American goldfinch	c	c	c	c
__ Red crossbill				r
SPARROW				
__*House sparrow	a	a	a	a

Bobolink

Acknowledgments:

This list was compiled from existing information by Stephanie L. Jones and Beth Dickerson. Information was supplied by W. Busby (KSBBA), M. Cooksey, C. Ely, G.H. Farley, B. Fisher, C. Hobbs, J. Jefferson, P.A. Johnsgard, L. Moore, M. McHugh, M. Schwilling, M.C. Thompson, and J.L. Zimmerman,.

Appendix B
Vertebrates (other than birds)
of Linn County, Kansas
Kansas Natural Heritage Inventory

Name	Common Name	SRank
	Amphibia	
Ambystoma texanum	Smallmouth Salamander	S5
Ambystoma tigrinum	Tiger Salamander	S5
Necturus maculoslis	Mudpuppy	S5
Notophthalmus viridescens	Eastern Newt	S1
Bufo americanus	American Toad	S5
Bufo woodhousii	Woodhouse's Toad	S5
Acris crepitans	Blanchard's Cricket Frog	S5
Hyla chrysoscelis	Cope's Gray Treefrog	S5
Hyla versicolor	Gray Treefrog	S4
Pseudacris triseriata	Western Chorus Frog	S5
Gastrophryne olivacea	Great Plains Narrowmouth Toad	S5
Rana areolata	Northern Crawfish Frog	S3
Rana blairi	Plains Leopard Frog	S5
Rana catesbeiana	Bullfrog	S5
Rana sphenocephala	Southern Leopard Frog	S5
	Mammalia	
Didelphis virginiana	Virginia Opossum	S5
Blarina hylophaga	Elliot's Short-Tailed Shrew	S4
Cryptotis parva	Least Shrew	S5
Scalopus aquaticus	Eastern Mole	S5
Myotis lucifugus	Little Brown Myotis	S3 S4
Eptesicus fuscus	Big Brown Bat	S5
Dasypus novemcinctus	Nine-Banded Armadillo	S3
Sylvilagus floridanus	Eastern Cottontail	S5
Lepus californicus	Black-tailed Jackrabbit	S4 S5
Tamias striatus	Eastern Chipmunk	S1
Marmota monax	Woodchuck	S4
Spermophilus franklinii	Franklin's Ground Squirrel	S2
Spermophilus tridecemlineatus	Thirteen-lined Ground Squirrel	S5
Sciurus carolinensis	Eastern Gray Squirrel	S5
Sciurus niger	Eastern Fox Squirrel	S5
Glaucomys volans	Southern Flying Squirrel	S2 S3
Castor canadensis	American Beaver	S5
Reithrodontomys fulvescens	Fulvous Harvest Mouse	S2 S3
Reithrodontomys megalotis	Western Harvest Mouse	S5
Reithrodontomys montanus	Plains Harvest Mouse	S5

Name	Common Name	SRank
Peromyscus leucopus	White-Footed Mouse	S5
Peromyscus maniculatus	Deer Mouse	S5
Sigimodon hispidus	Hispid Cotton Rat	S5
Neotoma floridana	Eastern Woodrat	S5
Microtus ochrogaster	Prairie Vole	S5
Microtus pinetorum	Woodland Vole	S5
Ondatra zibethicus	Common Muskrat	S5
Synaptomys cooperi	Southern Bog Lemming	S3?
Zapus hudsonius	Meadow Jumping Mouse	S3
Canis latrans	Coyote	S5
Vulpes vulpes	Red Fox	S4
Urocyon cinereoargenteus	Common Gray Fox	S3
Procyon lotor	Common Raccoon	S5
Mustela frenata	Long-tailed Weasel	S3
Mustela nivalis	Least Weasel	S3
Mustela vison	Mink	S3
Taxidea taxus	American Badger	S3
Spilogale putorius	Eastern Spotted Skunk	S2
Mephitis mephitis	Striped Skunk	S5
Felis concolor	Mountain Lion	SH
Odocoileus virginianus	White-tailed Deer	S5

Osteichthyes

Polyodon spathula	Paddlefish	S3
Lepisosteus oculatus	Spotted Gar	S1 S2
Lepisosteus osseus	Longnose Gar	S5
Lepisosteus platostomus	Shortnose Gar	S4
Dorosoma cepedianum	Gizzard Shad	S5
Campostoma anomalum	Central Stoneroller	S5
Ctenopharyngodon idella	Grass Carp	SE
Cyprinus carpio	Common Carp	SE
Nocomis biguttatus	Horneyhead Chub	S1 S2
Notemigonus crysoleucas	Golden Shiner	S5
Notropis atherinoides	Emerald Shiner	S5
Notropis buchanani	Ghost Shiner	S5
Notropis rusellus	Rosyface Shiner	S4
Notropis stramineus	Sand Shiner	S5
Phenacosius mirabilis	Suckermouth Minnow	S5

Name	Common Name	SRank
Pimephales notatus	Bluntnose Minnow	S5
Pimephales promelas	Fathead Minnow	S5
Pimephales vigilax	Bullhead Minnow	S5
Semotilus atromaculatus	Creek Chub	S5
Cyprinella lutrensis	Red Shiner	S5
Lythrurus umbratilis	Redfin Shiner	S5
Macrhysopsis storeriana	Silver Chub	S3 S4
Carpiodes carpio	River Carpsucker	S5
Catostomus commersonl	White Sucker	S5
Ictiobus bubalus	Smallmouth Buffalo	S5
Ictiobus cyprinellus	Bigmouth Buffalo	S5
Ictiobus niger	Black Buffalo	Ss
Moxostoma erythrurum	Golden Redhorse	S5
Moxostoma macrolepidotum	Shorthead Redhorse	S5
Ictalurus furcatus	Blue Catfish	S5
Ictalurus punctatus	Channel Catfish	S5
Noturus flavus	Stonecat	S5
Noturus gyrinus	Tadpole Madtom	S2 S3
Noturus nocturnus	Freckled Madtom	S4
Noturus exilis	Slender Madtom	S4
Pylodictis olivaris	Flathead Catfish	S5
Ameiurus melas	Black Bullhead	S5
Ameiurus natalis	Yellow Bullhead	S5
Ameiurus nebulosus	Brown Bullhead	SE
Fundulus notatus	Blackstripe Topminnow	S5
Labidesthes sicculus	Brook Silverside	S4
Lepomis cyanellus	Green Sunfish	S5
Lepomis gulosus	Warmouth	S4 S5
Lepomis humilis	Orangespotted Sunfish	S5
Lepomis macrochirus	Bluegill	S5
Lepomis megalotis	Longear Sunfish	S5
Micropterus dolomieu	Smallmouth Bass	S3 S4
Micropterus salmoides	Largemouth Bass	S5
Pomoxis annularis	White Crappie	S5
Pomoxis nigromaculatus	Black Crappie	SE
Etheostoma blennioides	Greenside Darter	S2
Etheostoma flabellare	Fantail Darter	S3
Etheostoma nigrum	Johnny Dater	S3 S4
Etheostoma spectabile	Orangethroat Darter	S5
Perca flavescens	Yellow Perch	SE

Name	Common Name	SRank
Percina caprodes	Logperch	S5
Percina phoxocephala	Slenderhead Darter	S5
Stizostedion vitreum	Walleye	S5
Aplodinotus grunniens	Freshwater Drum	S5
	Reptilia	
Chelydra serpentina	Common Snapping Turtle	S5
Chrysemys picta	Western Painted Turtle	S5
Graptemys geographica	Common Map Turtle	S2
Graptemys pseudogeographica	Ouachita Map Turtle	S4
Terrapene carolina	Three-toed Box Turtle	S4
Terrapene ornata	Ornate Box Turtle	S5
Pseudemys scripta	Red-eared Slider	S5
Trionyx muticus	Midland Smooth Softshell	S4
Trionyx spiniferus	Western Spiny Softshell	S5
Ophisaurus attenuatus	Western Slender Glass Lizard	S5
Crotaphytus collaris	Eastern Collared Lizard	S4
Sceloporus undulatus	Eastern Fence Lizard	S5
Eumeces anthracinus	Southern Coal Skink	S5
Eumeces fasciatus	Five-Lined Skink	S5
Eumeces laticeps	Broadhead Skink	S2
Eumeces obsoletus	Great Plains Skink	S5
Scincella lateralis	Ground Skink	S5
Cnemidophorus sexlineatus	Prairie-Lined Racerunner	S5
Carprophis amoenus	Western Worm Snake	S5
Coluber constrictor	Eastern Yellowbelly Racer	S5
Diadophis punctatus	Prairie Ringneck Snake	S5
Elaphe guttata	Great Plains Rat Snake	S5
Elaphe obsoleta	Black Rat Snake	S5
Heterodon platirhinos	Eastern Hognose Snake	S3
Lampropeltis calligaster	Prairie Kingsnake	S5
Lampropeltis getula	Common Kingsnake	S5
Lampropeltis triangulum	Milk Snake	S4
Nerodia erythrogaster	Blotched Water Snake	S5
Nerodia rhombifer	Diamondback Water Snake	S5
Nerodia sipedon	Northern Water Snake	S5
Opheodrys aestivus	Rough Green Snake	S4
Pituophis melanoleucus	Bullsnake	S5
Regina grahamii	Graham's Crayfish Snake	S4

Name	Common Name	SRank
Storeria dekayi	Texas Brown Snake	S5
Storeria occipitomaculata	Northern Redbelly Snake	S5
Tantilla gracilis	Flathead Snake	S4
Thamnophis proximus	Western Ribbon Snake	S5
Thamnophis sirtalis	Red-Sided Garter Snake	S5
Tropidoclonion lineatum	Lined Snake	S5
Agkistrodon contortrix	Copperhead	S5
Crotalus horridus	Timber Rattlesnake	S3
Sistrurus catenatus	Massasauga	S4

162 Records Processed

Explanation of the Natural Heritage Ranking System

Each species is given two ranks. A global (G) rank reflecting its rarity throughout the world and an state (S) rank reflecting its rarity within Kansas.

Global Rank

G1 = Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
G2 = Imperiled globally because of rarity (six to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it vulnerable to extinction throughout its range.
G3 = Either very rare and local throughout its range, or found locally (even abundantly at some of its locations) in a restricted range; in the range of 21 to 100 occurrences.
G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
GH = Historically known, expectation that it might be rediscovered.
GX = Believed to be extinct.
GU = Rarity unknown.

State Rank

S1 = Critically imperiled in Kansas because of extreme rarity IS or fewer occurrences or very few remaining individuals or acres or because of some factor(s) making it especially vulnerable to extinction from the state.
S2 = Imperiled in Kansas because of rarity (six to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.
S3 = Rare in Kansas (on the order of 21 to 100 occurrences).
S4 = Apparently secure in Kansas, with many occurrences.
S5 = Demonstrably secure in Kansas.
SH = Of historical occurrence in Kansas, perhaps not having been verified in the past 20 years, and suspected to be still extant in the state.
SX = Apparently extirpated from Kansas.
SU = Rarity in Kansas unknown.

Other Rank Symbols

? = Denotes uncertainty about the rank.
Q = Questions exist about the taxonomic status of the species.
T = May appear with the global rank, and indicates a global rank for a particular subspecific taxon.

Explanation of Federal and State Status Codes

Federal (status determined by U.S. Fish and Wildlife Service, Office of Endangered Species)
LE = Listed Endangered.
PE = Proposed for Listing as Endangered.
LT = Listed Threatened.
PT = Proposed for Listing as Threatened.
LELT=Listed Endangered in some regions and Listed Threatened in other regions.
Cl= Category 1 species for Listing. Species determined to be in need of protection by listing the species as Endangered or Threatened.
C2= Category 2 species for Listing. Species needs additional study to determine whether it should be Threatened or Endangered.
C2*= Category 2 species recommended for elevation to C1 status.
3C = Category 3 species. Currently, the species is not recommended for Listing as Threatened or Endangered.

State (Status determined by Kansas Department of Wildlife and Parks)
E = Endangered
T = Threatened
C = In Need of Conservation
U = Unclassified (no protective status)

Appendix C
Kansas Department of Wildlife and Parks
Threatened and Endangered Species
Known or Likely to Occur
in
Linn County, Kansas

Kansas Department of Wildlife and Parks
Threatened and Endangered Species Known or Likely to Occur
in
Linn County, Kansas

Bald eagle *(Haliaeetus leucocephalus)* - Endangered: Known to occur as a regular winter resident along the Marais des Cygnes River and at wetlands. Critical habitat has been designated. Endangered nationally.

Broadhead skink (*Eumeces laticeps*) - Threatened: may occur in mature woodlands where it depends upon tree cavities for habitat.

Central newt *(Notophthalmus viridescens Louisianensis)* - Threatened: Known to occur historically and likely still occurs in moist bottomland woodlands where small weedy pools are found.

Eastern hognose snake *(Heterodon platyrhinos)* - Threatened: May occur in suitable habitat. Prefers light loamy to sandy soils near streams and wetlands. Tends to avoid dense woodland.

Eastern spotted skunk *(Spilogale putorius interrupta)* - Threatened: May occur near woodland edges, in grasslands with shrub clumps or rock outcrops, and in abandoned farmsteads where old buildings or debris piles provide cover.

Eskimo curlew (*Numenius borealis*) - Endangered: formerly a regular spring transient using open fields and heavily grazed or burned grasslands. Was most common in the eastern 2/3 of the state, but has not been verified in Kansas since 1902. Recent sightings north of Kansas indicate a few birds may still migrate through the state. Endangered nationally.

Flat floater *(Anodonta suborbiculata)* - Endangered: This freshwater mussel is known to occur in suitable mud-bottomed permanent oxbow lakes along the Marais des Cygnes River. Critical habitat has been designated.

Green frog *(Rana clamitans melanota)* - Threatened: May occur in suitable backwater areas near streams and small impoundments.

Hornyhead chub *(Nocomis biguttatus)* - Threatened: Known to occur historically and may still occur in larger tributaries to the Marais des Cygnes River. Requires gravelly low gradient streams with pools and slow to moderate runs. Often associated with aquatic vegetation.

Least tern *(Sterna antillarum)* - Endangered: Known to occur as an uncommon seasonal transient or summer visitant. Endangered nationally.

Northern crawfish frog *(Rana areolata circulosa)* - Threatened: Known to occur in poorly drained meadows and lowlands where temporary rain-filled pools are used for breeding. Spends most of its life below ground in crayfish burrows. Critical habitat has been designated.

Northern redbelly snake *(Storeria occipitomacul a t a occiptomaculata)* - Threatened: May occur in mature upland woodlands having dense leaf litter, rocks, logs, and other debris present for cover.

Northern spring peeper *(Pseudacris crucifer crucifer)* - Threatened: Known to occur historically and may still occur as isolated colonies in suitable habitat. Requires small pools and wetlands with abundant aquatic vegetation located near woodlands.

Peregrine falcon *(Falco peregrinus)* - Endangered: Known to occur as an uncommon seasonal transient or winter visitant. Prefers areas with large concentrations of waterfowl. Endangered nationally.

Piping plover *(Charadrius melodus)* - Threatened: Known to occur as a rare seasonal transient at sparsely vegetated shorelines of stream, marshes, or impoundments. Threatened nationally.

Snowy plover *(Charadrius alexandrinus)* - Threatened: Known to occur as an occasional seasonal transient and summer visitant at sparsely vegetated wetlands and impoundment shorelines.

Western earth snake *(Virginia valeriae elegans)* - Threatened: Known to occur in rocky hillsides in moist woodlands. Spends daylight hours beneath rocks, logs, or in leaf-litter.

White-faced ibis *(Plegadis chihi)* - Threatened: Known to occur as an occasional seasonal or summer visitant at wetlands and impoundments.

Effective August, 1989

Appendix D
Executive Order 12996

EXECUTIVE ORDER 12996

Management and General Public Use of the National Wildlife Refuge System

By the authority vested in me as President by the Constitution and the laws of the United States of America, and in furtherance of the purposes of the Fish and Wildlife Act of 1956 (16 U.S.C. 742a), the Fish and Wildlife Coordination Act (16 U.S.C. 661), the National Wildlife Refuge System Administration Act (16 U.S.C. 668dd), the Refuge Recreation Act (16 U.S.C. 460k), the Endangered Species Act of 1973 (16 U.S.C.1531), the Emergency Wetlands Resource Act (16 U.S.C. 3901), the National Environmental Policy Act (42 U.S.C. 4321), and other pertinent statutes, and in order to conserve fish and wildlife and their habitat, it is ordered as follows:

Section 1. The Mission of the National Wildlife Refuge System. The mission of the National Wildlife Refuge System ("Refuge System") is to preserve a national network of lands and waters for the conservation and management of fish, wildlife, and plant resources of the United States for the benefit of present and future generations.

Sec. 2. Guiding Principles. To help ensure a bright future for its treasured national heritage. I hereby affirm the following four guiding principles for management and general public use of the Refuge System:

(a) Public Use. The Refuge System provides important opportunities for compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

(b) Habitat. Fish and wildlife will not prosper without high-quality habitat, and without fish and wildlife, traditional uses of refuges cannot be sustained. The Refuge System will continue to conserve and enhance the quality and diversity of fish and wildlife habitat within refuges.

© Partnerships. America's sportsmen and women were the first partners who insisted on protecting valuable wildlife habitat within wildlife refuges. Conservation partnerships with other Federal agencies, State agencies, Tribes, organizations, industry, and the general public can make significant contributions to the growth and management of the Refuge System.

(d) Public Involvement. The public should be given a full and open opportunity to participate in decisions regarding acquisition and management of our National Wildlife Refuges.

Sec. 3. Directive to the Secretary of the Interior. To the extent consistent with existing laws and interagency agreements, the Secretary of the Interior, in carrying out his trustee and stewardship responsibilities for the Refuge System is directed to:

(a) recognize compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation as priority general public uses of the Refuge System through which the American public can develop an appreciation for fish and wildlife;

(b) provide expanded opportunities for these priority public uses within the Refuge System when they are compatible and consistent with sound principles of fish and wildlife management, and are otherwise in the public interest;

© ensure that such priority public uses receive enhanced attention in planning and management within the Refuge System;

(d) provide increased opportunities for families to experience wildlife-dependent recreation, particularly opportunities for parents and their children to safely engage in traditional outdoor activities, such as fishing and hunting;

(e) ensure that the biological integrity and environmental health of the Refuge System is maintained for the benefit of present and future generations of Americans;

(f) continue, consistent with existing laws and interagency agreements, authorized or permitted uses of units of the Refuge System by other Federal agencies, including those necessary to facilitate military preparedness;

(g) plan and direct the continued growth of the Refuge System in a manner that is best designed to accomplish the mission of the Refuge System, to contribute to the conservation of the ecosystems of the United States, and to increase support for the Refuge System and participation from conservation partners and the public;

(h) ensure timely and effective cooperation and collaboration with Federal agencies and State fish and wildlife agencies during the course of acquiring and managing National Wildlife Refuges;

(I) ensure appropriate public involvement opportunities will be provided in conjunction with refuge planning and management activities; and

(j) identify, prior to acquisition, existing compatible wildlife-dependent uses of new refuge lands that shall be permitted to continue on an interim basis pending completion of comprehensive planning.

Sec. 4. Judicial Review. This order does not create any right or benefit, substantive or procedural, enforceable at law or equity by a party against the United States, its agencies, its officers, or any person.

WILLIAM J. CLINTON

THE WHITE HOUSE,
March 25, 1996

Appendix E
References

Brown, E.
1989 *What's it Worth? Dollars and Cents in Fish and Wildlife Recreation.* Missouri Conservationist, February, 1989.

Collins, J. T.
1974 *Amphibians and Reptiles in Kansas.* University of Kansas, Museum of Natural History, Public Educations Series No. 2.

Cowardin, L.M., V. Carter and F.C. Golet.
1979 *Classification of Wetlands and Deepwater Habitats of the United States.* Fish and Wildlife Service, Office of Biological Services.

Keystone Center.
1991 *Biological Diversity on Federal Lands - Report of a Keystone Policy Dialogue.* The Keystone Center, Keystone, CO.

Nordstrom, S.
1988 *National Wildlife Refuges and Local Communities: A Report on the Economic Benefits.* Utah State University. Logan, UT

Ohlenbusch, P.D., E.P. Hodges, and S. Pope.
1983 *Range Grasses of Kansas.* Cooperative Extension Service, Kansas State University. Manhattan, KS.

Tiner, R.W.,
1984 *Wetlands of the United States: Current Status and Recent Trends.* Fish and Wildlife Service, Washington, D.C.

U.S. Department of Agriculture, Soil Conservation Service
1981 *Soil Survey of Linn and Miami Counties, Kansas*

U.S. Department of Interior, Fish and Wildlife Service
1988 *Concept Plan for Waterfowl Habitat Protection - Prairie Potholes and Parklands.* FWS Region 3, Minneapolis, MN and Region 6, Denver, CO.

U.S. Department of Interior, Fish and Wildlife Service
1990 *Conservation of Avian Diversity in North America.* Office of Migratory Bird Management. Washington, D.C.

U.S. Department of Interior, Fish and Wildlife Service
1978 *Bottomland Hardwood Preservation Program, Lower Mississippi River Delta, Habitat Category 7.* FWS Region 4, Atlanta, GA.

U.S. Department of Interior, Fish and Wildlife Service

1986 *North American Waterfowl Management Plan - a Strategy for Cooperation.* Fish and Wildlife Service and Canadian Wildlife Service.

U.S. Department of Interior, Geological Survey

---- *Annual Water Reports for Water Years 1959-1988.* U.S. Geological Survey, Washington, D.C.

U.S. Department of Interior, Office of Surface Mining Reclamation and Enforcement (OSM)

1991 *Draft EIS - Proposed Revision to the Permanent Program Regulations Implementing Section 522(e) of the Surface Mining Control and Reclamation Act of 1977.* Washington, D.C.

U.S. Environmental Protection Agency

1977 *Quality Criteria For Water.* Washington, D.C.