

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

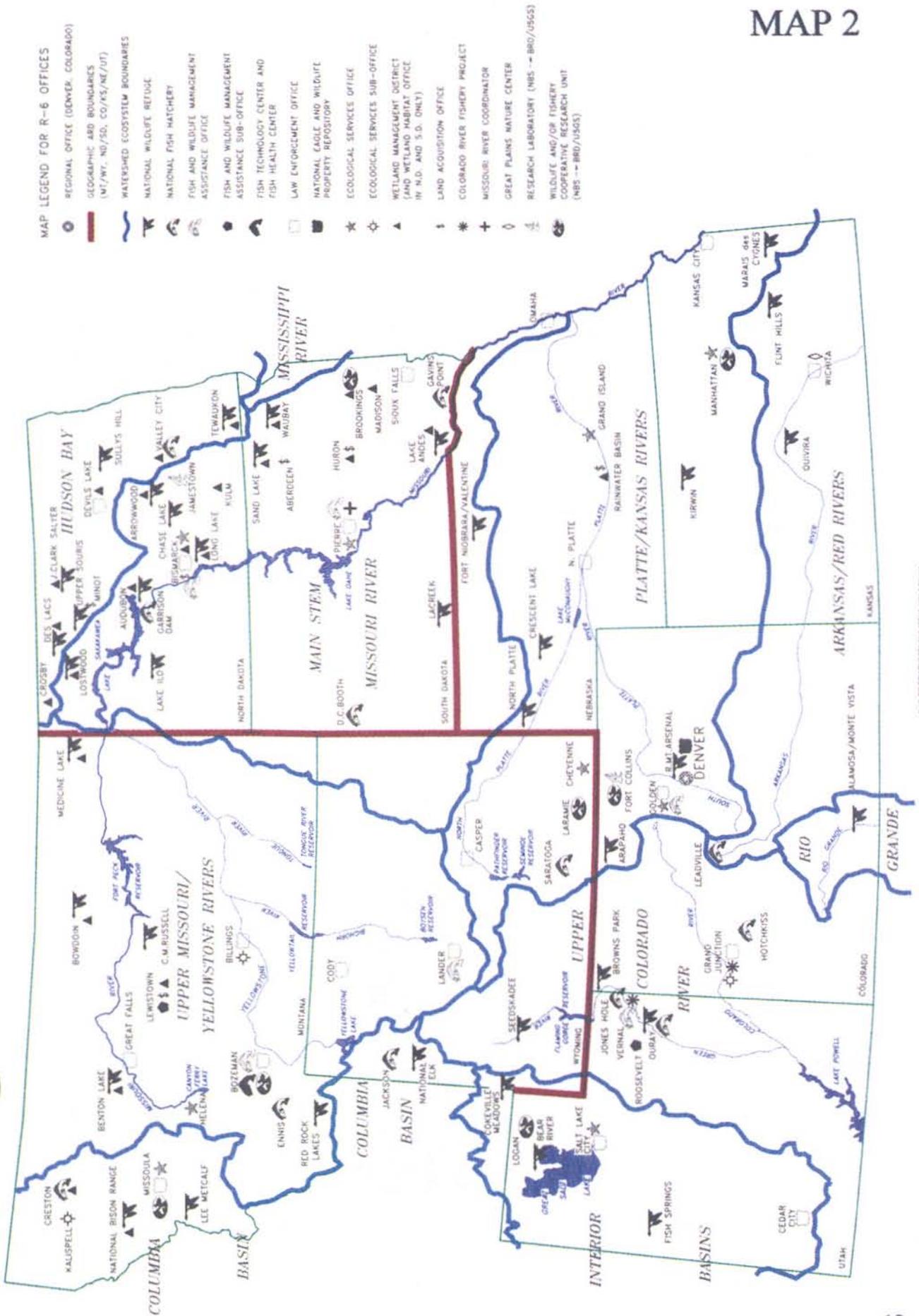
Mineral resources are present on the Refuge. Oil and gas resources are being extracted in areas bordering the Refuge northwest of Pleasanton. Limestone is quarried in Linn County and is used as concrete aggregate, building stone, and riprap or is crushed for use as agricultural lime.

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 AREA BOUNDARIES (MT/WY, ND/SO, 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

PRULEDR6

U.S. GOVERNMENT PRINTING OFFICE: 1986: 704 204

PRECEDING DATE: JAN. 22, 1986

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.

Melvorn 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, <u>Carex</u> , 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 LEGEND

REFUGE BOUNDARY

ZONES OF HABITAT

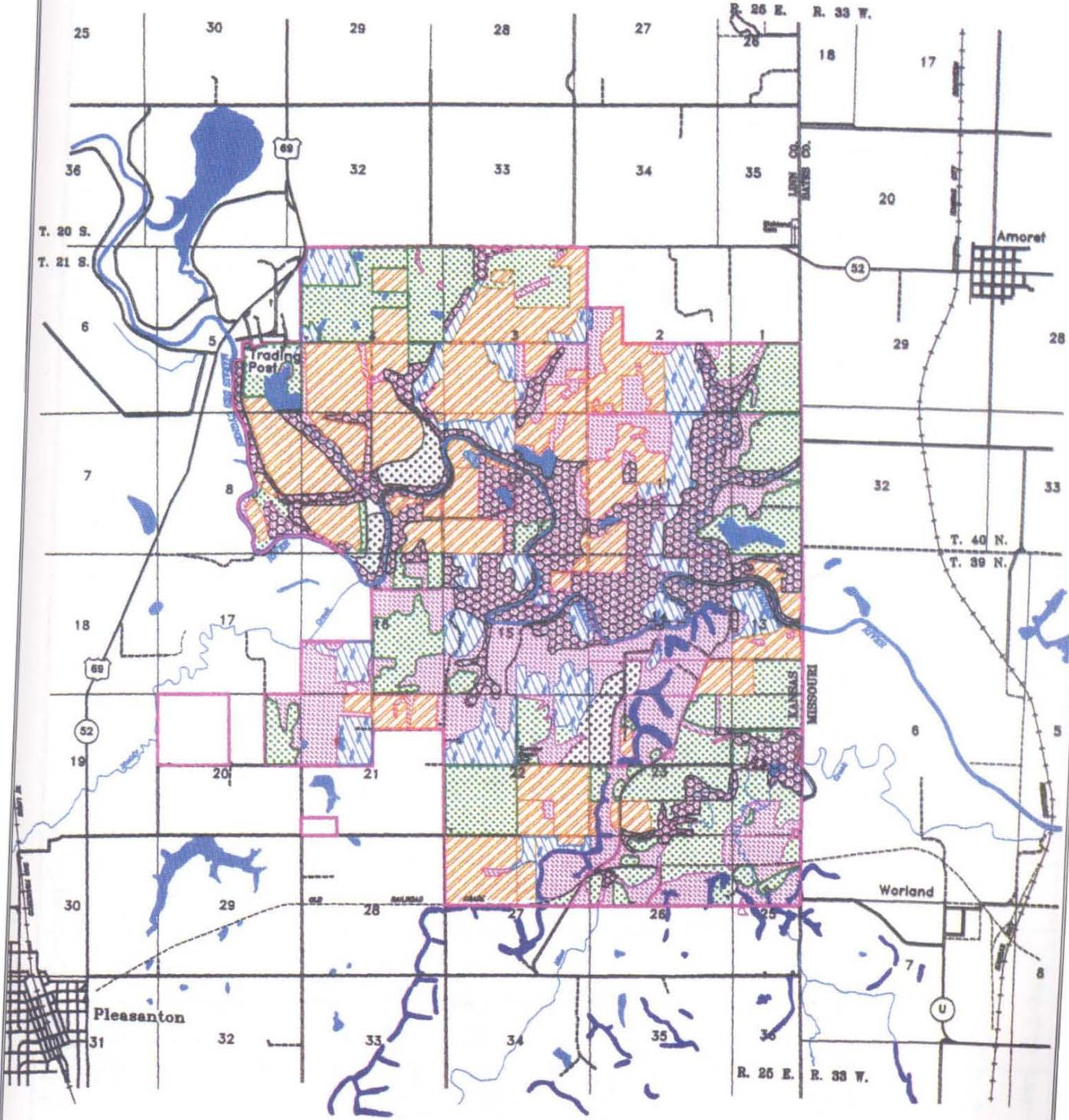
-  BOTTOMLAND HARDWOOD
-  UPLAND SHRUB
-  CROPLAND
-  MINE POND
-  INTRODUCED GRASSES
-  SAVANNAH/GROVE
-  UPLAND HARDWOOD

MAP 3

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Marais des Cygnes
National Wildlife Refuge

LINN COUNTY, KANSAS
SIXTH PRINCIPAL MERIDIAN



MAP 4

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Marais des Cygnes National Wildlife Refuge

LINN COUNTY, KANSAS

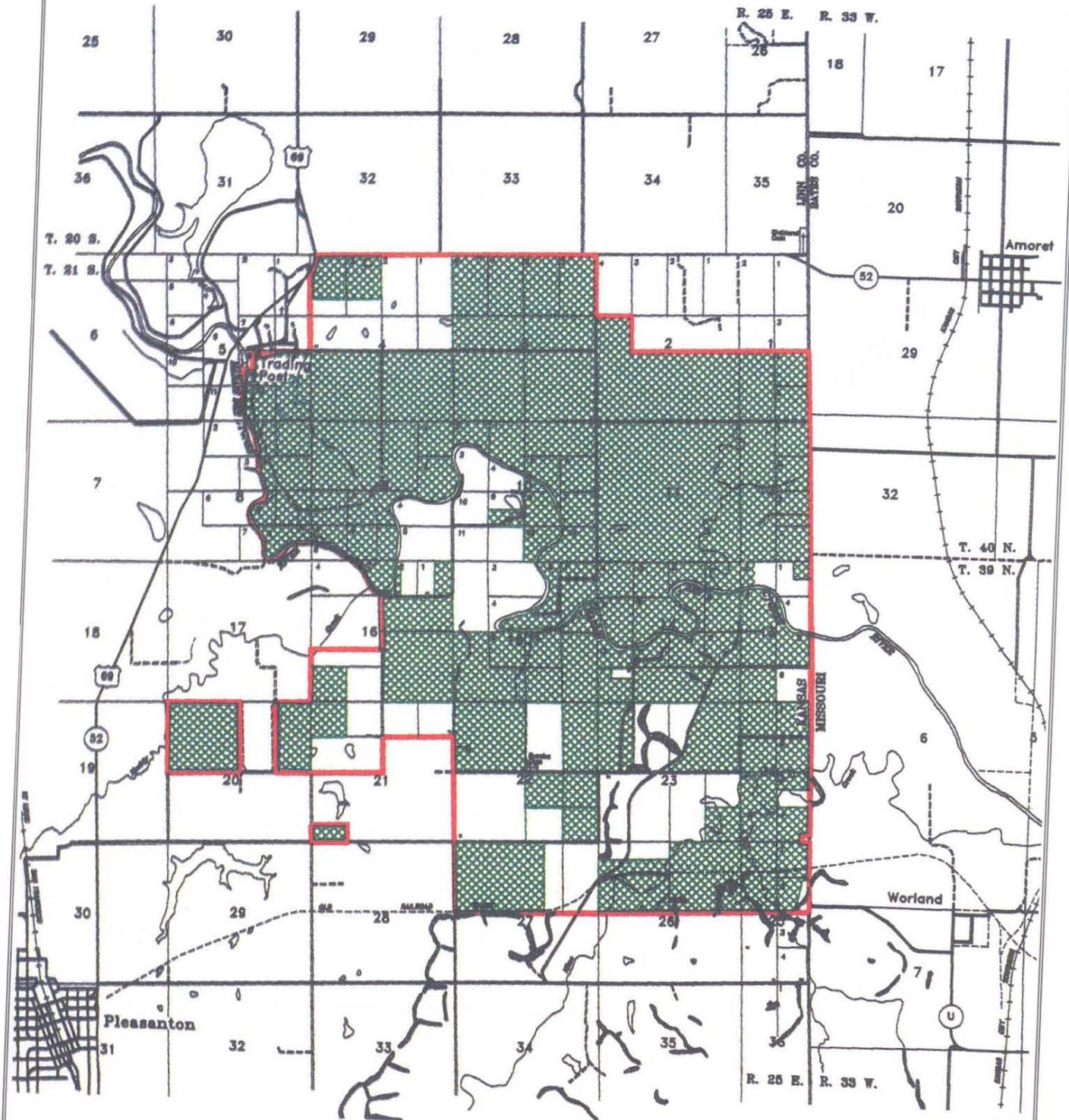
SIXTH PRINCIPAL MERIDIAN



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.

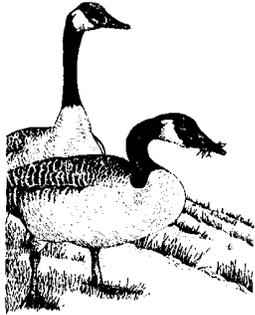
The only fish listed as a State-threatened species is the hornyhead chub (see Appendix C). It has been found in Big Sugar Creek, adjacent to the Refuge.

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.

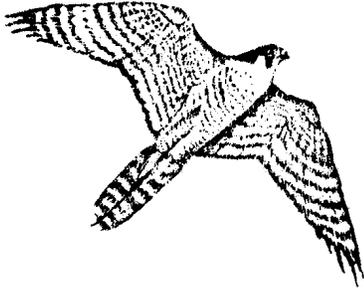
Western earth snake - State Threatened. This snake was recently discovered in Linn County. The most recent discovery was in the La Cygne Lake area, just north of the Refuge.

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

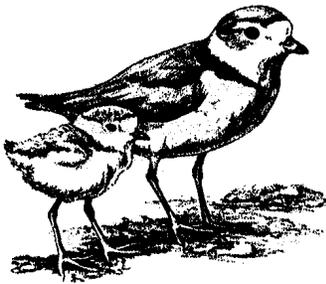
a few closely associated individuals. The habitat needed by this species is gradually being lost to agricultural expansion, detrimental agricultural practices such as overgrazing, and the general elimination of tallgrass prairie.



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:

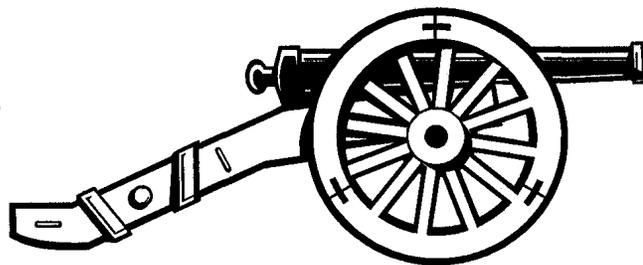
FY97	Building Repairs	\$10,000
	Base Funding	\$30,000
FY96	Site restoration (fence repair)	\$10,000
	Asbestos abatement	\$58,000
	Restore Ecosystem Hydrology	\$15,000
FY95	Site cleanup	\$10,000
	Planning	\$10,000
	Bird Survey	\$13,500*



*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.



