




REVIEW AND APPROVALS

SWAN LAKE NATIONAL WILDLIFE REFUGE

Sumner, Missouri

ANNUAL NARRATIVE REPORT

Calendar Year 1994

 _____ Refuge Manager	<u>5/1/95</u> Date	 _____ Wildlife Associate Manager	<u>5.5.95</u> Date
 _____ Regional Office Approval		<u>7/20/95</u> Date	

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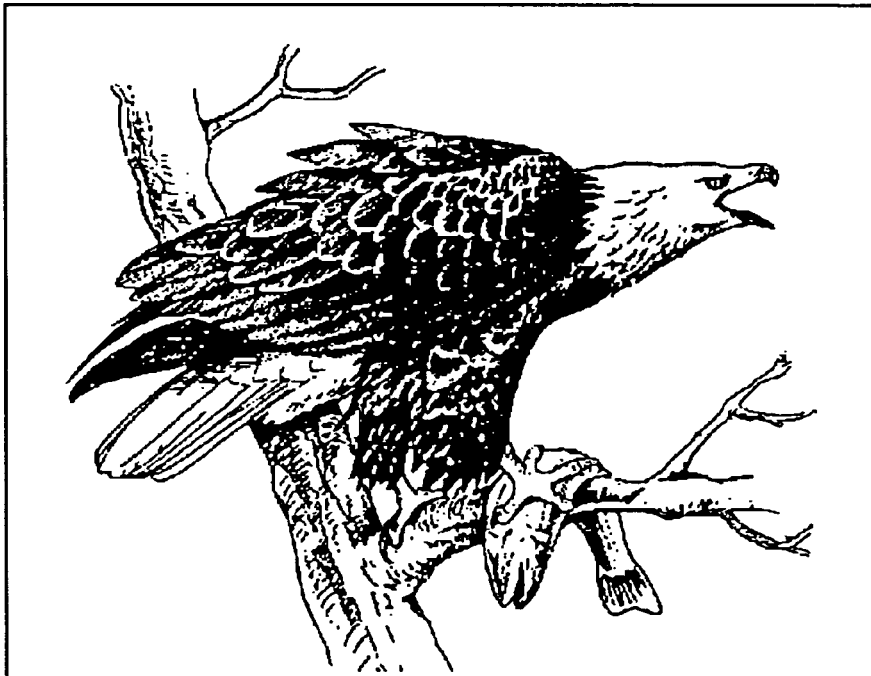
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## INTRODUCTION

Swan Lake National Wildlife Refuge was established by Executive Order 7563 on February 27, 1937. Purchase of the 10,670 acres began at that time with money from the "N.I.R., Agriculture, Wildlife Refuges Funds". Following purchase of the land, the Civilian Conservation Corps began work on the refuge creating wetlands, constructing roads and buildings, and initiating the refuge farming program. The primary purpose for establishment of the refuge was to provide a nesting, resting, and feeding area for waterfowl, primarily ducks. An important secondary purpose was to preserve a remnant flock of prairie chickens. Unfortunately, inadequate grassland habitat was available to maintain a viable population.

Since establishment of the refuge, the primary emphasis on waterfowl species has changed from ducks to the Eastern Prairie Population of Canada geese. Canada geese were first observed using the refuge in the early 1940's and numbers increased gradually to peak populations of from 150-200,000 annually during the early 1970's. Swan Lake NWR is now a primary wintering area for one of the largest concentrations of Canada geese in North America.

The refuge lies in the glacial till plain of north-central Missouri, in Chariton County, near the town of Sumner. It is located near the confluence of the Grand and Missouri Rivers, and is bordered on the south by Yellow Creek. Most of the refuge is relatively flat, with elevations ranging from a minimum of 653.96 MSL to a maximum of 741.56 MSL.

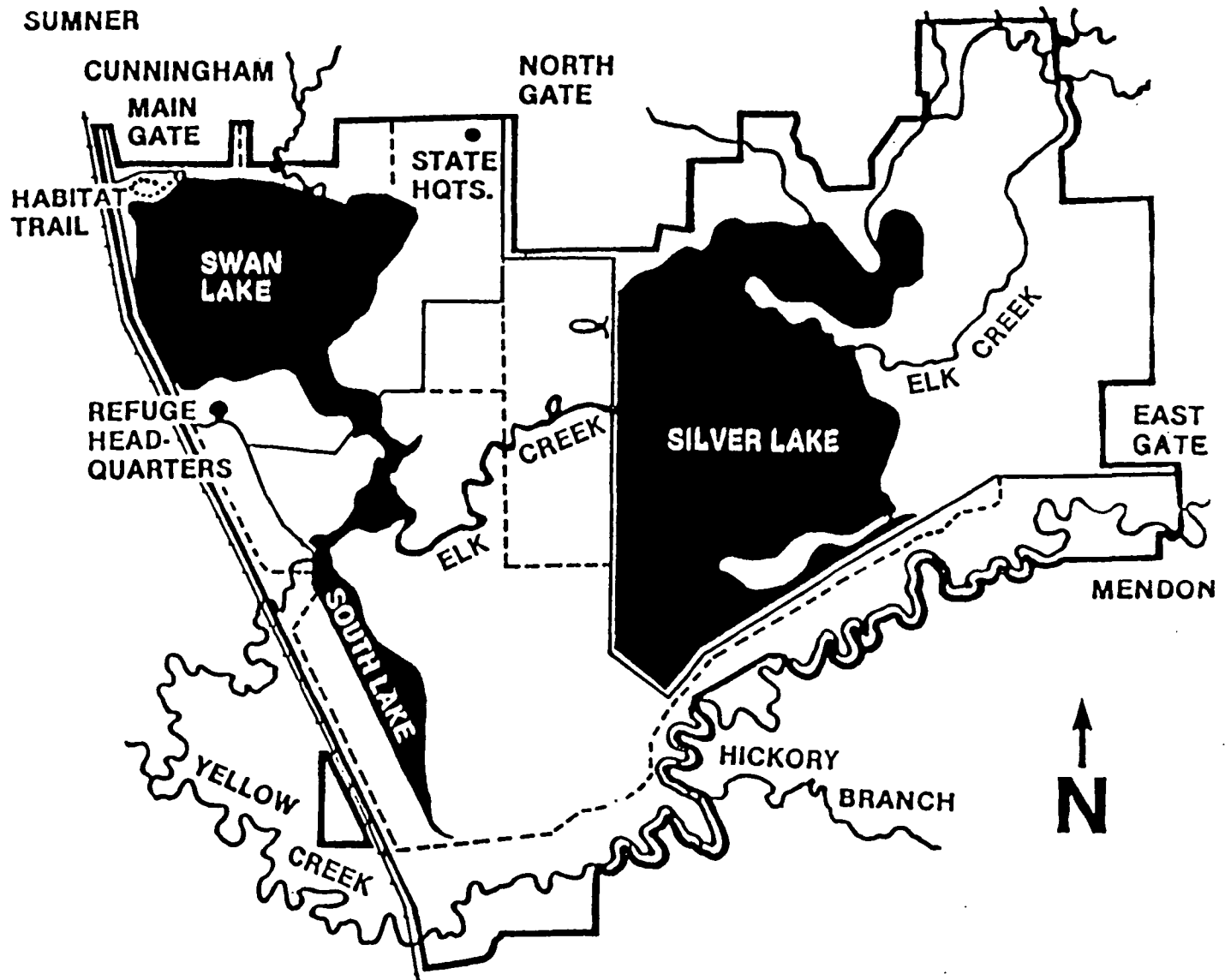
The refuge acreage is divided into five major habitat types: 1,000 acres of bottomland hardwoods, 3,840 acres of wetlands and moist soil units, 1,950 acres of croplands, 3,050 acres of open water, and 600 acres of grasslands.

In 1955 the Missouri Department of Conservation and the Fish and Wildlife Service entered into a cooperative agreement to permit managed goose hunting on Swan Lake NWR. This agreement stipulates that the Missouri Department of Conservation is responsible for management of lands immediately surrounding pits and blinds. The State currently manages 31 pits and blinds and farms approximately 800 acres of refuge lands. A second cooperative agreement was signed in 1980 to permit deer hunting on refuge lands during a special annual historic weapons hunt. Hunters are limited to muzzleloading rifles. The Missouri Department of Conservation is responsible for the administration of this hunt also.

Enactment of the 1985 Food Security Act resulted in additional responsibilities for the refuge, primarily through establishment of conservation easements on Farmer's Home Administration inventory properties. Beginning in 1988, FmHA properties were reviewed and easements established to be managed as part of the National Wildlife Refuge System. Because of the large numbers of FmHA properties in this portion of Missouri, this has and continues to be a major activity.

# Swan Lake

## NATIONAL WILDLIFE REFUGE



### LEGEND



- Refuge roads
- - - Secondary roads; hunter access/  
administrative, not normally open to visitors
- Refuge boundary
- .... Habitat trail
- ⦿ Boat launch



#### A. HIGHLIGHTS

##### THE GOOD...

- Flood damage repairs progress at full steam. (Sect I.2)
- Deer hunt for physically challenged successful. (Sect H.8)
- Assistant Manager Peyton retires after 33 years with FWS. (Sect E.1)
- Annual floods subside for a year. (Sect B)
- Refuge crops/habitat diversity have banner year. (Sect F.4-6)
- Moist soil units provide abundant food following flood year. (Sect F.2)
- Eagle/duck numbers increase during year. (Sect G.2-3)
- Refuge pole shed/storage building becomes a reality. (Sect I.1)

##### THE BAD...

- Cutworms destroy refuge corn crop. (Sect F.4)
- Dry conditions hamper fall reflooding plans. (Sect F.2)

##### THE UGLY...

- Fowl cholera outbreak occurs during early December. (Sect G.17)
- Lost-time accident results in staff member's broken toes. (Sect E.6)

## B. CLIMATIC CONDITIONS

Holding true to the "nothing's normal in Missouri" theory or "Missouri is a land of extremes," 1994 was no disappointment. Following a year of record precipitation in which 53.91 inches was recorded during 1993, 1994 was mild and dry. A total of 37.27 inches of precipitation was received during the period, near normal for the area. Months receiving highest amounts of precipitation were April (6.42 inches), July (4.33 inches), and October (4.58 inches). For the first time in many years the Grand River stayed within its banks for the entire period. Dry conditions permitted flood damage repairs to progress, while raining sufficiently to support area crops. We were truly blessed many-times-over by favorable weather conditions during the year.

## C. LAND ACQUISITION

### 1. Fee Title

Acquisition of a 124.83 acre inholding along the refuge's east side was finalized during the period. The land was purchased from Swan Lake Farms and John Zeilstra at a cost of \$159,625.

The bulk of land acquisition activities for 1994 involved review of Farmer's Home Administration Inventory properties. This activity was initiated in 1988, when staff reviewed properties in nine north-central Missouri counties. In 1989, review responsibilities were expanded to 15 counties (Saline, Carroll, Livingston, Chariton, Randolph, Monroe, Shelby, Macon, Linn, Sullivan, Adair, Knox, Putnam, and Scotland) and Swan Lake NWR was assigned an 18 county Management District. Review of properties in the southern 13 counties of the Management District (Bates, Henry, St. Clair, Hickory, Benton, Camden, Morgan, Miller, Pettis, Cooper, Moniteau, Cole and Howard) was conducted by the Ecological Services Office in Columbia, MO.

Today refuge staff work closely with Ecological Services personnel in evaluating new FmHA tracts, potential wetland restorations, and other FmHA responsibilities. At the conclusion of 1994, three tracts totaling 970 acres were transferred to the Service in fee title. An additional five tracts totaling 678 acres and found within Truman Reservoir's flood plain, were transferred to the Service from the Corps of Engineers.

### 2. Easements

In contrast to a relatively small number of fee title transfer proposals encountered in review of FmHA inventory properties, a significant number of conservation easements have been proposed. The number of easements granted by request as of the end of the period totaled 72, which comprise 3,743 acres. Of the 72 easements, 54 have been surveyed and all but two posted and marked with magnetic markers. On the average, about three-fourths of the total easements are visited annually.



- #2 - Currently, there are 72 FmHA easements comprising 3,743 acres under Swan Lake NWR's jurisdiction. They are, in short, costly and time consuming to say the least.

(JAG, 7/94)



- #3 - In addition to FmHA easements, three tracts totaling 970 acres have been transferred to the Service in fee title.

(JAG, 7/94)



- #4 - Each tract is unique in its problems or concerns. Fencing needs and boundary discrepancies continue to rank #1 and #2. Some units, as pictured, are prone to flooding.

(JAG, 7/94)



- #5 - Occasionally, houses, sheds, barns, etc. end up on easement or fee title tracts.

(JAG, 7/94)



- #6 - To avoid major problems, all acquired tracts should be posted and signed on or near the date the property is surveyed.

(JAG, 7/94)



- #7 - During the period, 5 tracts totaling 678 acres and found within Truman Reservoir's flood plain, were transferred to the Service from the Corps of Engineers.

(JAG, 7/94)





As easements go, fencing needs are the #1 problem associated with the current workload. Easement line discrepancies, and a need to better centralize basic paperwork and minimize duplication of effort, should also be noted. With a Private Lands position at this station becoming a reality in May, 1995, the easement workload as it pertains to all other staff members will be reduced.

3. Other

Nothing to report.

D. PLANNING

1. Master Plan

Nothing to report.

2. Management Plan

The EPP (Eastern Prairie Population of Canada geese) Management Plan was revised in June of 1992. The more updated and realistic refuge responsibilities stated within the plan, reflect current population trends and reduced refuge food requirements. Under this plan, a sustained zone population of 100,000 Canada geese (mid-October through mid-March) and a refuge contribution of 35,274 bushels of grain annually is desired.

3. Public Participation

Congressional and private inquiries as to general refuge management, the farming program, water manipulation, goose populations, the hunting program and a host of other topics declined substantially in 1994. Either this is a good indication that we are doing an adequate job of refuge management, or they feel we are beyond help. The bottom line is that the Flood of 1993 helped pull the community together, and almost all refuge flood recovery work (to the tune of \$1.7 million dollars) was accomplished using local contractors, local materials and equipment.

4. Compliance with Environmental and Cultural Resource Mandates

Section 404 permits were requested from the Corps of Engineers for all wetland restoration activities requiring one or thought to require one. Wetland restoration activities accomplished during the period were covered under the nation-wide Corps permit. Additional corps permits for all flood damage rehab work were obtained prior to the construction season.

5. Research and Investigations

Nothing to report.

6. Other

Nothing to report.



4 2 5 6 1

SWAN LAKE STAFF  
1994



3

E. ADMINISTRATION

1. Personnel

		<u>EOD</u>	<u>STATUS</u>
1. John Guthrie, Refuge Manager	GS-485-12	12-03-90	PFT
2. George W. Peyton, Assistant Manager	GS-485-11	01-29-89	Retired
3. Rose Hannebaum, Administrative Tech.	GS-303-6	04-08-90	PFT
4. Harold C. Milligan, Eng. Equip. Oper.	WG-5716-08	05-14-75	PFT
5. Stuart L. Burnside, Tractor Operator	WG-5705-06	04-07-72	PFT
6. Irvy L. Miller, Tractor Operator	WG-5705-06	03-23-80	PFT

- #8 - Staff members and spouses gathered at "Ye old saloon" 11/4 to give George Peyton a proper retirement send-off.

(JAG, 11/94)



- #9 - After 33 years, George and wife Janice retired to the hills of northern Missouri, near Moberly, where they promised to keep busy.

(JAG, 11/94)



- #10 - In conjunction with George's retirement party, staff members (L to R) Miller, Burnside, Milligan and Hannebaum (not pictured) received well deserved flood work awards.

(JAG, 11/94)



The year was relatively quiet in terms of personnel changes. Below is a listing of staffing patterns over the last eight years:

	Permanent		
	<u>Full-Time</u>	<u>Part-Time</u>	<u>Total FTE</u>
FY 1994	7.0	0	7.0
FY 1993	7.0	0	7.0
FY 1992	7.0	0	7.0
FY 1992	6.3	0	6.3
FY 1990	7.0	0	7.0
FY 1989	7.0	0	7.0
FY 1988	6.0	0	6.0
FY 1987	6.0	0	6.0

Filling the new refuge Private Lands position was nearing completion by the end of the period. It is hoped that the selected person will be on board and hard at work by spring of 1995.

## 2. Youth Programs

Due to funding limitations, the station YCC Program was cancelled during 1994. No other youth programs currently exist on Swan Lake NWR.

## 3. Other Manpower Programs

Nothing to report.

## 4. Volunteer program

Volunteers contributed substantially to refuge operations during 1994. Chillicothe Audubon Society members assisted with waterfowl census work and special weekend visitor center openings. The Mendon Lion's Club graciously donated their time and talents in serving lunch to physically challenged deer hunt participants.

## 5. Funding

A six year annual O&M funding history is illustrated below. Funding was adequate to accomplish most refuge programs during 1994.

### Six Year Annual O&M Funding History

<u>Funding Code</u>	<u>FY-89</u>	<u>FY-90</u>	<u>FY-91</u>	<u>FY-92</u>	<u>FY-93</u>	<u>FY-94</u>
1121	-	30,000	30,000	59,000	36,000	*56,000
1230	-	19,000	-	-	-	-
1261	229,700	276,000	217,441	211,916	202,015	*208,902
1262	122,700	107,378	150,500	132,011	349,596	*125,806
9120	-	15,378	1,500	1,200	-	400
1221	-	-	1,010	1,500	-	-
Totals	352,400	407,694	409,451	405,627	597,611	391,108

- \* - 1121 funding total includes: one FTE for Private Lands position.
- \* - 1261 funding total includes: \$202,802 (base operations) and \$6,000 (vision project, specifically habitat).
- \* - 1262 funding total includes: \$85,806 (base operations) and \$40,000 (MMS).

Desoto NWR contributed \$10,000 in support of Swan Lake's farming program through an inter-elevator grain transfer during the period.

As a direct result of damages received from the Great Flood of 1993, Swan Lake NWR was awarded \$1,995,000 in special flood damage repair funds. A complete summary of rehab work accomplished during the period can be found under Section I.2.

#### 6. Safety

Monthly safety meetings were held covering a variety of topics pertaining to refuge activities. In addition, safety items accomplished during the period included: Replacement of worn vehicle/equipment tires, completion of step test requirements, participation in Lyme disease surveillance program, and LE refresher training for one staff member. Safety in operation and maintenance of equipment is and will continue to be high priority with all staff members.

While refuge staff were attempting to move a heavy metal grate 12/5, the grate inadvertently slid off a small ledge and onto staff member Lee Burnside's foot. The structure fell across the right foot just behind the steel-toed portion of his boots and effectively broke three toes. Unfortunately (especially for Lee in this case), accidents happen. It was nobody's fault. It happened very fast. The injury resulted in slightly over six weeks off work and a period of light duty after returning.

All refuge personnel were tested for Lyme disease 1/94. Results for all staff members were negative.

Refuge staff members Milligan, Miller, Burnside and Guthrie received audiometric checks 4/94.

#### 7. Technical Assistance

Technical assistance is given to numerous individuals or groups during the course of a year upon request. Questions about wetland restoration, wildlife problems, food plot establishment, moist soil management, planting of wildlife habitat, etc. are answered or in some cases referred to the proper contact.

#### 8. Other-Farm Bill and Private Lands

Minimal effect determinations were completed in conjunction with local SCS offices on several properties during the period. Additional staff efforts were devoted to the Wetland Reserve Program (WRP), Emergency Wetland Reserve Program (EWRP), wetland restoration work and other technical related matters.



- #11 - Meeting with local SCS personnel, COE officials, landowners, and other involved parties were common occurrences during the period.

(JAG, 6/94)



- #12 - Flood damaged areas were evaluated under specific WRP guidelines, 105 tracts within the local 11 county area were offered with 8 being accepted into the program.

(JAG, 6/94)



- #13 - Columbia Fisheries Resource staff Jim Milligan (chunky one on right) and Judy McClendon, Southern Missouri Ascertainment Office, discuss FWS acquisition possibilities.

(JAG, 7/94)





## F. HABITAT MANAGEMENT

### 1. General

Swan Lake National Wildlife Refuge is located in the floodplain of the Grand River, near its confluence with the Missouri River in north-central Missouri. Yellow Creek borders it on the south and three intermittent creeks; Turkey, Elk and Tough Branch flow directly into the refuge from the north. Locust Creek, another creek of major importance, runs adjacent to the refuge on the west side before it flows into the Grand River. Hickory Creek, a small intermittent creek, flows into Yellow Creek on the east side of the refuge.

Since most of Swan Lake NWR is relatively flat, (fall is less than 1 foot/mile) it is commonly flooded by these water sources making habitat management difficult at times. As with many other areas, water management, cropland management, etc. are adjusted on an annual basis as conditions permit, and manipulated accordingly.

A major goal of habitat management is to diversify refuge lands into a mixture of habitat types beneficial to all wildlife. We can improve nesting cover, reestablish bottomland hardwoods, increase field edge, plant native grasses, and modify farming practices for the benefit of many species of wildlife, while still meeting annual waterfowl objectives.

### 2. Wetlands

Wetland management generally consists of a gradual drawdown in the early spring of the two large moist soil units, Swan Lake and South Pool; while smaller units are drained on a staggered schedule from April through June. All units are normally reflooded during the fall or spring months. Typically, all of the moist soil units are flooded naturally at least once each year. As with most plans dependent on weather, water level management of individual pools must be flexible and adjusted annually according to changing conditions.

During 1994, flood damage repair work was ongoing in refuge moist soil units for much of the period. By fall, lack of water, location of construction sites and planned work for the summer of 1995 prevented full utilization of many units during the major migration period. It is hoped that, barring weather problems, rehab work on all moist soil units will be completed by the end of summer, 1995. Work has centered on improving water movement to and from individual units, levee rehab, water control structure replacement when warranted, and in some cases reducing annual flooding impacts through improved levee design.



With a dry summer following a flood year such as 1993, refuge moist soil unit waterfowl food resources were outstanding (nearly 3,500 acres). Wild millet and smartweed thrived in post-flood conditions. American lotus and prairie cordgrass did not fare as well following two-months of inundation. What was once several hundred acres of lotus in Swan Lake did not (at least yet) reappear. An estimated 75% of all flooded prairie cordgrass was destroyed, and flooded timber may exhibit damage for many years to come.

### 3. Forests

Although nothing was accomplished on the refuge in terms of planting bottomland hardwoods during the period, the potential exists in abandoned farm fields for establishing native forest species. Yellow Creek Research Natural Area is located along the southern boundary of Swan Lake Refuge and supports our most impressive stand of bottomland hardwood timber. The area encompasses 1,000 acres.

### 4. Croplands

Cropland management is conducted on approximately 1,950 acres of the refuge. All farming is done for account either by refuge employees, who farm about 1,150 acres of the interior of the refuge, or by Missouri Department of Conservation personnel, who farm about 800 acres on the refuge perimeter adjacent to goose blinds.

The farming program has been based on biological farming practices in which no pesticides or fertilizers are used. In the last two years however, to make up for a failed legume crop vital to biological rotations, minimal fertilizer and lime were applied. The fertilizer and lime application rate was determined by soil tests run by the University of Missouri.

This year marked a busy one in terms of reestablishing our legume crop and meeting the station goal of 35,274 bushels of grain as specified under the EPP Management Plan. During the period the following was accomplished: 277 acres of corn planted (with an average yield of 100 bu/ac), 20 acres of buckwheat planted, 34 acres of lespedeza mixture seeded (10 lbs Korean lespedeza, 3 lbs red clover, 2 lbs alsike clover/acre), 370 acres of red clover mixture seeded (12 lbs red clover, 3 lbs alsike clover/acre), 37 acres of winter wheat planted, and 29 acres of alsike clover seeded. Weather cooperated in raising a good stand of all crops that were planted above.

The pre-approved herbicide Sutan was applied to all corn acreage at a rate of 7-8 pints per acre. A minimal application of Sutan removes foxtail competition during early stages of corn growth.

The goals of the farming program are: to meet waterfowl food objectives as listed in the EPP Management Plan, provide habitat diversity and "edge" for many species of refuge wildlife (both migratory and resident), demonstrate biological farming principles, build existing soil's organic matter and nutrients depleted by past farming operations, and compliment other refuge management programs for the benefit of wildlife and people.

- #14 - In a matter of two days, cutworms nearly destroyed the refuge corn crop (200 acres). Tractor Operator Burnside examines damage.

(JAG, 5/94)



- #15 - Severed corn plant and culprits. By replanting two weeks later after the destructive portion of the life cycle was completed, the problem was solved. No chemical control was implemented.

(JAG, 5/94)



- #16 - In recent years refuge staff has experimented with several types of fall tillage equipment. This combination disc/harrow leaves adequate surface litter while breaking up gumbo type soil structure.

(JAG, 11/94)



## 5. Grasslands

One-hundred-ten acres of a native grass mixture was planted during the period. A Truax native grass drill and cultipacker were used. The grass mixture, developed by Quail Unlimited, consisted of 2 lbs Indiangrass, 1.5 lbs little bluestem, .5 lbs sideoats grama, 1.8 lbs big bluestem, 2 lbs switchgrass, and 4 ounces of assorted forbs per acre. All pounds of grass mentioned above are listed as pure live seed (PLS). The bulk seeding rate was 11-11.5 lbs/acre with an estimated cost of establishment of \$30 per acre. All fields were planted 5/26-27.

## 6. Other Habitats

Following prescribed burning of 60 acres of native grassland, existing firelanes (around the native prairie area and approximately 25 acres) were seeded to a mixture of Korean lespedeza and clover. These will be maintained in wildlife cover until burning is again scheduled in 3-5 years.

Portions of several refuge fields planted to corn in 1993, were left standing during 1994 and allowed to grow up in annual weeds. This is an excellent way to establish a wildlife food plot. Sufficient palatable corn remained into the second year.

## 7. Grazing

Nothing to report.

## 8. Haying

Nothing to report.

## 9. Fire Management

Prescribed burns were conducted in selected areas on .5 miles of refuge dike to control undesirable woody vegetation. Sixty acres of native grass in two tracts were burned 3/25 to stimulate existing grass and control woody vegetation. Burning is generally scheduled every 3-5 years on native grass stands.

## 10. Pest Control

Encroachment of brush on refuge levees and in moist soil units continues to be a major problem. Prescribed burning and mechanical means such as disking or mowing have slowed but not alleviated the process. Many levees were originally constructed with side slopes too steep to maintain, thus compounding the problem.

## 11. Water Rights

Nothing to report.



- #17 - Flooded out native grass fields were reseeded during May using a borrowed Truax planter. Intermixed grass fields help diversify refuge uplands.

(JAG, 5/94)



- #18 - A small field adjacent to refuge headquarters was planted to a native grass mixture with forbs 5/26. This area will serve as a public display plot.

(JAG, 8/94)



- #19 - Annual forbs such as Garden Cosmos were common throughout the display plot above and other refuge seedings accomplished in 1994.

(JAG, 8/94)



## 12. Wilderness and Special Areas

Nothing to report.

## 13. WPA Easement Monitoring

Nothing to report.

## G. WILDLIFE

### 1. Wildlife Diversity

In recent years, efforts have been directed towards promoting increased habitat diversity to benefit a wide range of wildlife species. Mowing of odd-areas and isolated fields has been reduced, allowing these acres to revert to timber through natural succession. From 1983-94, over 750 acres of farmland were converted to moist soil units which are currently managed to create a variety of vegetation types and encourage invertebrate populations. Prairie areas are burned periodically to maintain native grass stands. These and other management techniques over time will make a difference, gradually reducing the acres of marginal farm ground and increasing wildlife habitat and diversity refuge wide.

### 2. Endangered and/or Threatened Species

The bald eagle and peregrine falcon are the only nationally listed endangered or threatened species found on the refuge.

Eagles are common winter residents while peregrine falcons are rare spring and fall visitors.

A record peak of 105 bald eagles (39 adult/66 immature) were observed using the refuge 2/14. At the same time, an estimated 20,000 Canada geese and 105,000 ducks were present on the area.

No peregrine falcon sightings were documented during the year.

Wildlife listed on Missouri's rare and endangered species list which can be found on the refuge include:

<u>Species</u>	<u>Occurrence at Swan Lake During 1994</u>
Northern Harrier	Year-round, common, nests on refuge
Sharp-shinned hawk	Numerous summer and fall sightings
Cooper's hawk	Several summer sightings
King rail	None observed
Upland sandpiper	None observed
Least tern	None observed
Osprey	Observed in the spring
Smooth green snake	None observed
Long-tailed weasel	None observed
Massasauga rattlesnake	Few summer sightings



#20 -  
The Eastern Massasauga rattlesnake is a refuge inhabitant of low-lying prairie areas. It is currently listed as a Missouri Rare and Endangered Species.

(TJ, 5/91)

#21 - Dragonflies, like other orders of aquatic insects, spend some or all of their life in water. They are both abundant and valuable in the food chain of marshes and lakes.

(TJ, 7/94)



#22 -  
A truly rare visitor to Missouri, these black-bellied whistling ducks were sighted on Swan Lake 5/4.

(JAG, 5/94)





#23 -

A narrative without a picture of a killdeer just isn't a narrative. This one nested in visitor center parking lot.

(JAG, 6/94)

#24 - Northern Missouri is known for its trophy bucks and Swan Lake is no exception.

(JAG, 11/94)



#25 -

Along most refuge waterways, evidence of beaver activity can be readily seen. Trapping is prohibited because of an abundant river otter population.

(JAG, 11/94)



### 3. Waterfowl

As is often the case in Missouri, temperatures ranged from one extreme to the other during 1994. For the most part the winter was mild with limited snow cover.

Beginning in January, the Canada goose population remained at an estimated 18,000 birds during much of the month. The refuge also contained 3,500 ducks (95% mallard) and 500 snow geese. February 4-7 marked our station peak in spring waterfowl numbers. During this time 28,000 Canada geese, 10,000 snow geese, and ducks in significant numbers were observed.

Flooding during 1993 severely impacted availability of refuge and area grain for waterfowl during the spring of 1994. As expected, many birds flew on northward rather than stopping. Others which did stay found plenty of water and adequate browse, but limited grain and other waterfowl foods. The result was extensive feeding by waterfowl away from the refuge, then returning for water/loafing on the area during much of the day.

By mid-April, most geese had migrated out. Spring duck numbers were never large (18,000+), but species diversity was good. Mallards, ruddy ducks, goldeneye, pintail, gadwall, hooded mergansers, scaup, northern shoveler and teal were common refuge sightings.

On September 22, the first fall migrant Canada geese arrived when 20 were observed on Swan Lake. By early October, the goose population had climbed to 20,000 birds, of which at least half were small Canada geese (Richardson's). In addition, an estimated 11,000 pintails, 38,000 mallards, 300 gadwall, 30 wood ducks, and numerous other species were present on the area.

On November 15, 11,300 Canada geese, 15,800 snow geese, and 104,000 ducks were observed. Fluctuating temperatures/weather conditions throughout latter November and December caused the refuge goose population to vary considerably. Peak populations ranged from as high as 42,350 Canada geese and 60,000 snow geese on 12/12, to as low as 8,300 Canada geese and 500 snow geese during the period two weeks earlier.

In recent years fall duck use has continued to increase, Canada goose use has remained stable, and snow geese are becoming more common in significant numbers during migration periods.

The Swan Lake Zone (1,400 square miles) Canada goose quota of 4,000 birds harvested during hunting season was not reached during 1994. A 40-day goose season in Missouri (within the Swan Lake Zone), resulted in 4,192 birds being harvested for an average kill/hunter ratio of .30 birds per day.

### 4. Marsh & Water Birds

A variety of marsh and water birds can be seen during the spring, summer, and fall months. White pelicans are common migrant visitors. They begin arriving in early March and stay throughout April. The spring population

peaked at 600 birds on 4/21. During fall migration, pelicans arrive in early August and frequent refuge pools throughout October. The fall population peaked at 2,100 birds on 9/14.

One sandhill crane was observed using South Pool 5/17.

#### 5. Shorebirds, Gulls, Terns, and Allied Species

Mudflats exposed during drawdown of moist soil units provide excellent shorebird habitat on an annual basis. Numerous species were observed during the period including the more common yellowlegs, long-billed dowitcher, least sandpiper and killdeer. Less common species seen were the piping plover, stilt sandpiper, American avocet and woodcock.

During the annual North American Migratory Bird Count, conducted May 14th, eight caspian terns and six spotted sandpipers were observed, in addition to the species mentioned above.

#### 6. Raptors

Seventeen species of raptors are known to use the refuge. The most common are the red-tailed hawk, northern harrier, American kestrel, barred owl, and great horned owl. Sightings of the northern harrier and red-tailed hawk occur most frequently.

One Merlin hawk was observed 10/12 by local Audubon members. A lone long-eared owl was sighted along Silver Lake 11/15.

#### 7. Other Migratory Birds

Each year hundreds of thousands of grackles and red-winged blackbirds descend upon the refuge during the fall migration period. Numerous instances of damage to corn and millet crops are documented annually.

Equipment Operator Milligan conducted the annual Dove Coo Count Survey during the month of May.

#### 8. Game Mammals

White-tailed deer, fox squirrels, raccoon and cottontail rabbits are classified as game mammals in Missouri. The abundance of these species refuge wide is evident based on daily sightings throughout the course of a year. Of the game mammals, only white-tailed deer are hunted on Swan Lake NWR and under strict regulations.

#### 9. Marine Mammals

Nothing to report.

#### 10. Other Resident Wildlife

Wild turkeys, coyotes and river otters continue to be seen frequently. In addition, beaver are more numerous than ever and continuously disrupt water flowage capabilities of ditches and structures. Seven river otters were observed in a borrow area along Silver Lake on 3/25.

#### 11. Fisheries Resources

Current drawdown regimes, flooding frequency and shallowness of impoundments all contribute to limited fishing opportunities. It is unknown yet what damage or benefits resulted from the Flood of 1993 concerning refuge fisheries. In the future, improving fisherman access to impoundments will be a priority undertaking.

#### 12. Wildlife Propagation and Stocking

Personnel from Louisiana State University, School of Forestry, Wildlife and Fisheries, again collected white-tailed deer fawns from the State of Missouri during the period. Although deer were not collected from Swan Lake NWR, they were kept at the Missouri Department of Conservation Headquarters located on the refuge until transfer to Louisiana. Graduate students are comparing the rate of antler growth and weight gain between Missouri whitetails and Louisiana deer. An average of 40-60 orphaned whitetail fawns are collected annually. This was the third year of the study.

#### 13. Surplus Animal Disposal

Nothing to report.

#### 14. Scientific Collections

Nothing to report.

#### 15. Animal Control

Nothing to report.

#### 16. Marking and Banding

Pre-season banding of Canada geese on Swan Lake NWR is accomplished annually by Missouri Department of Conservation personnel with assistance from refuge staff. Banding quotas for Canada geese in 1994 were the same as in 1993, 500 Richardson's and 500 EPP geese. The total banded geese for 1994 fell short of quotas, with only 122 geese being captured. This total was the lowest during the last three years. Trapping success was impacted by a low population of EPP birds on the area during trapping periods. Neck collars (white on blue) and leg bands were put on all trapped geese. Two measurements were taken of the culmen and mid-wing, weight recorded, and each bird then released. There were no casualties to geese or banding personnel this year (see summary on following page).

1994 Pre-Season Goose Trapping Results at Swan Lake NWR

Subspecies	Age/Sex	HYM	HYF	AHYM	AHYF
Richardson's		38	40	20	22
Interior		0	2	0	2

17. Disease Prevention and Control

An outbreak of Avian cholera occurred on Swan Lake NWR from 12/2-10. It is believed that the cholera was spread by infected snow geese migrating southward from North and South Dakota. Suspected cholera was first observed at nearby Fountain Grove WMA in latter November. Weather was mild with daytime temperatures frequently in the 50° range. Four snow goose specimens collected from Fountain Grove WMA and submitted to Madison's Health Lab were later confirmed to have died from avian cholera.

Dead waterfowl were picked up by MDC and FWS personnel on Swan Lake NWR in amounts ranging from 15 - 120 birds daily from 12/1-10. Retrieved birds were burned at a local farmers hog operation using his incinerator facilities. This process worked very well for disposing of all dead waterfowl. Birds were picked up in all three major pools. A total of 475 birds (80% snow geese (380), 5% Canada geese (24), and 15% ducks (71)) were picked up during the cholera outbreak. Duck species collected included gadwall, widgeon, pintail, mallard and green-winged teal. An estimated 45,000 snow geese, 95,000 ducks and 45 bald eagles were utilizing Swan Lake at this time.

With the onset of cold weather in mid-December, the cholera problem and number of snow geese dwindled. Swan Lake was drained to discourage further use of problem areas by waterfowl. No reoccurrence of fowl cholera was observed through the end of the period.

## H. PUBLIC USE

1. General

Approximately 40,000 people visited the refuge in 1994. Wildlife observation accounted for 80% of the visitation. Many people drive through the refuge in the evenings during the year. Autumn is the most popular time for people to visit due to the arrival of waterfowl, the migration of many other birds, and presence of fall colors.

People enjoy stopping at the Visitor Center throughout the year. In 1994, over 3,000 people took advantage of the opportunity to view wildlife videos, ask questions, and look at the many available exhibits. In latter October and November, weekend visitors were able to enjoy the Visitor Center, when it normally would be closed, due to refuge volunteers manning facilities.

- #26 - An outbreak of avian cholera occurred at Swan Lake NWR 12/2-10. Classic head back and convulsions are symptoms illustrated in picture.

(JAG, 12/94)



- #27 - Dead waterfowl were retrieved by FWS & MDC personnel and incinerated in a hog farmer's carcass burner. A total of 475 waterfowl were disposed of.

(JAG, 12/94)



- #28 - At the time of the cholera outbreak, an estimated 45,000 snow geese, 95,000 ducks, 20,000 Canada geese and 45 bald eagles were using Swan Lake NWR. Plenty of need for concern.

(JAG, 11/94)



Other popular activities on the refuge included hunting and fishing, accounting for 10 per cent of the visitation. In addition, a number of people hiked the nature trail, photographed wildlife and participated in other consumptive wildlife recreation, such as picking berries or pecans, and collecting deer antlers.

2. Outdoor Classrooms - Students

Nothing to report.

3. Outdoor Classrooms - Teachers

Nothing to report.

4. Interpretive Foot Trails

Over 300 people hiked the nature trail in 1994. The trail is a 3/4 mile loop which leads the visitor to a greater understanding of the three elements of habitat; food, water and cover. The trail runs along Swan Lake through a wooded bottom area, gradually winding uphill, exposing the hiker to both wetland and upland habitat. In addition, the trail contains numbered signs which correspond to numbered sections of a nature trail leaflet. The leaflet was revised in 1989 and covers such topics as water, cover, food, wetlands, edge, and upland management, as well as pointing out items of interest along the way. Because of flood damage to the majority of the nature trail during 1993; signs, bridges, trail route, etc. will be redesigned in the near future.

5. Interpretive Tour Routes

Nothing to report.

6. Interpretive Exhibits/Demonstrations

The refuge Visitor Center contains six exhibits with lifelike mounts of birds and animals, and numerous photographs with interpretive texts. In addition, a habitat touch table is available. Although these exhibits are enjoyed, the two VCR units are much more popular. One video contains an introduction to the refuge and explains the activities to enjoy during each season. The second VCR unit, set up in our small theater, allows the visitor to select a video out of seven different subjects including: Take Pride in America, the North American Waterfowl Management Plan, pelicans, duck stamps, river otters, snakes and wetlands. Both the exhibits and videos have been enthusiastically received by visitors.

7. Other Interpretive Programs

In addition to several school groups and other organizations visiting the refuge throughout the year, refuge staff participated in numerous programs during the period.



- #29 - With ongoing flood recovery work and a small staff, public use programs admittedly were put on hold during 1994.

(JAG, 7/93)



- #30 - Wildlife observation continues to be the most important public use activity on the refuge. It accounts for nearly 80% of all refuge visitation.

(JAG, 11/94)



- #31 - Over the last two years, public goose hunting blinds have been decreased from 48 to 31 blinds total. Emphasis remains on providing a quality hunting experience.

(JAG, 10/94)



### Goose Hunting

Goose hunting on Swan Lake NWR has been a popular refuge program since 1955. The hunting program is run annually by the Missouri Department of Conservation under cooperative agreement. Several changes were made in the hunting program this year with a goal of improving overall quality and success rate. All blinds were evaluated based on hunter success, crippling loss, numbers of days selected and management costs. Based on this information, the poorest blinds were removed from the program in 1993-94, leaving 31 total. In an effort to improve hunting quality, several blinds were relocated and replaced with newly styled ones.

The 1993 goose hunting season marked the final year of a four year half-day hunt study. Once this information is further analyzed, improvements will be implemented to boost overall quality of the hunting program. Preliminary data suggested that about half of the goose hunters within the Swan Lake Zone favored half-day hunting. In 1994, the decision was made to permit all-day hunting for geese from stabilized refuge blinds. MDC data has shown that 80% of waterfowl hunters are headed home by 1:00 pm even if all-day hunting is permitted. It was felt that with significant blind reduction occurring in 1993-94, conversion to half-day goose hunting also, might be unrealistic at this time. More changes are planned for 1995.

The 1994 Canada goose season was split with the first period beginning October 19th and concluding November 6th. During the first nine days area hunters harvested 183 birds with a zone harvest of 1,241. Hunter pressure was moderate with only 7 parties turned away opening weekend. A total of 32,800 geese were recorded in the Swan Lake Zone prior to the opening.

The second portion of the season began November 25th, and ended December 25th. Changing weather conditions caused the refuge goose population to fluctuate daily. A high of 20,200 Canada geese was recorded 12/12 using Swan Lake during the second split. A low of 8,350 Canada geese was recorded 11/28. The 1994 Canada goose season ended with 2,262 hunters harvesting 675 geese on the refuge.





A comparison of Swan Lake's Canada goose population, harvest and food production data over the last 11 years (1983-1994), is illustrated below:

Year	Length Season	Bag Limit	Zone Peak Pop	Zone Quota	Refuge Hunters	Refuge Harvest	Zone Harvest	Bu. Grain
1983	70 days	1	131,500	20,000	6,552	1,875	8,727	51,938
1984	50 days	2	64,250	16,000	6,374	2,646	12,851	13,192
1985	50 days	2	78,100	16,000	5,095	2,242	11,204	37,518
1986	50 days	2	77,985	16,000	5,686	1,659	6,726	58,994
1987	40 days	2	54,025	10,000	4,672	1,668	6,345	42,574
1988	40 days	2	111,450	10,000	4,435	1,836	8,978	35,042
1989	40 days	2	118,000	10,000	4,298	1,660	5,822	41,037
1990	50 days	2	67,065	10,000	4,946	1,316	5,216	12,809
1991	50 days	2	87,800	10,000	4,152	1,161	5,955	25,075
1992	50 days	2	57,700	10,000	3,579	979	4,627	28,000
1993	33 days	2	50,950	5,000	2,289	852	5,913	2,700
1994	40 days	2	42,350	5,000	2,262	675	4,192	33,520

#### Primitive Weapons Deer Hunt

Two primitive weapons deer hunts were held on Swan Lake NWR during the period. The primary goal of these special hunts is to keep an already abundant white-tailed deer population in check. On January 7-8, an any-sex hunt was held for which 1,268 applicants applied for 85 available permits. Another 228 people applied for 85 permits during the second but antlerless-only deer hunt on January 21-22.

During the first hunt, 75 hunters (that showed) harvested 29 deer. Weather conditions were not favorable with a mean temperature of 16°F on Saturday. A few nice bucks were taken using muzzleloader firearms during the first hunt, with all participants seemingly enjoying the experience.

In the second special hunt, 73 hunters harvested 51 deer. Only antlerless-only deer can be taken during this hunt. Bonus tags (allowing a second additional antlerless only deer to be taken), can also be used in this hunt.

A highlight for the year was again our muzzleloader hunt for the physically challenged January 7-8. Six hunters (all but one in a wheel-chair) participated. Each hunter was provided a volunteer with muzzleloader, pre-constructed blind, served lunch on hunt days, and other assistance as needed. The Mendon, Missouri Lion's Club drew great praise from hunt participants and volunteers alike for providing wonderful lunches. Three deer were harvested during the two-day hunt, but everyone had their opportunities. Words cannot describe the warmth and satisfaction that surrounds this hunt. Without volunteers it could not take place. Those that have the most reason to complain (participants), never complain at all.

- #32 - The Mendon Lion's Club graciously donated their time and efforts in providing lunch for physically challenged deer hunters and volunteers.

(JAG, 1/94)



- #33 - Volunteer Wolken discusses hunting strategy with participant Dooley. "His antlers were at least this wide and..."

(JAG, 1/95)



- #34 - Rewards are many during this hunt. A happy and content Calvin Pope poses with trophy and a smile a mile wide.

(JAG, 1/95)



The table below illustrates the buck/doe rates of harvest for all primitive weapons deer hunts held on Swan Lake NWR in 1994.

	<u>Bucks</u>	<u>Does</u>	<u>Hunters</u>	<u>Success</u>
January 7-8	19	10	75	39%
January 21-22	19	32	73	70%
*January 7-8	1	2	6	50%
Totals	39	44	154	---

\* Special Physically Challenged Hunt

#### 9. Fishing

The refuge is open to public fishing under State regulations between 3/1 and 10/15 annually. Fishing was enjoyed by an estimated 1,500 people during the period. Bullhead, carp, channel catfish and big mouth buffalo are the most abundant fish species and thus make up most of the catch.

#### 10. Trapping

Nothing to report.

#### 11. Wildlife Observation

Wildlife observation continues to be the most important activity on the refuge. Many local people drive through the refuge in the evenings throughout the year to catch a glimpse of wildlife species. In the fall, roads are crowded as hundreds of visitors come to view waterfowl, or attempt to see one of the many large white-tail bucks. Almost half of the non-consumptive recreational use occurs in October and November during the peak of the fall waterfowl migration.

#### 12. Other Wildlife Oriented Recreation

Nothing to report.

#### 13. Camping

Nothing to report.

#### 14. Picnicking

Nothing to report.

#### 15. Off Road Vehicling

Nothing to report.

#### 16. Other Non-Wildlife Oriented Recreation

Nothing to report.

### 17. Law Enforcement

The refuge has one law enforcement person. In addition, cooperation provided by the State Conservation Agents is excellent and they conduct the majority of law enforcement activities on the refuge. There were no law enforcement problems during the period.

Refuge Manager Guthrie attended 40-hour LE refresher training in Des Moines, Iowa 3/21-24. Requalification with the Service revolver was completed at DeSoto NWR 9/93.

### 18. Cooperating Association

For the fourth year in a row, Swan Lake NWR offered items for sale through the Midwest Interpretive Association. Items sold included: T-shirts, coffee mugs, bird books, calendars, posters, stationary, post cards, flower books and hiking trail guides. Sales have been a pleasant surprise with work load minimal. Our thanks to Administrative Technician Hannebaum for efficient running of the program.

### 19. Concessions

Nothing to report.

## I. EQUIPMENT AND FACILITIES

- [1. New Construction
- [2. Rehabilitation

Work accomplished during the period emphasized improving refuge facilities, replacement of equipment storage building, flood recovery rehab/repairs, upgrade of moist soil units, and replacement of outdated or damaged water control structures. Projects along these lines completed during the period included:

- Placed additional rip rap on approximately 3½ miles of Silver Lake Levee to repair degraded portions following 1993 floods. (Average stone size 10-12 inches, depth 1 foot, width 17 feet.)
- Upgraded approximately 2 miles of South Pool Levee to a uniform elevation of 662.0 MSL. Resloped and repaired flood damaged portions of levee. Graveled existing road on levee top.
- Removed Patrol Road Levee (approximately 2½ miles) to increase Yellow Creek's floodplain and slow water velocity through refuge bottomlands. The existing 3 foot levee was spread over farm fields to the north and finished construction work seeded to a switchgrass mixture.
- Regraveled nearly entire refuge road system (estimated at 25 miles) as a result of impacts of the Flood of 1993. Roads were top-dressed with an average depth of 2 inches of 1-1½ inch crushed rock.



- #35 - Construction of a new 60'W x 96'L equipment storage building commenced in Dec 93' and ended in April 94'. Total cost was \$42,269.95.

(JAG, 3/94)



- #36 - Completed structure with 30'W end door, 24'W side door and translucent panels around perimeter of building.

(JAG, 11/94)



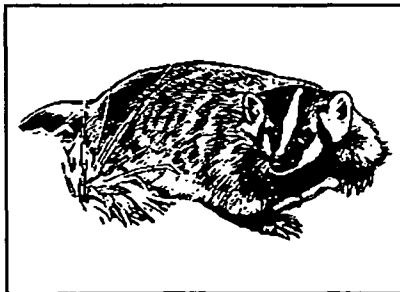
- #37 - Although the new maintenance shop was built in Nov of 1993, minor corrections and required finish work were completed during the period.

(JAG, 11/94)





- Constructed approximately 1 mile of low level dike w/water control structure in cooperation with Missouri Department of Conservation in the S&T hunting lanes. This project has been in the works for several years and was finally completed. Its purpose is to convert approximately 65 acres of marginal farmland into a manageable moist soil unit.
- Resloped and repaired entire length ( $\frac{1}{2}$  mile) of Cross Levee 5 to an elevation of 665.0 MSL. Finish work, rip rap, and water control structure are scheduled for completion in 1995.
- Completion of flood repair work to Swan Lake Levee. Resloped and repaired approximately  $1\frac{1}{2}$  miles of levee which serves as our main public entrance road. The entire road surface was regaveled.
- Seeded down all construction sites with winter wheat and perennial ryegrass initially, then a frost seeded mixture of 10 lbs PLS Blackwell switchgrass and 2 lbs PLS Indianagrass was broadcast over established vegetation. Approximately 7 miles of levee was seeded in this manner.
- Repairs to all moist soil unit levees in the form of resloping and patching flood damaged portions. Most of this work centered on increasing levee slope and seeding down construction sites immediately after work was completed.
- Reestablishment of 110 acres of flooded out native grass fields. A mixture of switchgrass, Indianagrass, little bluestem, big bluestem, sideoats grama and prairie forbs was used.
- Reestablishment of 460 acres of legumes flooded out in 1993 and an important part of our current modified biological farming program.
- Construction of 60'W x 96'L equipment storage building (replacement) at a cost of \$46,269.95. Work was completed by HTH Company, Union, Missouri, under contract #14-48-0003-93-0032.
- Finally, all other, but more minor, flood related and general maintenance work that was accomplished during the period (in spite of all that went on above). The assistance received from Doug Johnson, RO Special Services, in setting up and completing MMS projects and other flood rehab projects is greatly appreciated.



- #38 - Degraded stretches of rip rap along Silver Lake were reroaked during the period. The Flood of 93' held water near top of levee for almost two months.

(JAG, 6/94)



- #39 - Over 13,000 tons of rip rap were spread over existing rock to upgrade levee slope. Refuge dozer and operator Milligan performed admirably.

(JAG, 6/94)



- #40 - Cross Levee #5 was completely redone during the period. Flood damage was extensive to both road and water control structure. The WCS will be replaced in 1995.

(JAG, 12/94)





- #41 - In an effort to reclaim flood damaged farmland, many farmers resorted to using the Barker disc or similar equipment. Pictured version has 38" blades.

(JAG, 6/94)



- #42 - Pulled by a tracked Caterpillar tractor, a machine such as this can work the top 24-30" of soil. Deposited sand is rolled under and mixed with soil.

(JAG, 6/94)



- #43 - Flood funding allowed the refuge to purchase a much needed Caterpillar Model 12G road grader. It has been an important tool in the flood recovery effort and general road maintenance tasks.

(JAG, 1/94)



- #44 - Dry conditions, adequate equipment and good operators combined to make the period's flood recovery effort a major success. Much credit also goes to refuge staff.

(JAG, 6/94)



- #45 - Finished Swan Lake Levee and main entrance road following flood rehab work. Road shoulder was resloped to 5:1 and seeded to a native grass mixture.

(JAG, 10/94)



- #46 - South Pool Levee/road was resloped to pre-flood condition, seeded to native grass mixture and regravelled to restore destroyed access road.

(JAG, 10/94)





- #47 - Following the Great Flood of 1993, interest in the Wetland Reserve Program (WRP) was high. Levee break along the Missouri River is just an example of one farmers plight.

(JAG, 6/94)



- #48 - Areas of large sand deposits were common along Missouri River bottoms. Depth ranged from inches to several feet.

(JAG, 7/94)



- #49 - Even after one growing season and under adverse conditions, flood damaged land quickly began to revegetate.

(JAG, 8/94)





### 3. Major Maintenance

- Replace guttering on refuge storage buildings (\$3,200)
- Vehicle replacement (no contractors bids received, resubmitted for FY95 \$17,000)
- Replacement tools for shop (\$2,850)
- Shelving, storage compartments, air hose, etc. to finalize completion of the maintenance shop (\$4,700)

### 4. Equipment Utilization and Replacement

The following items were replaced or added during the period:

- Purchase of Caterpillar, Model 12G road grader at a contract price of \$128,000. This replaces our older and less versatile Champion road grader transferred to Illinois River NWR previously. (flood funding)
- Purchase of Homelite 3" centrifical pump Model 12-120TP3, complete with hoses, clamps, etc. at a cost of \$1,427. (flood funding)
- Purchase of 26'W Fuerst hydraulic harrow cart (drag) complete with tires, lift cylinder, hoses, etc. at a cost of \$4,600.
- Purchase of Caterpillar, Model EL 240C hydraulic excavator at a contract price of \$149,722. (flood funding)

### 5. Communications Systems

Nothing to report.

### 6. Computer systems

Nothing to report.

### 7. Energy Conservation

Nothing to report.

### 8. Other

Nothing to report.

## J. OTHER ITEMS

### 1. Cooperative Programs

Refuge staff work closely with the Missouri Department of Conservation and other special interest groups on a daily basis. Monthly coordination

meetings were held with Missouri Department of Conservation personnel concerning refuge operations and other topics.

## 2. Other Economic Uses

Nothing to report.

## 3. Items of Interest

Refuge Manager Guthrie attended the annual Missouri Forest, Fish & Wildlife Conference in Osage Beach, MO 2/2-3.

Refuge Manager Guthrie attended LE Refresher Training in Des Moines, IA 3/21-24.

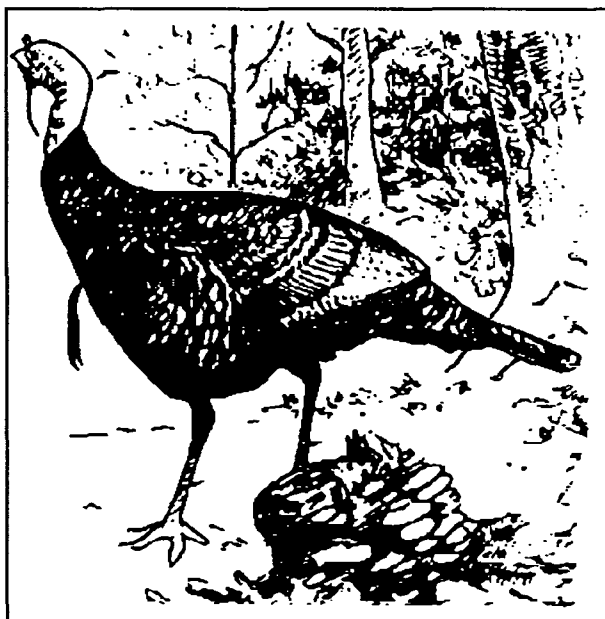
Assistant Manager George Peyton retired May 3, 1994, after 33 years of Federal Service. For anyone interested in contacting him, his address is: 36105 State Highway Y, Excello, MO 65247.

Refuge revenue sharing checks for FY 94 distributed during the period included: Bates County (\$466), Cedar County (\$248), Henry County (\$296), St. Clair County (\$1,165) and Chariton County (\$24,421).

## 4. Credits

All sections of this report: Guthrie

Editing and typing the entire report: Hannebaum



# Birds of SWAN LAKE

Swan Lake National Wildlife Refuge, located in north central Missouri, was established in 1937 as a resting and feeding area for waterfowl, primarily ducks, and as a sanctuary for prairie chickens. It has now become the primary wintering area for the Eastern Prairie Population of Canada geese whose numbers exceed 100,000. The refuge's 10,670 acres comprise a wide variety of habitat types. Silver Lake is a permanent body of water covering 3,000 acres. An additional 3,500 acres are wetlands in which water levels are manipulated to produce natural waterfowl foods. To supplement natural foods about 2,000 acres of land are farmed (without chemicals) for corn, milo, clover, wheat, and soybeans. Bottomland forests, abandoned fields in various stages of succession, and a native prairie provide other types of wildlife habitat. This diversity of habitat supports a large variety of birds.

## Legend

This bird list contains 237 species which have been recorded on the refuge. Another eight birds, listed under Accidentals have been reported but are not normally expected to be present.

**Sp** — Spring ..... March-May  
**S** — Summer ..... June-August  
**F** — Fall ..... September-November  
**W** — Winter ..... December-February

**a** — abundant — common species that is very numerous  
**c** — common — almost 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 2-5 years  
**(E)** — Endangered

\*Indicates species known to breed on or near Swan Lake, MISSOURI

SPECIES	Sp	S	F	W
Common Loon.....	o		o	
Pied-billed Grebe.....	c	o	c	
Horned Grebe.....	u		u	
Eared Grebe.....	o		r	
American White Pelican.....	c	u	c	
Double-crested Cormorant.....	u	o	u	
American Bittern.....	u	u	u	
Least Bittern.....	u	o	u	
Great Blue Heron*	c	c	c	u
Great Egret.....	u	u	u	
Snowy Egret.....	o	u		
Little Blue Heron.....	r	u	o	
Cattle Egret.....	u	u	u	
Green-backed Heron*	u	c	u	
Black-crowned Night Heron.....	u	u	o	
Yellow-crowned Night Heron*	o	o		
Tundra Swan.....	r		r	r
Greater White-fronted Goose.....	u		u	u
Snow Goose.....	c	o	a	u
Ross' Goose.....			r	r
Canada Goose.....	a	u	a	a
Wood Duck*	c	c	c	u
Green-winged Teal.....	c	o	c	u
American Black Duck.....	o		o	o
Mallard*.....	c	u	c	c
Northern Pintail.....	a	u	a	o
Blue-winged Teal.....	c	u	c	u
Cinnamon Teal.....	r		r	r
Northern Shoveler.....	c	o	u	u
Gadwall.....	c		c	
American Wigeon.....	c		c	r
Canvasback.....	c		u	r
Redhead.....	c		o	u
Ring-necked Duck.....	c		u	o
Lesser Scaup.....	c	o	c	o
White-winged Scoter.....			r	
Common Goldeneye.....	u		u	u
Bufflehead.....	c		u	o
Hooded Merganser.....	u		u	o
Common Merganser.....	c		u	u
Red-breasted Merganser.....	o		o	
Ruddy Duck.....	c	o	u	
Turkey Vulture.....	c	c	c	
Osprey.....	o		o	
Bald Eagle (E).....	u		c	c
Northern Harrier*	c	o	c	c
Sharp-shinned Hawk.....	u	o	u	u
Cooper's Hawk.....	u	o	u	u
Northern Goshawk.....			r	r

SPECIES	Sp	S	F	W
Red-shouldered Hawk.....	u	o	o	o
Broad-winged Hawk.....	c		c	
Swainson's Hawk.....	o		u	r
Red-tailed Hawk*	c	c	c	c
Rough-legged Hawk.....	u		u	u
Golden Eagle.....	o		o	o
American Kestrel*	c	u	c	u
Merlin.....	o		o	
Peregrine Falcon (E).....	r		r	
Ring-necked Pheasant.....	r	r	r	r
Wild Turkey*.....	o	o	o	o
Northern Bobwhite*.....	c	c	c	c
King Rail*	o	o		
Virginia Rail.....	u	u		
Sora.....	c	c	u	
American Coot.....	c	u	c	r
Sandhill Crane.....	r		r	r
Black-bellied Plover.....	c	u	u	
Lesser Golden Plover.....	u	u	u	
Semipalmated Plover.....	u	u	u	
Piping Plover.....	o	r	o	
Killdeer*.....	c	c	c	o
American Avocet.....	u	r	u	
Greater Yellowlegs.....	c	u	c	
Lesser Yellowlegs.....	a	c	a	
Solitary Sandpiper.....	u	u	u	
Willet.....	r	r	r	
Spotted Sandpiper*.....	c	c	c	
Upland Sandpiper*.....	u	u	u	
Hudsonian Godwit.....	u		r	
Marbled Godwit.....	r			
Ruddy Turnstone.....	o		o	
Red Knot.....	r			
Sanderling.....	u	u	o	
Semipalmated Sandpiper.....	c	u	c	
Western Sandpiper.....	o	o	o	
Least Sandpiper.....	c	u	c	
White-rumped Sandpiper.....	u		u	
Baird's Sandpiper.....	u	r	u	
Pectoral Sandpiper.....	a	c	a	
Dunlin.....	o		o	
Stilt Sandpiper.....	u	u	u	
Buff-breasted Sandpiper.....	o	r	o	
Short-billed Dowitcher.....	u	u	u	
Long-billed Dowitcher.....	c	u	c	
Common Snipe.....	c	u	c	r
American Woodcock.....	c	u	u	
Wilson's Phalarope.....	u	r	u	
Red-necked Phalarope.....	r		r	

SPECIES	Sp	S	F	W
Franklin's Gull.....	c	o	c	
Bonaparte's Gull.....	u		u	
Ring-billed Gull.....	c	o	u	
Herring Gull.....	u	o	u	
Caspian Tern.....	o	r	u	
Common Tern.....	u	o	u	
Forster's Tern.....	c	o	o	
Least Tern.....	o			
Black Tern.....	c	u	c	
Rock Dove*.....	u	u	u	u
Mourning Dove*.....	a	a	a	u
Black-billed Cuckoo.....	u			
Yellow-billed Cuckoo*.....	c	c	c	o
Common Barn-Owl.....	r	r	r	r
Eastern Screech Owl*.....	c	c	c	c
Great Horned Owl*.....	c	c	c	c
Snowy Owl.....				r
Barred Owl*.....	c	c	c	c
Long-eared Owl.....	u		u	u
Short-eared Owl.....	u			u
Common Nighthawk*.....	u	u	u	
Whip-poor-will*.....	u	u	u	
Chimney Swift*.....	c	c	c	
Ruby-throated Hummingbird.....	c	u	u	
Belted Kingfisher*.....	c	c	c	o
Red-headed Woodpecker*.....	c	c	c	c
Red-bellied Woodpecker*.....	c	c	c	c
Yellow-bellied Sapsucker.....	u	r	u	r
Downy Woodpecker*.....	c	c	c	c
Hairy Woodpecker*.....	u	u	u	u
Northern Flicker*.....	c	c	c	u
Pileated Woodpecker*.....	u	o	o	c
Olive-sided Flycatcher.....	r	o	r	
Eastern Wood Pewee*.....	c	c	c	
Acadian Flycatcher.....	o		o	
Willow Flycatcher.....	c			
Eastern Phoebe*.....	c	c	c	
Great Crested Flycatcher*.....	u	o	u	
Western Kingbird.....	r		r	
Eastern Kingbird*.....	c	c	c	
Horned Lark*.....	c	c	u	u
Purple Martin.....	u	u	u	
Tree Swallow*.....	c	u	a	
Northern Rough-winged Swallow.....	c	c	a	
Bank Swallow*.....	c	c	c	
Cliff Swallow.....	u	o	u	
Barn Swallow*.....	c	c	c	



SPECIES	Sp	S	F	W
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Blue Jay*	c	c	c	c
American Crow*	c	c	c	c
Black-capped Chickadee*	c	c	c	c
Tufted Titmouse*	c	c	c	c
Red-breasted Nuthatch				r
White-breasted Nuthatch	u	u	u	u
Brown Creeper	u		u	u
Carolina Wren	r	r	r	r
House Wren*	c	c	c	
Winter Wren				u
Sedge Wren*	u	u	u	
Marsh Wren	u	u	u	
Golden-crowned Kinglet	u		u	u
Ruby-crowned Kinglet	u		u	r
Blue-gray Gnatcatcher*	u	u	o	
Eastern Bluebird*	u	u	u	o
Gray-cheeked Thrush	u			
Swainson's Thrush	u		u	
Hermit Thrush	c		c	
Wood Thrush*	c	c	c	
American Robin*	c	c	c	o
Gray Catbird*	c	c	c	
Northern Mockingbird*	u	u	u	u
Brown Thrasher*	c	c	c	
Water Pipit	u		u	
Cedar Waxwing	c		c	c
Loggerhead Shrike*	u	u	u	u
European Starling*	c	c	c	c
White-eyed Vireo	u	u	u	
Bell's Vireo*	c	c	u	
Solitary Vireo	u		u	
Yellow-throated Vireo	u	r	u	
Warbling Vireo*	u	u	u	
Red-eyed Vireo*	c	c	u	
Tennessee Warbler	u		u	
Nashville Warbler	u		u	
Northern Parula	u		u	
Yellow Warbler*	c	c	c	
Chestnut-sided Warbler	u		u	
Magnolia Warbler	u		u	
Yellow-rumped Warbler	c		c	o
Blackburnian Warbler	u		u	
Blackpoll Warbler	c		u	
Black-and-white Warbler	u	r	u	

SPECIES	Sp	S	F	W
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American Redstart*	c	u	c	
Prothonotary Warbler	u	r	r	
Ovenbird	u	r	u	
Louisiana Waterthrush	u	r	u	
Kentucky Warbler	r			
Mourning Warbler	u		r	
Common Yellowthroat	c	c	c	
Wilson's Warbler	u		c	
Yellow-breasted Chat	o	o	u	
Summer Tanager	o	o	o	
Northern Cardinal*	c	c	c	c
Rose-breasted Grosbeak*	u	u	u	
Indigo Bunting*	c	c	c	
Dickcissel*	c	c		
Rufous-sided Towhee*	c	c	c	o
American Tree Sparrow	u		u	c
Chipping Sparrow*	u	u	u	
Field Sparrow*	u	u	u	
Vesper Sparrow	u		u	
Lark Sparrow	u	u	u	
Savannah Sparrow	u		u	
Grasshopper Sparrow*	c	c	c	
Le Conte's Sparrow	o		o	
Sharp-tailed Sparrow	o		o	
Fox Sparrow	u		u	
Song Sparrow*	c	c	c	u
Lincoln's Sparrow	o		o	
Swamp Sparrow	u		u	u
White-throated Sparrow	c		c	u
White-crowned Sparrow	c		c	c
Harris' Sparrow	u		u	o
Dark-eyed Junco	u		u	c
Lapland Longspur	r		o	
Snow Bunting				r
Bobolink	u	o	u	
Red-winged Blackbird*	a	a	a	c
Eastern Meadowlark*	c	c	c	c
Western Meadowlark	r		r	r
Yellow-headed Blackbird	o		r	r
Rusty Blackbird	c		c	o
Brewer's Blackbird	o		o	
Common Grackle*	a	c	a	c
Brown-headed Cowbird*	c	c	c	u
Orchard Oriole*	c	c	c	
Northern Oriole*	c	c	c	
Purple Finch	u		u	o
Common Redpoll	o		o	
American Goldfinch*	c	c	c	o
House Sparrow*	c	c	c	c

## Accidental Birds

Tricolored Heron  
White-faced Ibis  
Greater Scaup  
Surf Scoter

Common Moorhen  
Sprague's Pipit  
Prairie Warbler  
Lark Bunting

## Sighting Notes

Time In Field \_\_\_\_\_ Date \_\_\_\_\_

Weather \_\_\_\_\_

Observers \_\_\_\_\_

Species Total \_\_\_\_\_

Location \_\_\_\_\_

Birdwatching is encouraged.  
Please check at the refuge office  
for times and places of entry.  
**PLEASE OBEY POSTED SIGNS**

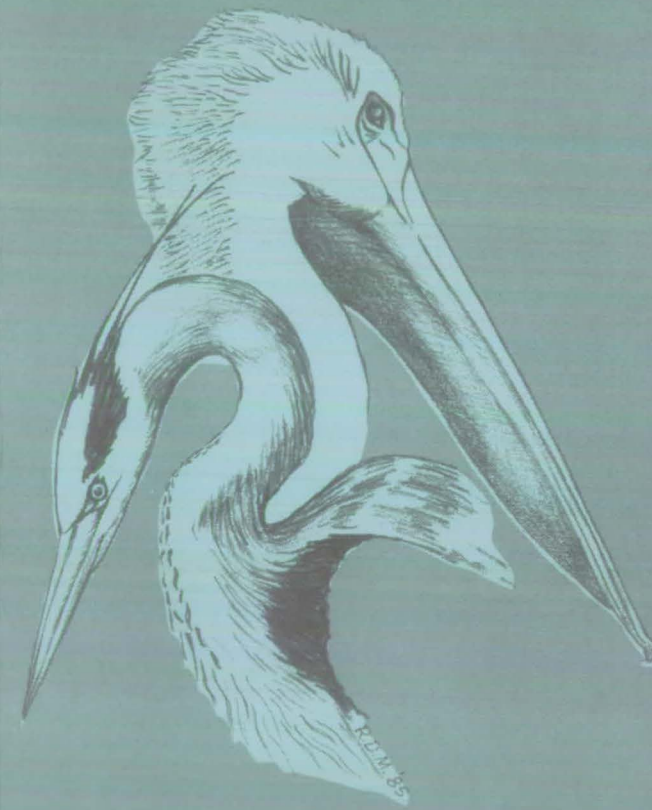
For Further Information Contact:  
Refuge Manager  
Swan Lake National Wildlife Refuge  
P.O. Box 68  
Sumner, Missouri 64681  
Phone (816) 856-3323



DEPARTMENT OF THE INTERIOR  
U.S. FISH AND WILDLIFE SERVICE  
RF-3-33570-2-9/87



# Birds of SWAN LAKE



MISSOURI

National Wildlife Refuge





## HISTORY

French fur traders, two of Daniel Boone's sons and a woodsman named Thomas Stanley explored Missouri before it became a State in 1821. They settled this country when it was a rich, untamed wilderness. Stanley lived off the land and made his home in the hollow of a huge sycamore log not far from here. Deer, elk, bear, otter, wild turkey, and prairie chickens were found in abundance. In 1828, Thomas Stanley built a log trading post at the site of present-day Sumner and thus pioneered a settlement trend which was later spurred by railway construction.

The human population grew and wildlife populations dwindled. In 1911, nearby Hog Lake was drained and converted to farmland. Drought and hard times hit in the nineteen thirties, and deer, elk, bear, otter and wild turkey became memories. Only a few flocks of prairie chickens remained.

## ABOUT THE REFUGE

Congress established Swan Lake National Wildlife Refuge in 1937 during the Depression years when the dust bowl conditions obscured the future of our Nation's migratory waterfowl. The Civilian Conservation Corps

built roads and buildings and created wetlands. Farming to produce food for wildlife began.

The original refuge objective was to preserve habitat for ducks and prairie chickens. Canada geese had been rare visitors, stopping only briefly to rest on their long migration from their nesting grounds in northern Manitoba. Eight hundred geese wintered here for the first time in 1941. Their numbers increased in succeeding years and have exceeded 100,000 every year since 1962. This refuge has one of the largest concentrations of Canada geese in North America and is now the primary wintering area for the Eastern Prairie Population.

Swan Lake has converted to a biological farming program. Inorganic fertilizers and pesticides are not used. About 2,000 acres are planted to corn, sorghum, clover, and wheat each year. All crops are left in the fields for geese and other wildlife. An additional 3,500 acres of low ground is managed to produce wild plants such as millet and smartweed which are used as food and cover by waterfowl. The remaining land is covered by forest, permanent grass, or native prairie.



## MANAGEMENT FOR DIVERSITY

The U.S. Fish and Wildlife Service manages more than 420 refuges across the Nation. These refuges preserve a wide variety of habitats to ensure the continuing survival of America's wildlife. Swan Lake, a 10,670 acre refuge, is a key element in the refuge system.

As a major wintering area for Canada geese, the refuge also supports many other species of wildlife. The large waterfowl concentrations attract about 100 bald eagles each fall as well as coyotes, red fox, and other predators which feed on dead and dying geese.

Diversity of wildlife species is one of the best indicators of environmental health. The refuge supports at least 40 species of mammals and more than 230 species of birds, eight of which are threatened with extinction in Missouri. Species typically seen include turkeys, woodpeckers, raccoon, squirrels, and white-tailed deer. Although rare, river otters may occasionally be seen. This refuge is a special place where visitors may pause for awhile and feel the pulse of the land.

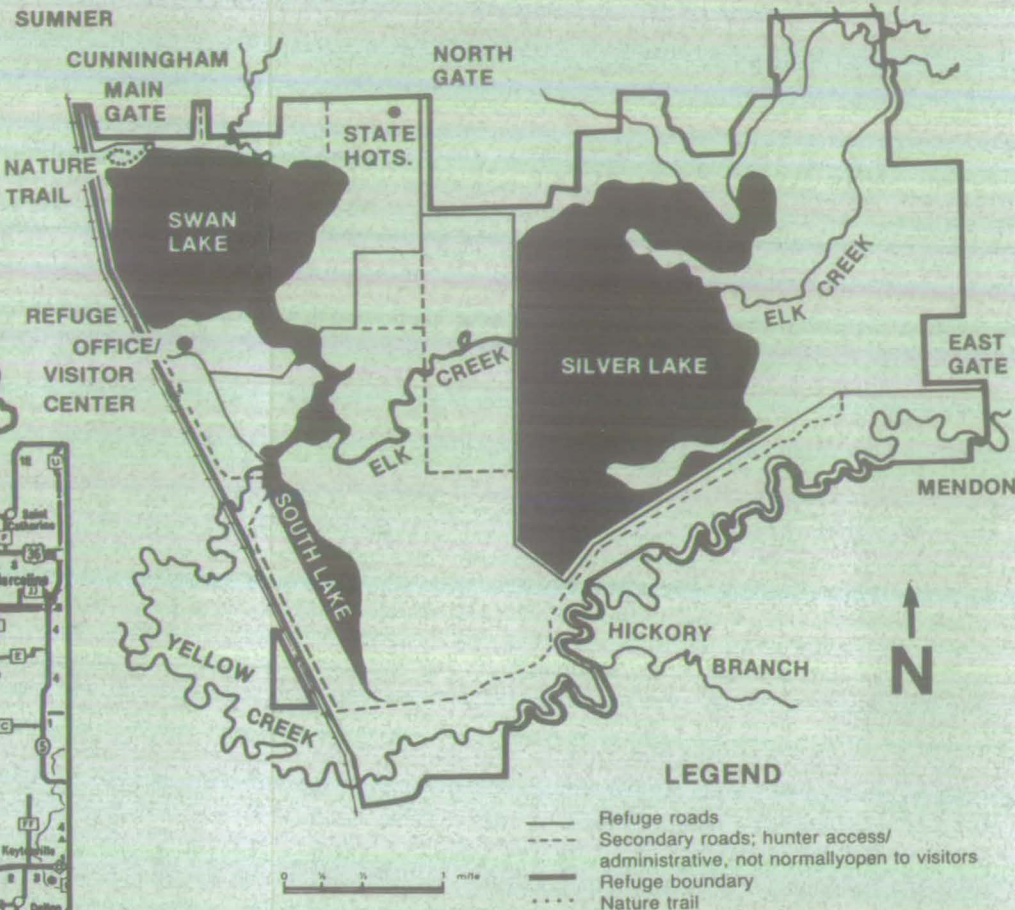
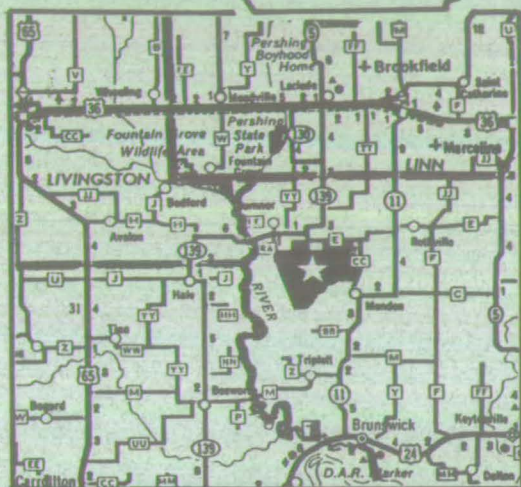


**For more information contact:**

Swan Lake National  
Wildlife Refuge  
P.O. Box 68  
Sumner, MO 64681

(816) 856-3323

**VICINITY MAP**



# Swan Lake

## NATIONAL WILDLIFE REFUGE

MISSOURI



### YOUR INVITATION TO SWAN LAKE

Swan Lake National Wildlife Refuge may be reached by traveling south from U.S. Highway 36 on State Highway 139 to Sumner. The main refuge entrance is one mile south of Sumner.

The refuge is open during daylight hours only. Visitor Center hours are from 8 a.m. to 4:30 p.m., Monday through Friday and the public is encouraged to view wildlife videos and exhibits on display. Camping is not permitted on the refuge but excellent facilities are available at Pershing State Park on State Highway 130, seven miles north. Hunting is prohibited except for a special primitive weapons deer hunt and goose hunting administered under cooperative agreement by the Missouri Department of Conservation.

Because of the large concentration of wintering geese, public access to the interior of the refuge is limited to March 1 through October 15. Fishing is permitted under State regulations during this time. When the interior is closed, the Nature Trail remains open and large numbers of geese and other wildlife can be viewed from the Trail or main entrance road. An old silo standing east of the Visitor Center has been converted to an observation tower. You are welcome to climb the tower year-round. It provides an excellent panoramic view of Swan Lake, wetlands, and fields.

*"Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity."*

— Aldo Leopold

