

Squaw Creek National Wildlife Refuge  
Mound City, Missouri

ANNUAL NARRATIVE REPORT  
Calendar Year 1982

U.S. Department of the Interior  
Fish and Wildlife Service  
NATIONAL WILDLIFE REFUGE SYSTEM

Squaw Creek National Wildlife Refuge  
Mound City, Missouri

ANNUAL NARRATIVE REPORT  
Calendar Year 1982

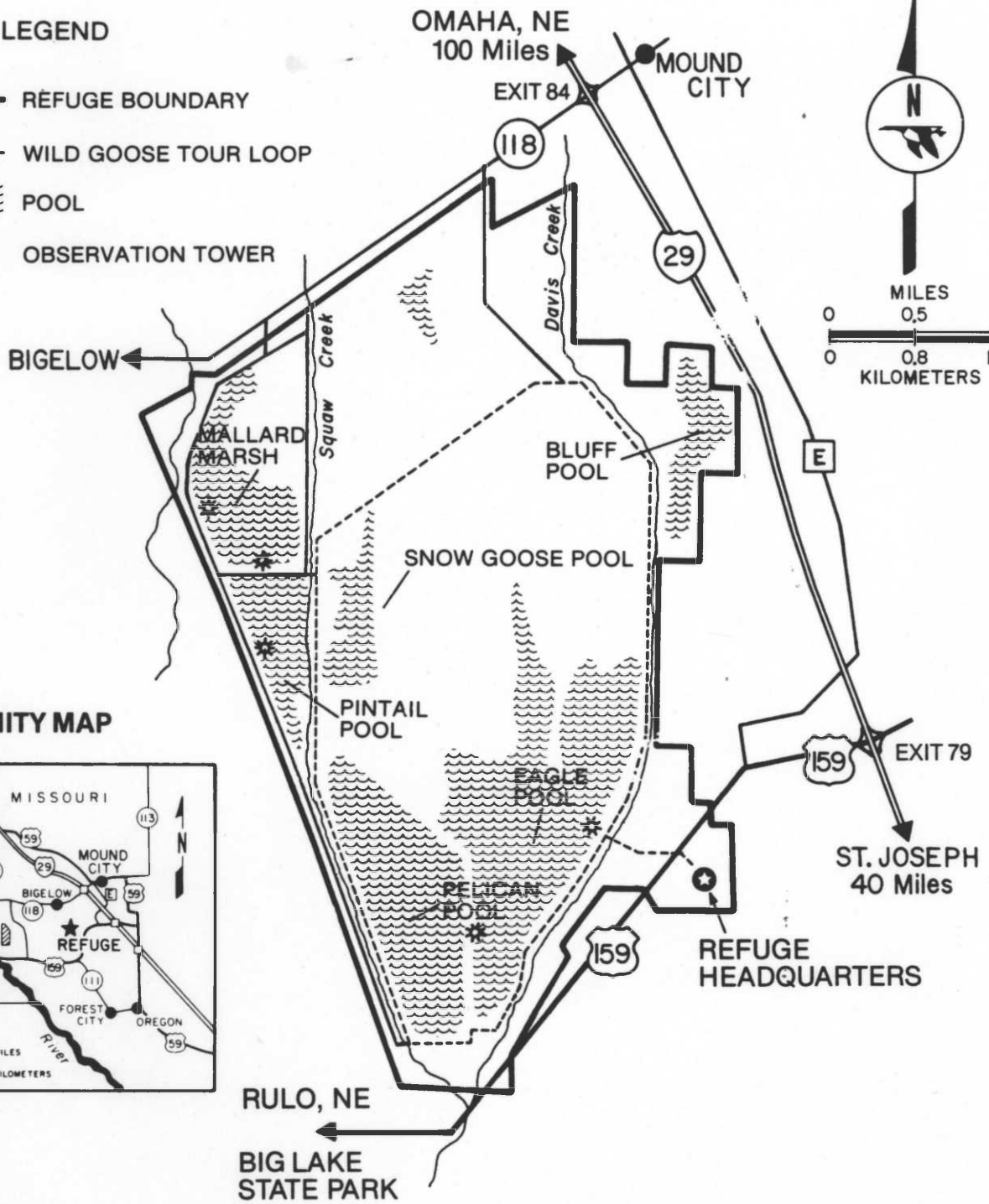
U.S. Department of the Interior  
Fish and Wildlife Service  
NATIONAL WILDLIFE REFUGE SYSTEM

# Squaw Creek National Wildlife Refuge

Mound City, Missouri

## LEGEND

- REFUGE BOUNDARY
- - - WILD GOOSE TOUR LOOP
- ~~~~~ POOL
- \* OBSERVATION TOWER



## VICINITY MAP



Personnel

Berlin A. Heck	Refuge Manager	GS-11, PFT
Shirley A. Zeliff	Refuge Assistant	GS- 5, PFT
Kenneth L. Grannemann	Assistant Refuge Manager	GS- 9, PFT
William R. Hamilton	Equipment Operator	WG- 9, PFT (Retired 1/22/82)
Walter J. Szelag	Maintenance Worker	WG- 7, PFT
Darrell A. Geib	Biological Aid	GS- 2, TFT (4/25-8/20/82)
Glenn A. Wheeler	Biological Aid	GS- 2, TFT (4/25-8/13/82)
Richard G. Martinez	Student Trainee (Engineering) (Junior Fellowship Program) (12/20-31/82)	GS- 3, PFT

Review and Approvals

Berlin A. Heck February 24, 1983  
Submitted By Date

\_\_\_\_\_  
Regional Office Review Date





Berlin A. Heck, Refuge Manager, GS-11, PFT  
B.S. Wildlife Management, LA Tech. University  
M.S. Biology, Northeast Louisiana University  
With FWS for twelve years, five years at Squaw  
Creek, from Brigantine NWR, Iroquois NWR and  
Great Meadows NWR. Native of north Louisiana.



Kenneth L. Grannemann, Assistant Refuge Manager, GS-9, PFT  
B.S. Zoology, Kansas State College at Pittsburg. M.S.  
Biology, University of North Alabama. With FWS for five  
years, one year at Squaw Creek. From Ecological Services  
and TVA (four years). Native of SE Kansas.



Walter J. Szlag, Maintenance Worker, WG-7, PFT  
Served at Squaw Creek two years. From Sacramento NWR  
and Iroquois NWR Job Corps. Native of western New York.



Darrell Geib with his "busted sickle" award in honor of his mowing exploits and Glenn Wheeler with his "broken chain" award in honor of his almost uncanny ability to get stuck.

8/82 BH





Bill Hamilton

After more than thirty years of federal service, Engineering Equipment Operator William R. Hamilton retired on January 22 this year. Bill's Fish and Wildlife Service career began here as a dragline oiler on August 13, 1954. It was a hard living at \$1.30 per hour back then but Bill worked his way up to operator and inherited an ancient fleet of heavy equipment that sometimes ran and sometimes didn't, depending on how it was treated by previous owners. He became one of the best mechanics/operators in this part of the country, nursing along old draglines, dozers, graders and other equipment.

Even though Bill declined a retirement party he received gifts and a scrapbook full of letters from friends around the refuge system wishing him and Bonnie the happiest of retirements.

We certainly miss his work here at the refuge.

## TABLE OF CONTENTS

	<u>Page</u>
A. <u>HIGHLIGHTS</u>	1
B. <u>CLIMATIC CONDITIONS</u>	1
C. <u>LAND ACQUISITION</u>	
1. Fee Title. . . . .	Nothing to Report
2. Easements. . . . .	4
3. Other. . . . .	Nothing to Report
D. <u>PLANNING</u>	
1. Master Plan. . . . .	Nothing to Report
2. Management Plan. . . . .	Nothing to Report
3. Public Participation . . . . .	Nothing to Report
4. Compliance with Environmental Mandates . . . . .	Nothing to Report
5. Research and Investigations. . . . .	4
E. <u>ADMINISTRATION</u>	
1. Personnel. . . . .	7
2. Youth Programs . . . . .	Nothing to Report
3. Other Manpower Programs. . . . .	Nothing to Report
4. Volunteers Program . . . . .	8
5. Funding. . . . .	8
6. Safety . . . . .	8
7. Technical Assistance . . . . .	Nothing to Report
8. Other Items. . . . .	8
F. <u>HABITAT MANAGEMENT</u>	
1. General. . . . .	10
2. Wetlands . . . . .	10
3. Forests. . . . .	Nothing to Report
4. Croplands. . . . .	13
5. Grasslands . . . . .	16
6. Other Habitats . . . . .	Nothing to Report
7. Grazing. . . . .	Nothing to Report
8. Haying . . . . .	16
9. Fire Management. . . . .	17
10. Pest Control . . . . .	19
11. Water Rights . . . . .	Nothing to Report
12. Wilderness and Special Areas . . . . .	19
13. WPA Easement Monitoring. . . . .	Nothing to Report



## TABLE OF CONTENTS

Page

### G. WILDLIFE

1.	Wildlife Diversity . . . . .	19
2.	Endangered and/or Threatened Species . . . . .	19
3.	Waterfowl. . . . .	24
4.	Marsh and Water Birds. . . . .	27
5.	Shorebirds, Gulls, Terns and Allied Species. . . . .	28
6.	Raptors . . . . .	28
7.	Other Migratory Birds. . . . .	30
8.	Game Mammals . . . . .	30
9.	Marine Mammals . . . . .	Nothing to Report
10.	Other Resident Wildlife. . . . .	31
11.	Fisheries Resources. . . . .	Nothing to Report
12.	Wildlife Propagation and Stocking. . . . .	Nothing to Report
13.	Surplus Animal Disposal. . . . .	32
14.	Scientific Collections . . . . .	Nothing to Report
15.	Animal Control . . . . .	32
16.	Marking and Banding. . . . .	Nothing to Report
17.	Disease Prevention and Control . . . . .	33

### H. PUBLIC USE

1.	General. . . . .	34
2.	Outdoor Classrooms - Students. . . . .	Nothing to Report
3.	Outdoor Classrooms - Teachers. . . . .	Nothing to Report
4.	Interpretive Foot Trails . . . . .	Nothing to Report
5.	Interpretive Tour Routes . . . . .	Nothing to Report
6.	Interpretive Exhibits/Demonstrations . . . . .	34
7.	Other Interpretive Programs. . . . .	34
8.	Hunting. . . . .	Nothing to Report
9.	Fishing. . . . .	37
10.	Trapping . . . . .	Nothing to Report
11.	Wildlife Observation . . . . .	37
12.	Other Wildlife Oriented Recreation . . . . .	39
13.	Camping. . . . .	39
14.	Picnicking . . . . .	40
15.	Off-Road Vehicling . . . . .	Nothing to Report
16.	Other Non-Wildlife Oriented Recreation . . . . .	Nothing to Report
17.	Law Enforcement. . . . .	40
18.	Cooperating Associations . . . . .	Nothing to Report
19.	Concessions. . . . .	Nothing to Report

## TABLE OF CONTENTS

Page

### I. EQUIPMENT AND FACILITIES

1. New Construction. . . . .	40
2. Rehabilitation . . . . .	41
3. Major Maintenance . . . . .	Nothing to Report
4. Equipment Utilization and Replacement . . . . .	44
5. Communications Systems. . . . .	Nothing to Report
6. Energy Conservation . . . . .	45
7. Other . . . . .	Nothing to Report

### J. OTHER ITEMS

1. Cooperative Programs. . . . .	45
2. Items of Interest . . . . .	47
3. Credits . . . . .	48

### K. FEEDBACK

48

### A. HIGHLIGHTS

Engineering Equipment Operator William Hamilton retired January 22.  
(Section J.2)

Reprogramming of BLHP funds for a new shop/storage building was approved in Washington. The building and site work was bid at \$215,300.  
(Section I.1)

The fifth annual "Eagle Days" program was held in December and 1,050 persons attended. (Section H.7)

Flooding from June and August rainfall caused considerable damage.  
(Sections F-1, F-4, H-11 and I-2)

### B. CLIMATIC CONDITIONS

Overall, weather for 1982 could best be described as wet. Rainfall for the year totaled 49.18 inches compared to the expected average of 34.5 inches. Distribution of rainfall is shown in Figure 1.

A summary of temperature data is given in Table 1.

Table 1. 1982 Temperature Data

Month	Temperatures (F°)			
	Daily Highs		Daily Lows	
	Average	Range	Average	Range
January	no data			
February	no data			
March	no data			
April	65	33-84	41	19-64
May	78	64-89	58	43-68
June	78	67-97	60	46-72
July	91	83-99	66	60-77
August	86	73-100	64	52-77
September	72	52-88	58	40-70
October	71	34-72	48	29-65
November	53	34-72	35	15-56
December	43	25-68	27	9-58

The year began with bitterly cold temperatures and all refuge waters frozen over. Overnight lows throughout January and the first half of February were quite commonly below 0°F. Snowfall for the winter was rather light and occurred as follows: January 3--3 inches, January 12--2 inches, March 4--4 inches, and April 5--1 inch. Milder temperatures

occurred in mid to late February and although ice broke up about February 15 to 20 in area creeks, refuge pools remained almost totally frozen over through the end of the month. March 1-3 a considerable amount of open water was present in refuge pools; however, a cold front that came through the third kept nearly everything frozen over from March 3 to 10. Warm weather on the 11th and 12th resulted in a thaw that lasted throughout the remainder of the month.



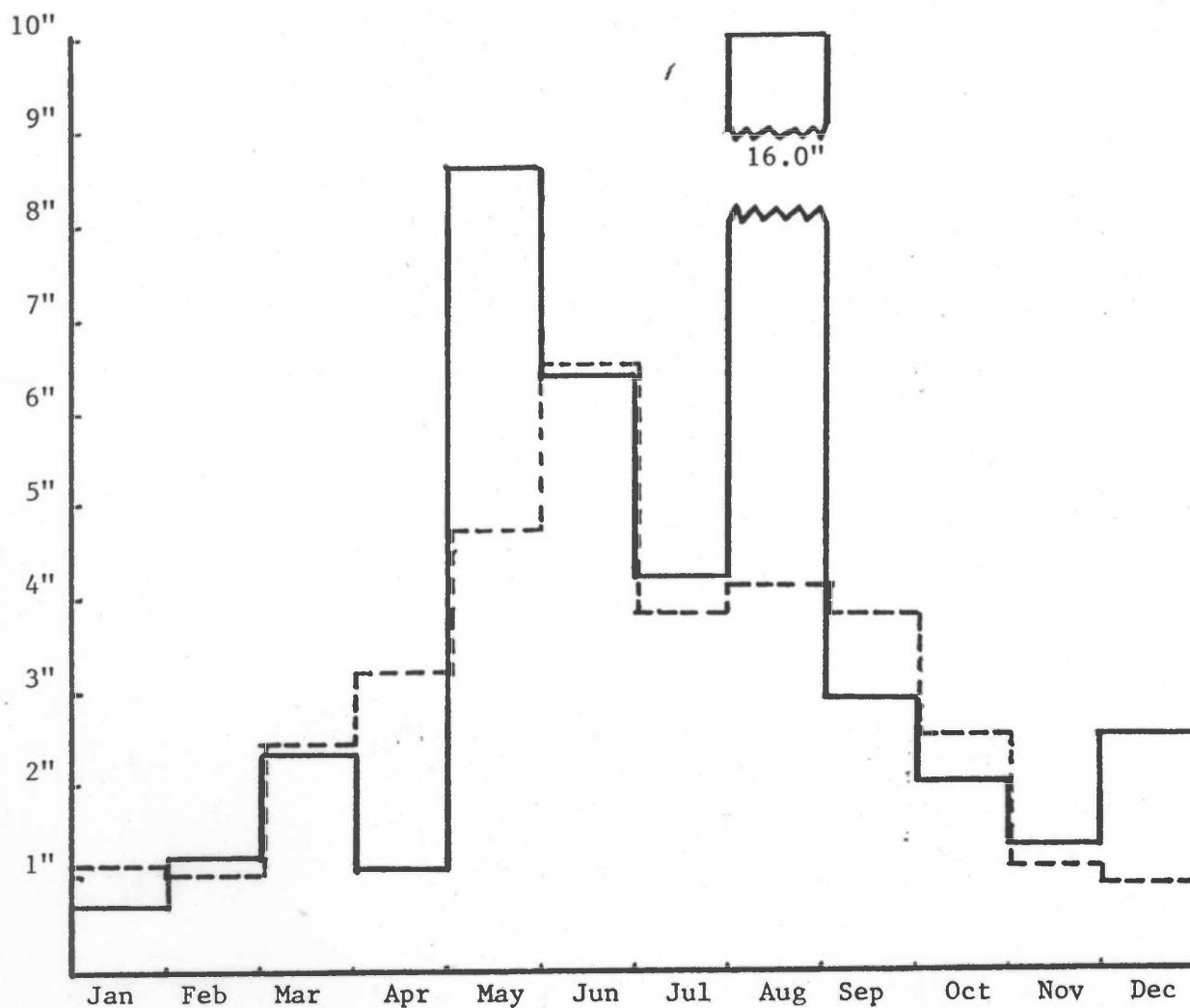
Inflow tube (3') for Mallard Marsh crushed by ice breakup on Squaw Creek in February. 2/82 BH

April was cool and dry. May saw the beginning of wet weather which extended through June. May was especially wet with total rainfall roughly double "normal" amounts and measurable rainfall on sixteen days of the month.

July, with near normal temperatures and rainfall, provided relief from the wet weather; however, August was a record setter for wet weather. A total of sixteen inches of rain, over four times the 3.9 inch normal, fell during the month. September saw a return to drier weather and precipitation was near normal for the remainder of the fall.

Temperatures during the fall were relatively mild. Although the majority of refuge pools were frozen over by December 9, waterfowl were able to keep open two small holes in the ice through the end of the year. Snowfall was light and generally melted within a day or two of its falling. Snowfall was recorded as follows: November 11--one inch, December 28--two inches.

Figure 1. Monthly rainfall for 1982 at Squaw Creek NWR (solid line) as compared to historical averages (dashed line) based on 1941-80 records from Rosecrans Airport (25 miles southeast).





## C. LAND ACQUISITION

### 2. Easements

St. Joseph Light and Power released an easement through the refuge after their telegraph line was removed. It originally ran the north-south length of the refuge along the east side of Davis Creek and out County Road on the north.

The Burlington-Northern Railroad line between Bigelow and Mound City passes through the refuge for approximately 1,500 feet in a 100 feet wide right-of-way. After salvage of rails, ties and bridges the easement will revert back to the refuge. It was previously thought that the land was owned by the railroad but it was only an easement.

The floods in June brought up old legal questions when log jams in Squaw and Davis Creeks just south of the refuge boundary resulted in the land-owner complaining to us. He insisted that we clean out the log jams because they were causing flooding on his land and there was an agreement that we would maintain the ditches. We knew there was a recently signed flow easement that resulted from our ditch cleaning activities on the refuge but nothing else. A check of an old realty map (tract 320d) did indicate an easement existed; however, we had no plat or other information on hand. The field solicitor was able to furnish us a copy of a cooperative agreement which was dated 1945 but, as it turns out, was never recorded at the courthouse. Because it was an agreement with previous owners the whole thing was void. This was just as well for the present owner because it would have given us the authority but did not obligate us to maintain his ditch.

## D. PLANNING

### 5. Research and Investigations

Squaw Creek NR79--The Natural History of the Western Massasauga, Sistrurus catenatus tergeminus (33560-1) by Richard A. Seigel, University of Kansas, candidate for PhD.

A final field-season report was received but the dissertation is still being drafted. Following is a summary of work to date: Sixty-nine snakes were captured and processed in 1982, compared to 57 in 1981 and 42 in 1980. This represents a net increase of 21.0% over 1981 and 64.2% over 1980. The daily capture rate in 1982 was 1.86 snakes/day, compared to 1.43/day in 1981, and .96/day in 1980. Unlike 1981, when at least part of the difference in capture rate was attributed to the increased use of drift fences, it is likely that the increase this year is the result of an actual increase in the number of snakes present. No substantial change was made in field procedures in 1982, and the proportion of individuals captured in drift fences was virtually identical to last year (1982=13.8%, 1981=13.7%). These data, when combined with

information on age structure, suggest an increasing population size at Squaw Creek.



Rich Seigel checks the temperature of  
a garter snake along the tour route.

9/82 BH

Twelve stomach items or scats were recovered from massasaugas in 1982, more than doubling the available sample size. Of the 22 total items examined, 19 (86.3%) were mammals (Microtus or Peromyscus), and the remaining three were snakes (Storeria dekayi). Snakes were eaten only by juvenile massasaugas, and may form a major part of their diet. The feeding habits of Squaw Creek massasaugas are quite similar to Sistrurus in Pennsylvania and Wisconsin.

An extensive radio-telemetry program was planned for 1982 to determine if massasaugas migrated off the refuge in summer, and to locate hibernation sites more precisely. Owing to major difficulties with the telemetry company, only two individuals were equipped with transmitters this year. One transmitter failed almost immediately, and no data were obtained. In the second case, an adult male was followed for almost three weeks in mid-fall (September--October). The snake was intercepted at the northern edge of the moist prairie, heading south. Following its release in mid-September, it moved almost 200 meters due south, eventually establishing a home range about 150 meters south of the original capture point. Unfortunately, the snake was found dead in the prairie in mid-October, so no further data were recorded. A necropsy was performed on this individual by Dr. John Mulder (KU Animal Care Unit), but failed to discover the cause of death. However, it was judged unlikely that the transmitter was to blame.

An important consideration of this study was the effect of various refuge management procedures (mowing, burning) on Sistrurus populations. In 1982, burning of the central prairie (the primary habitat for massasaugas in spring and fall) was accomplished on April 21, well after the emergence of snakes from hibernation. A series of ten meters wide transects were walked through the prairie within three days after the burn, to assess the impact on massasauga populations. Two massasaugas were found burned to death in four transects walked. A number of additional snakes, mainly Nerodia (Natrix) were also found burned. The number of snakes killed by the fire is unknown; but may be substantial, since only a fraction of the area of the prairie was sampled.

Squaw Creek NR8--Waterfowl Mortality Rates at Squaw Creek National Wildlife Refuge (formerly, Non-Hunting Waterfowl Mortality on Squaw Creek National Wildlife Refuge) 33560-2 by Terry L. Miller, Northwest Missouri State University, Master's Thesis.

Waterfowl mortality from non-hunting causes has been estimated to claim twenty percent of the annual fall flight of eighty million ducks and geese in North America. In 1980, waterfowl mortality studies were initiated at several refuges in Missouri including Squaw Creek National Wildlife Refuge to further quantify these waterfowl losses. Specifically, the objectives were: 1) to develop an effective method of sampling for waterfowl mortality and 2) to determine the number and relative proportion of waterfowl (primarily ducks and geese) dying from various mortality factors. These objectives were selected to aid wildlife managers in detection and quantification of waterfowl losses.

Squaw Creek NWR, located near Mound City, Holt County, Missouri; encompasses 6,887 acres (2,789 ha). Approximately 2,000 acres (800 ha) consist of man-made marshland where significant numbers of waterfowl deaths have been observed each year. Peak populations of migrating lesser snow geese (Chen caerulescens) and mallards (Anas platyrhynchos) using the refuge may each exceed 250,000 birds. Also, private hunting lands completely encompass the entire refuge perimeter.

During the fall 1980 pilot study 30 quadrants 10x150 yds(9x137m) positioned with long axis perpendicular to the shorelines of refuge pools were searched to determine the areas of greatest waterfowl mortality. Transect routes between quadrants were systematically searched while traveling to quadrant sites to increase the sample size of necropsied ducks and geese. Quadrant and transect searches were conducted twice weekly using a three day interval for six weeks. A one day search of the entire study area was conducted after pools were frozen at the termination of the 1980 sampling season. In the fall of 1981 and spring of 1982, quadrants 20x100 yds(18x91m) were positioned with long axis parallel to shorelines and open water vegetation interfaces. Sixty-five of the 260 established quadrants were randomly selected and searched twice weekly using a three day interval for twelve weeks.

In the fall of 1980, 281 waterfowl were collected during quadrant and transect searches, which identified shorelines and open water vegetation

edges as the areas of greatest mortality. Fowl cholera was the most important mortality factor. An additional 391 scavenged birds were collected on the one day search of the entire study area. Lesser snow geese (385), mallards (263) and Canada geese (*Branta canadensis*) (18) were the primary species collected. Because of the relatively small area searched it was not possible to extrapolate these data to the total mortality.

In the fall of 1981, quadrant sampling produced 742 waterfowl carcasses with lesser snow geese (598), mallards (62), and Canada geese (26) being the primary species collected. Lead poisoning (40.1%), gunshot or crippling (37.4%), fowl cholera (11.7%), and aspergillosis (10.8%) were the mortality causes diagnosed for 222 of these carcasses from necropsy analysis. A scavenging rate was determined which indicated that approximately 75% of the waterfowl are eaten within three days after succumbing. Three extrapolation estimates indicated that approximately two thousand waterfowl died on the refuge during the fall of 1981. These calculations were minimum estimates of mortality due to severe weather, low visibility and scavenging factors that precluded determining the total magnitude of waterfowl losses.

In the spring of 1982, four weeks of searching for waterfowl mortality was unproductive possibly due to high water, favorable weather conditions and reduced mortality factors.

Although total numbers of duck and goose losses were not measured, the relative importance and seasonal variation of natural mortality was indicated. The techniques described in this thesis could provide a valuable sampling tool for managers.

## E. ADMINISTRATION

### 1. Personnel

Table 2. Personnel Ceilings FY 1978-82

	Permanent Full Time	Part Time	Temporary
FY 82	5	0	2*
FY 81	5	0	0
FY 80	6	0	0
FY 79	6	0	0
FY 78	6	0	0

\*Two 700 hour Biological Aids



#### 4. Volunteers

Volunteers were used to keep the refuge headquarters open Sunday afternoons from November 21 through December 19. A total of 22 volunteers from the Mound City Christian Youth Fellowship and the United Methodist Youth Fellowship worked 78 hours. Many positive comments were received because the headquarters was accessible on Sunday.

#### 5. Funding

Table 3. Funds status FY 1978-82

FY	1100	1210	1220	1230	1240	1400	1994	Total
1982		130,000	1,000		37,000		276	\$168,276
1981		115,000			37,000		1,500	154,500
1980		116,000			37,000			153,000
1979	300	116,000		1,000	42,000			159,300
1978	400	92,000	1,000	1,000	37,500	500		131,900

#### 6. Safety

There were no accidents during the year. Work days since the last lost time accident are 1,979.

One tort claim for \$237.99 was paid to a visitor because an open pipe gate slammed against his car during a high wind, scratching and denting it and breaking off the radio antenna.

One visitor claims to have been bitten by a small rattlesnake (massasauga) on November 7 when he picked it up to play with it, mistakenly thinking it was a bull snake. He was treated at Fairfax Hospital and released. The snake escaped. This was the first documented snake bite in the 48 year history of the refuge.

A safety program was held each month.

#### 8. Other Items

Several inspections and other visits occurred during the year as follows: Steve Frick visited the refuge in early April to discuss BLHP projects and expenditures as part of a servicewide inquiry. No report of findings was received.

A programmatic inspection of the refuge was made in May by a regional team lead by Harold Benson. The report was considered favorable toward present management direction.

A meeting was held at the refuge on 12/12 to discuss drainage problems in the Porter Creek/Todd Ditch drainage just north of the refuge.



Landowners in the area are wanting the government to take action to improve drainage on their cropland and hunting clubs. This is a problem that has come up several times in the last thirty years or so. The refuge still maintains that we are not responsible for the problem and that the best solution to the drainage problem is for landowners to organize a drainage district and drain their excess water into Squaw Creek north of the refuge. More is likely to come of this situation as landowners did indicate a desire to pursue the matter beyond the refuge manager's scope of authority.

Two regional engineers inspected south levees of Eagle and Pelican Pools in June as part of national emphasis on dam safety. They recommended that our dams be dropped from the listing of potentially dangerous.

Kansas City Area Office Administrative Officer made an administrative inspection of the refuge in July. No report of findings was received.



Heck takes Biologist Bob Oetting and Jerry Cummings for a closer look at the marsh in Eagle Pool.

8/82 KG

Regional and Area Biologists made a Wildlife Management Evaluation of the refuge in August. Some areas of disagreement in the report are being resolved.

The Regional Contracting Officer made an administrative audit in November. The report was very favorable.

## F. HABITAT MANAGEMENT

### 1. General



Topsoil deposited in July flood  
on Davis Creek by Cross Levee #3.  
7/82 BH

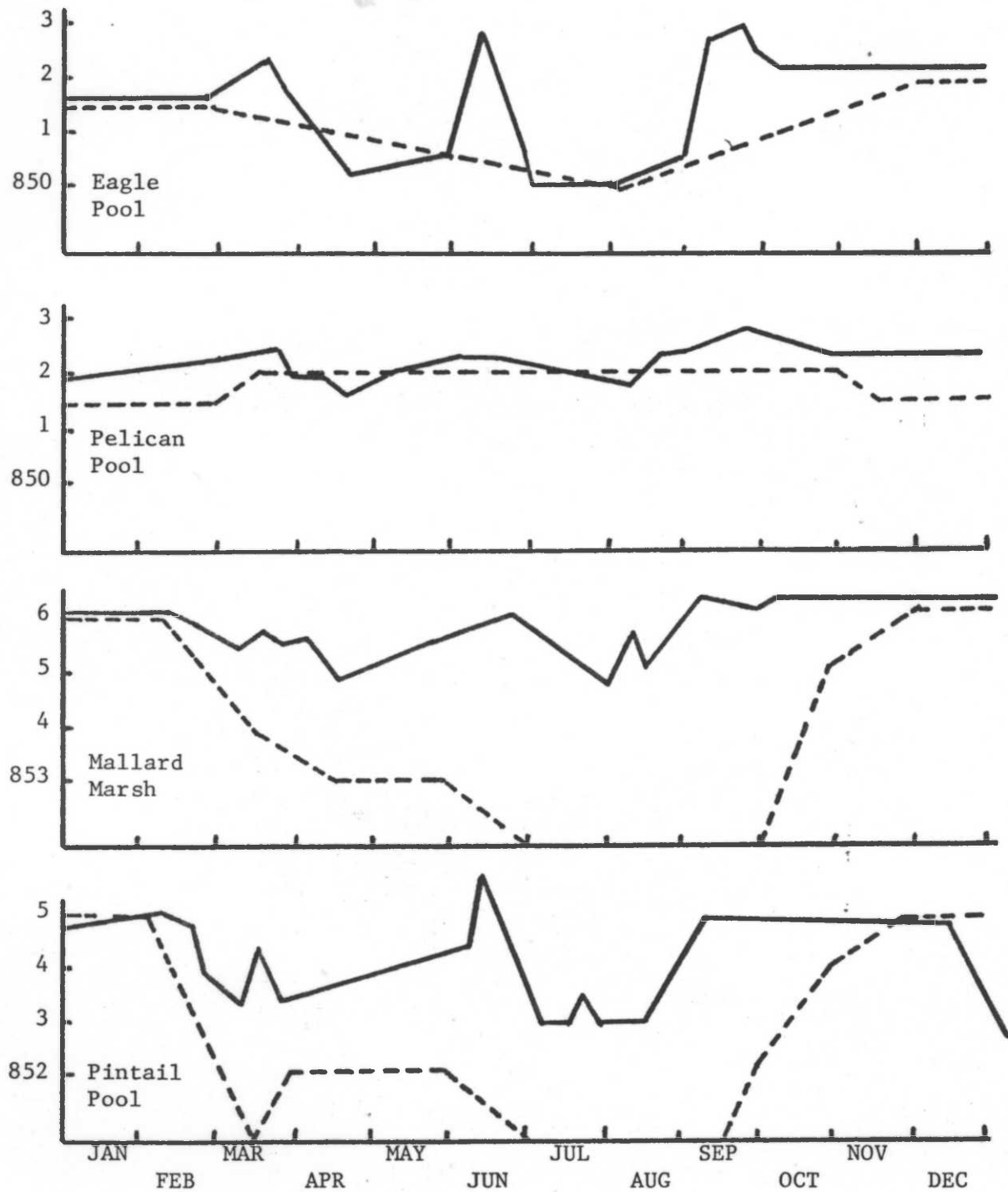
Overall, habitat conditions were fair to good; however, summer and early fall flooding did influence conditions considerably. Habitat management is accomplished primarily by water-level manipulation and prescribed burning and, to a lesser extent, by cropland management and haying.

### 2. Wetlands

A total of about 2,400 surface acres of wetlands are present on the refuge. These are mostly managed impoundments in which water levels are manipulated according to schedules set in our annual water management plan. Water management efforts this year were greatly hampered by heavy summer rains and resultant flooding. A graph depicting actual versus planned water levels in our four primary impoundments is shown in Figure 2.

In addition to these four impoundments which total 1,950 surface acres, three other managed impoundments (totaling 350 acres) and one unmanaged impoundment (120 acres) were available for wildlife usage.

Figure 2. Actual (solid line) versus planned (dashed line) water levels (m.s.l.) during 1982







Dike erosion north of Pintail Point where rip-rap project failed last year. 11/82 BH

The proposed plan for 1982 called for the maintenance of Pelican Pool (600 acres) at 852.0 m.s.l. for most of the year. This practice enabled marsh-adapted species such as yellow-headed blackbirds, blue-winged teal and king, Virginia and sora rails to use the refuge for nesting and migration. Maintaining Pelican Pool at this level also provides a reservoir of water which enhances our ability to manipulate water levels in the remainder of refuge impoundments and offers a degree of protection from summer or fall droughts.

Eagle Pool (900 acres), Mallard Marsh (250 acres) and Pintail Pool (200 acres) were scheduled for summer drawdown to promote moist soil plant production. Overall, production of moist soil plants was not good due to flooding during the months of June, August and September.

Snow Goose Pool (100 acres) was held high until late February when the water control structure washed out. The structure was repaired in late March and water was maintained at low levels throughout the spring to expose mudflats and promote use by shorebirds. Water levels were raised in the fall to promote waterfowl usage.

Cattail Pool's (130 acres) water control structure also washed out in late February and repairs were made in late March. Although efforts were made to manage this pool for moist soil plant production, flooding from Davis Creek greatly interfered with drawdown and reflooding schedules.

Long Slough (60 acres) receives all its water from rainfall and run-off. It was maintained at a relatively high and stable level throughout the year. This pool provides brood habitat in the central portion of the refuge during the summer.

Bluff Pool is essentially unmanaged and is maintained as a natural marsh. The only management action possible and the only one taken was to periodically remove beaver dams from the outlet channel in order to prevent flooding of private farmland.

#### 4. Croplands

This was the first year in a revised croplands management program. Cropland on the refuge totals approximately 800 acres, half of which is planted to corn and half to soybeans. Soybean fields are aerially sown to winter wheat (two bushels per acre) in September in order to provide green browse for geese. No insecticides were used in 1982.

Cooperative agreements which are renegotiated annually with four local farmers provide for a 66 2/3 percent cooperator: 33 1/3 percent refuge share division. Share division is based on actual crop yields and prices on September 1. Under this arrangement the cooperators receive nearly all of the soybeans and a portion of the corn, while the refuge receives its share in the form of standing corn and winter wheat. Although there will be annual variation due to changes in crop yields and prices, the outcome of this program is to provide the refuge with approximately 400 acres of green browse and 200 acres of unharvested corn annually.



Field A-3 with sprouted corn after flooding.

6/82 KG



Results of the program for 1982 are shown in Table 4. Wet weather precluded cooperators from planting all of their fields and reduced crop yields considerably. According to our cooperators yields were among the lowest in the history of the refuge.



Harvested soybean field (A-7) with aerially sowed wheat sprouted prior to arrival of geese. 10/82 BH



Same beanfield (A-7) with a few geese harvesting the wheat. 11/82 BH

Nearly all winter wheat was consumed by geese during the fall migration. It was seeded two bushels per acre which proved a little thin. Geese fed in harvested cornfields but did not feed in unharvested fields. Plans are to shred standing corn in the spring to provide a food supply during the spring migration. At this time it appears that deer and other resident wildlife will consume fifty to seventy percent of the standing corn prior to the spring waterfowl migration.

It is commonly asked why snow geese do not go into standing corn. There are exceptions such as when snow cover is deep late in winter and someone has neglected to complete his combining. But with very few exceptions, snow geese are not found using standing corn in this area. Reasons given are that geese are birds of open areas and they feel unsafe where they could be ambushed by a predator. Also they have problems taking off with their 4-5 foot wingspan. But another reason is that they are not tall enough to reach the corn hanging on the stalk so there is no reason to enter such an area.

Table 4. Crop yields for 1982 farming program

Cooperator	Soybeans		Corn		Refuge share acres (bushels)	
	Acres	Average Yield	Acres	Average Yield	Corn	Soybeans
Maley	187.8	25.0	192.2	65.5	94.3 (6,186)	5.3 (133)
Tenney	124.7	19.6	151.5	60.0	64.7 (3,882)	
Loucks	52.0	25.2	51.4	110.0	21.3 (2,343)	
Whipple	12.0	27.8	15.1	126.0	4.3 ( 542)	
Totals	376.5	23.3	410.2	71.3	184.6(12,953)	5.3 (133)

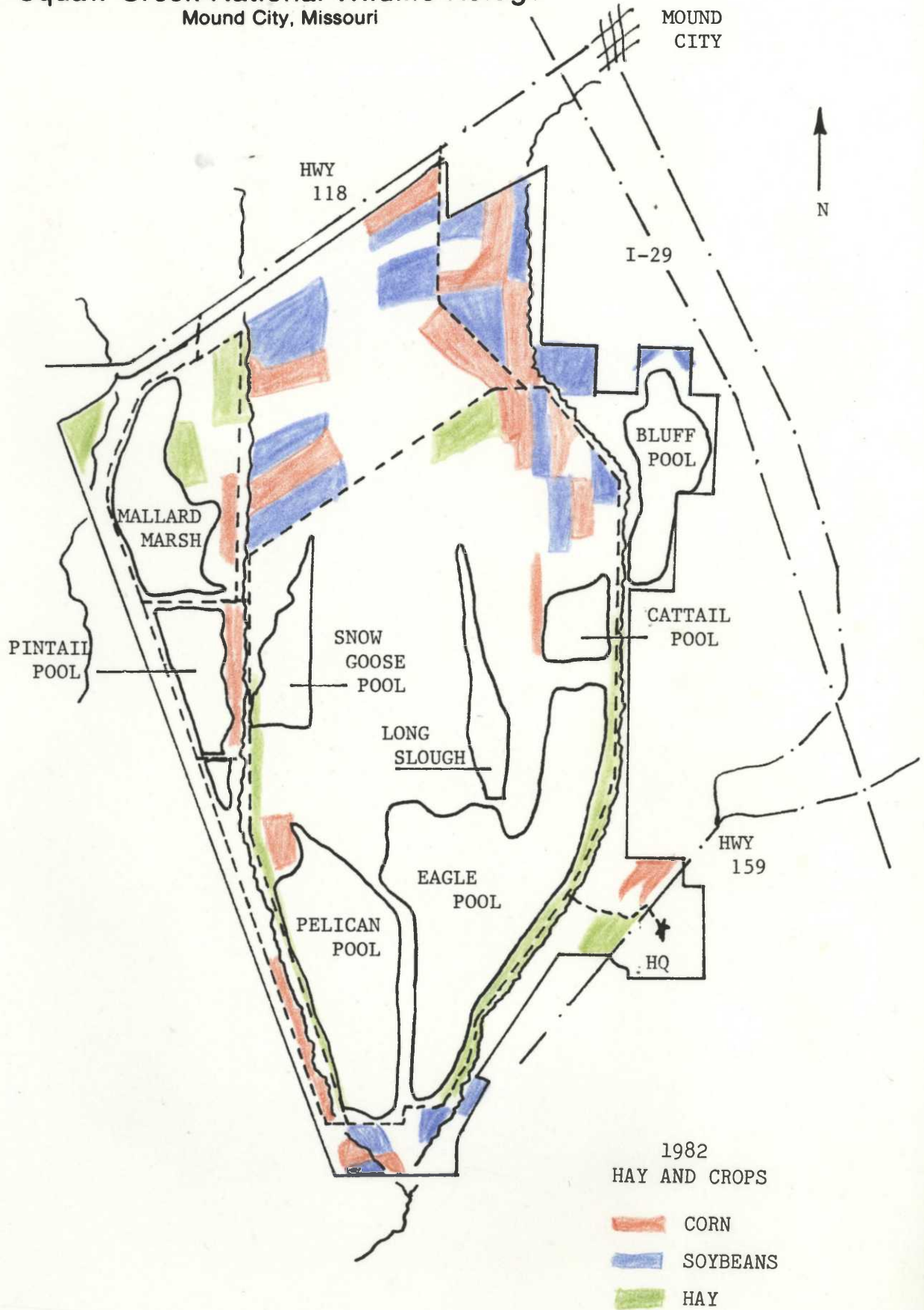


Ears on standing corn are too high off the ground for snow geese to reach unless snow is piled up. 12/82 BH



# Squaw Creek National Wildlife Refuge

Mound City, Missouri



## 5. Grasslands

The central prairie on the refuge, encompassing about 1,000 acres, is a lowland cordgrass type that is typical of this area prior to settlement by Europeans. Typical of the ecosystem are the abundant ant mounds scattered throughout (see picture in F-9). Refuge personnel have always called them "Allegheny ants" but no more was known. Dr. Dubois from Washington, Illinois recently classified them as Formica montana and wrote the following information:

"Formica montana Emery, 1893, ranges throughout north central North America. It has been reported from the following states and one Canadian province: Ohio, Wisconsin, Illinois, Minnesota, Iowa, Manitoba, North Dakota, South Dakota, Nebraska and Kansas."

"Therefore, its presence in northwestern Missouri is not unexpected. This ant is a prairie species which nests in earthen mounds (often in natural hummocks) which are commonly covered with grass. The size of the mound varies greatly depending upon age of the colony, number of workers and other factors. This species is unusual in that it is one of the few species in the Formica fusca group which occasionally uses thatching. Nests are most common in grasslands and are rarely found in woods. This species often constructs larger mounds in wet prairie so the ants can keep their brood above the water table."

## 8. Haying

Haying was conducted by two cooperators during 1982. Under conditions of one permit the cooperator receives the first four cuttings of alfalfa hay free to reimburse him for labor and supplies needed to establish the initial stand. After the fourth cutting the cooperator pays \$5.00 per ton for additional hay. A total of approximately eighty acres of alfalfa was involved in this permit with about forty acres of the alfalfa being along the refuge tour roads. Roadside seeding saves fuel and staff time by having the areas hayed rather than having it mowed by refuge staff. It stays green longer than other grasses and coots, deer, pheasants and other wildlife use it extensively for food.

The other haying cooperator harvested fifteen acres of native grass hay (74.78 tons) at a rate of \$5.00 per ton from a field of predominately Indian grass and switchgrass near the main entrance road (field A-2). Indian grass and switchgrass had become so dense that very limited use of the field was being made by wildlife. Hay was cut in 150 foot wide strips leaving six inches of stubble in order to diversify habitat in the field. While this has increased wildlife use of the fields, 150 feet is considered too wide so future openings will be about fifty feet in width.





Large bales of hay in the strip-mowed prairie grass field  
west of the headquarters. 10/82 BH

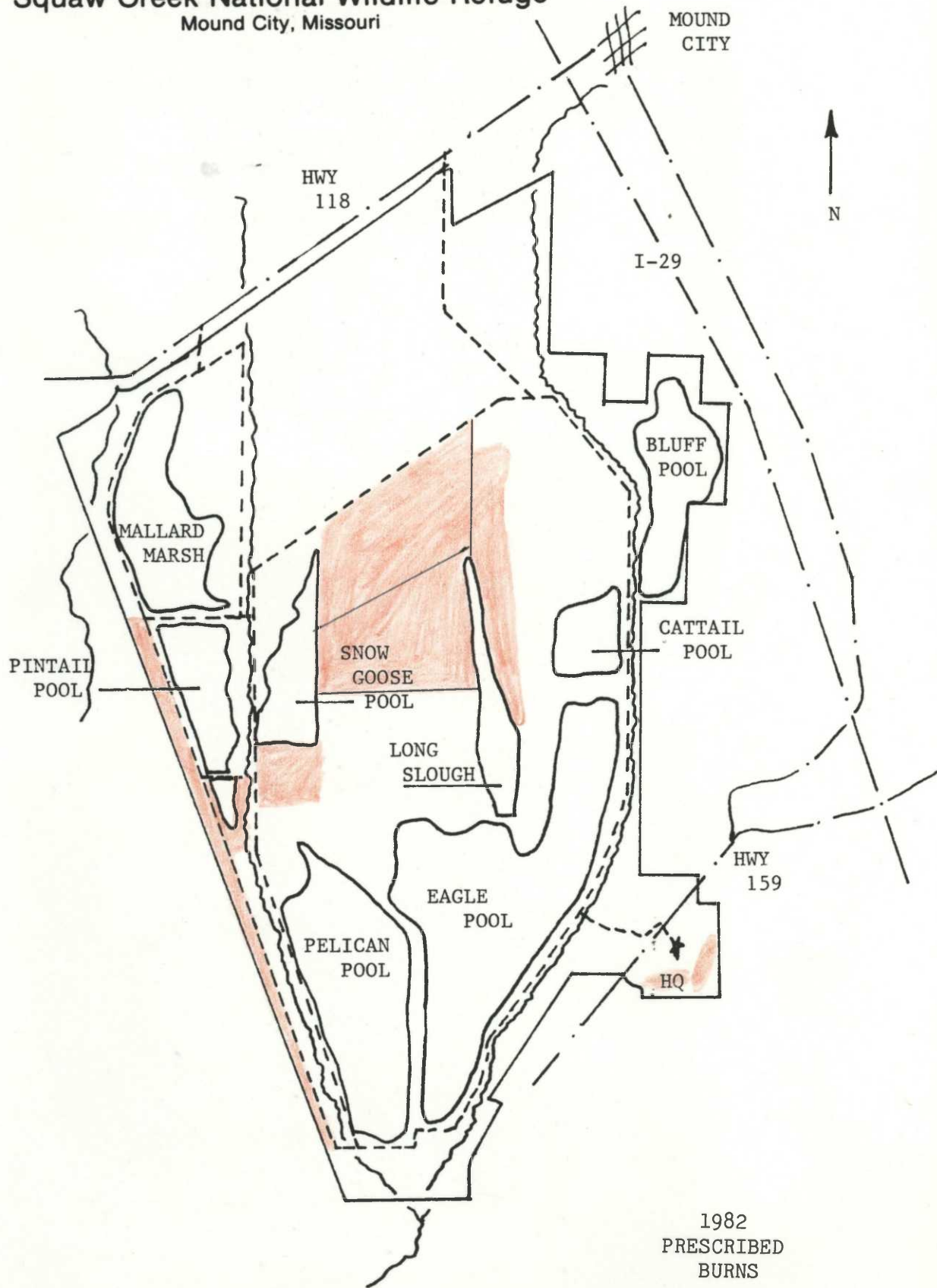
#### 9. Fire Management

No wild fires occurred on the refuge during 1982. Several prescribed burns were conducted during the spring and results of all burns were good. A description of these burns follows:

- 1) On April 14 several small native grass remnants were burned in the bluffs east of the headquarters in order to retard invasion of woody plants, especially rough-leaved dogwood which is very prolific in this area.
- 2) On April 21 the central prairie area (burn units 3, 4 and 7) was burned to kill invading willow and cottonwood trees and maintain the native cordgrass prairie with its variety of plant and animal species.
- 3) On April 23 a thin strip of land along our western border (between the railroad and the auto tour road) was burned to kill invading willow and dogwoods. Kill of these woody species was excellent and a dense growth of prairie cordgrass resulted. This area also harbors the best example of lowland prairie forbs on the refuge. It is the only place where compass plant (Silphium) can be found on the refuge.

# Squaw Creek National Wildlife Refuge

Mound City, Missouri







The north-central cordgrass prairie after a burn, picture looking south from Cross Levee #2. The ant mounds are built by the species Formica montana and are common in the prairie.  
4/82 BH



A couple weeks later, the results of the burn. Objective was to kill encroaching brush (dogwood, willow, cottonwood).  
5/82 BH

## 10. Pest Control

Control of plant pests by refuge personnel consisted of spot spraying with Roundup about two acres of thistles and several very small patches of Johnson grass along the refuge tour route.

## 12. Wilderness and Special Areas

The 100 acre Loess Hills Research Natural Area (G8 aeolian land form) and the 250 acre Bluejoint-Sloughgrass Prairie Research Natural Area (K-73 northern cordgrass prairie) are the only areas included in this category. The cordgrass prairie was burned in late April to enhance vegetation composition.

# G. WILDLIFE

## 1. Wildlife Diversity

Squaw Creek National Wildlife Refuge contains a diversity of habitat types and consequently a diversity of wildlife species; 292 species of birds, 34 species of mammals and 35 species of reptiles and amphibians have been reported from the refuge. Management efforts at this refuge are designed to maintain habitat diversity. The primary natural process which tends to reduce habitat diversity is the invasion of woody plants (particularly willows and cottonwoods) into wetlands and open grasslands. This woody invasion is being countered by management techniques such as prescribed burning and mowing.

## 2. Endangered and/or Threatened Species

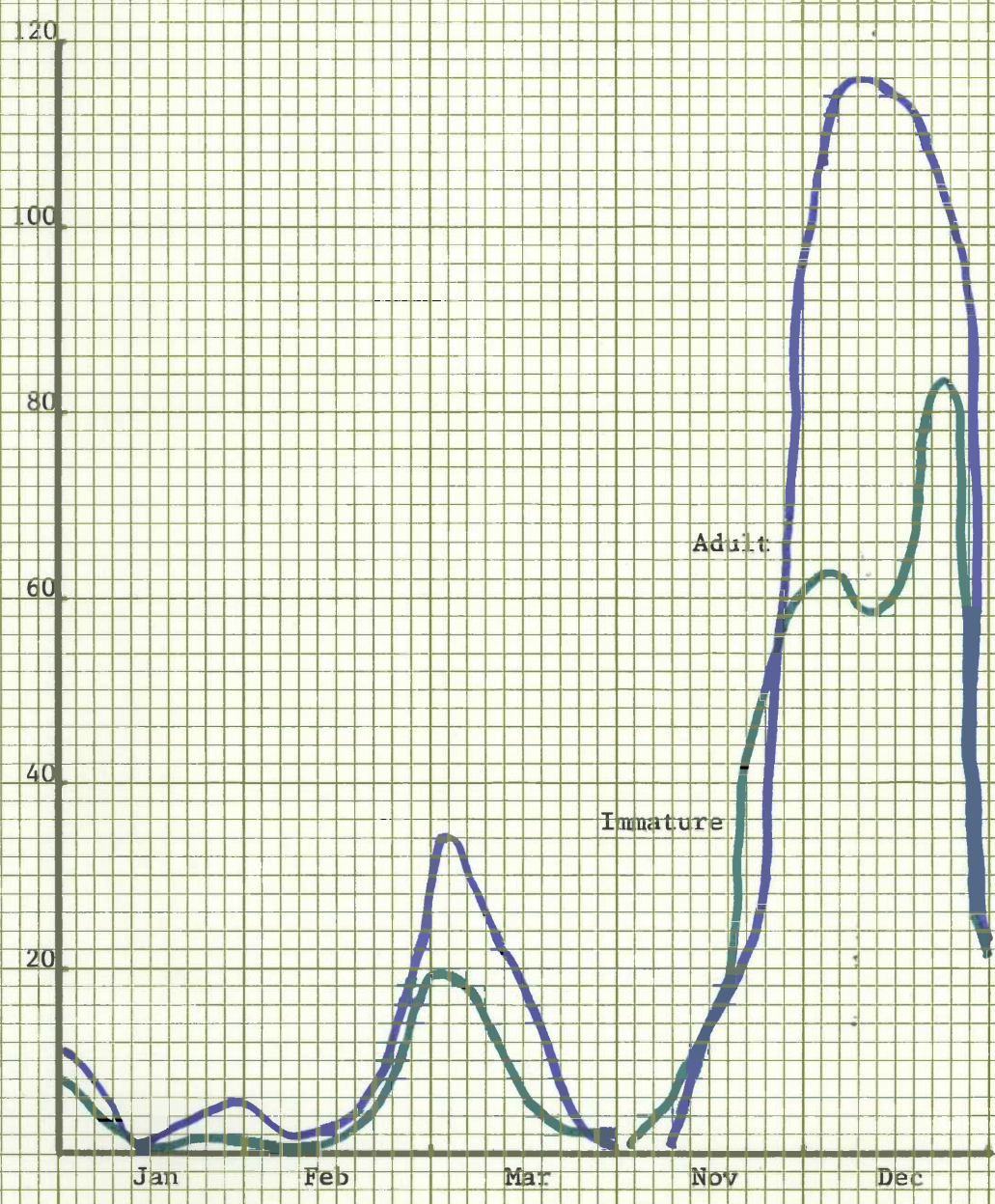
Two federally endangered species occur on the refuge. Peregrine falcons are occasionally observed during spring and fall migrations; however, none were observed during 1982. The other endangered species, the bald eagle was present during the months of January through April and October through December.

The year began with all impoundments frozen over, no waterfowl present, and relatively low numbers of eagles present. During January and February numbers fluctuated between two and fifteen and averaged seven birds. Eagle numbers along with waterfowl numbers began rising the last week of February. Spring bald eagle numbers peaked at 55 on March 1 and declined to nine by March 15. The last eagle of the spring was observed on April 12.

Fall bald eagle numbers are shown in Figure 3. The first eagle was observed on October 18 and a peak of 183 was counted on December 20. Habitat conditions for eagles were excellent and mild weather resulted in a higher than usual number of eagles staying through the end of the year.



Bald Eagle Numbers in 1982



FP/LOW-10 X 10 TO 1 INCH  
10TH LINE HEAVY



Wintering Bald Eagle Populations on Squaw Creek NWR  
(1979-1982)



FP-100-10 X 10 TO 1 INCH  
10TH LINE HEAVY

The refuge contains several species of animals classified as rare or endangered by the state of Missouri. The central prairie area harbors the last known stable population of massasauga rattlesnakes in Missouri. Massasaugas, which are classified as rare, seemed to do well this year and apparently the rainy summer provided excellent habitat conditions for them. Mammals include the long-tailed weasel (rare) which is a rare resident of the refuge and the mountain lion (endangered) which has been sighted by several reliable observers in past years. We neither saw nor received any reports of either of these mammals during 1982. Occurrence of Missouri rare or endangered birds on the refuge during 1982 is given in the following table.

Species	Missouri Status*	Occurrence at Squaw Creek NWR during 1982
Double-crested Cormorant	E	Common spring and fall migrant; peak of 250 on 5/3
Sharp-shinned Hawk	E	Uncommon spring and fall; peak of 2 on 10/5
Cooper's Hawk	E	Rare, one bird reported on 4/12, 4/19, 11/8 and 12/13
Red-shouldered Hawk	E	Not observed during 1982
Marsh Hawk	E	Present during spring, fall and winter but much reduced, peak of 3 on 4/19 and 12/13
Osprey	E	Rare, one bird reported on 4/12
King Rail	R	Not observed in 1982
Upland Sandpiper	R	Not observed in 1982
Least Tern	E	Observed on three occasions in August and September, peak of 6 on 9/6
Barn Owl	E	Two in release program
Henslow's Sparrow	R	Not observed during 1982

\*E = Endangered, R = Rare





Bald eagles concentrate within easy camera range of  
the tour route. 12/82 KG

### 3. Waterfowl

A summary of monthly waterfowl use days for the year for major waterfowl species is provided in Table 5. Waterfowl use of the refuge occurs primarily during spring and fall migrations with very little production here. Approximately 25 million waterfowl use days were recorded during 1982 with 24 million use days occurring during October through December. A summary of the use days for ducks and geese is given in Table 6.

Table 5. Monthly Waterfowl Use Days (selected species or groups)

Month	Snow Goose	Canada Goose	Mallard	Pintail, Gadwall and Wigeon	BW and GW Teal
January	0	0	10	0	0
February	21,000	340	1,820	10	0
March	310,000	7,967	120,900	21,855	5,735
April	60,000	450	24,000	11,400	18,750
May	10	0	610	20	9,486
June	10	0	600	0	1,200
July	0	0	610	0	930
August	0	0	1,350	10	1,580
September	1,800	720	6,000	1,110	24,300
October	1,147,000	101,370	155,000	710,675	105,090
November	9,730,000	492,300	3,670,000	542,550	48,600
December	4,260,000	112,200	2,850,000	4,770	0
Total	15,529,820	715,347	6,830,900	1,292,400	215,671



Table 6. Waterfowl Use Days (millions) at Squaw Creek NWR

Year	Snow Geese	Other Geese	Mallards	Other Ducks	Total Waterfowl
1982	15.53	.84	6.83	1.51	24.71
1981	18.17	.66	6.21	3.16	28.20
1980	5.72	.73	7.14	3.66	17.25
1979	7.23	.37	10.12	4.34	22.06
1978	13.23	.63	11.82	1.81	27.40

The year began with very cold weather and all impoundments being totally frozen over. No waterfowl were present during January or the first two weeks of February. The spring migration was brief and waterfowl numbers were low. Spring peaks for geese were as follows: snow geese--110,000 on 3/8, Canada geese--465 on 3/8, and white-fronts--241 on 3/15. Twenty different species of ducks visited the refuge during the spring with the dominant species being mallards which peaked at 7,790 on 3/29.

The most controversial species of waterfowl using the refuge is the snow goose. Fall use is of special concern due to the possibility of affecting natural migration patterns by providing their needs this far north. Table 7 shows trends in the mid-continent snow goose population during the past five years.

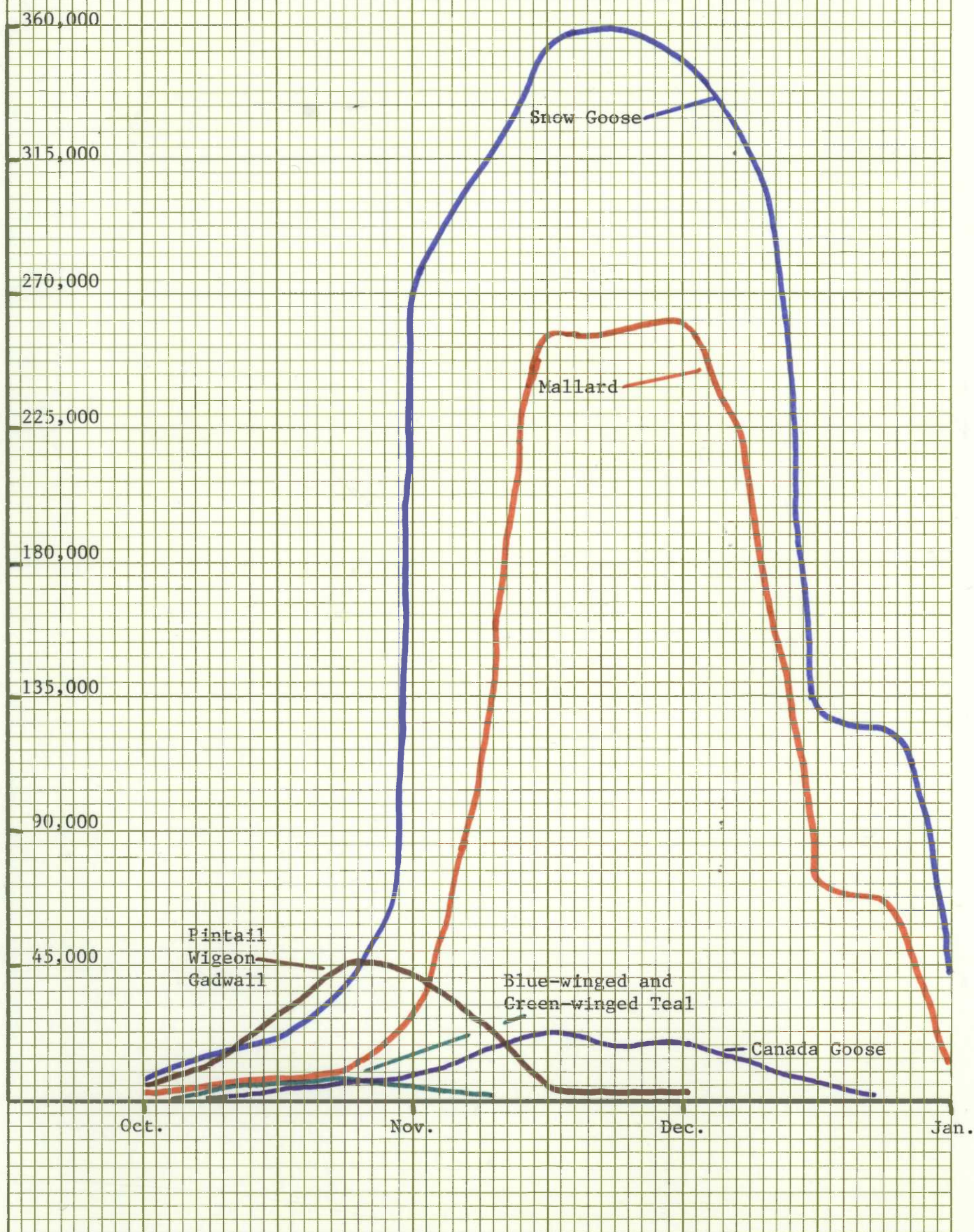
Table 7. Snow Goose Trends

Year	Refuge Peak	Mid-Continent Population	Refuge Productivity % immature	Census young/family
1978	285,000	1,286,000	37.5	1.8
1979	170,000	1,400,000	54.2	1.3
1980	150,000	1,408,000	26.0	1.7
1981	310,000	1,795,000	42.0	2.6
1982	360,000	1,792,000	31.5	1.7

Waterfowl production in 1982 was normal with approximately thirty mallards, forty blue-winged teal and 125 wood ducks reared to flight stage (Class "D" data).

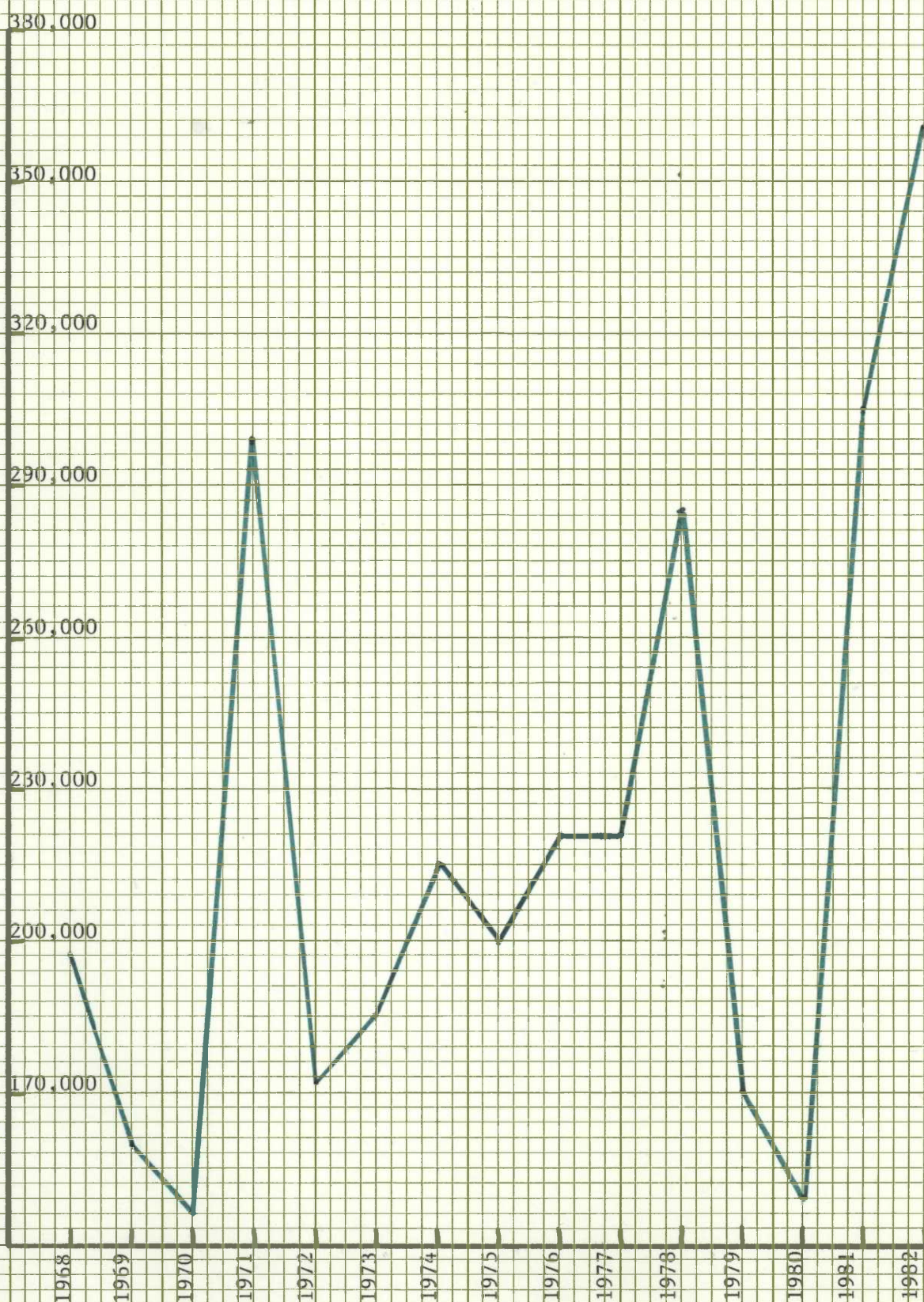
The fall migration was near normal for ducks and abnormally high for geese. Table 5 shows monthly use days and the attached graph shows average weekly populations for certain species or groups. Mallards were near normal and peaked at 260,000 on 11/29. Pintails and teal were rather low for the fall but other dabblers were present in near normal levels. Higher than usual numbers of redheads (peak of 200 on 11/1), canvasbacks (peak of 100 on 11/29) and ring-necks (peak of 900 on 11/15) and lower than usual numbers of lesser scaup characterized the divers.

Weekly Peak Populations for Major Waterfowl Species  
(Fall 1982)





Squaw Creek NWR Snow Goose Peak Populations  
(1968-1982)







Snow geese used Eagle Pool extensively this year.

12/82 BH

Goose use of the refuge this year was abnormally high for all species. Snow geese were a little late in arriving with large numbers not arriving until the last few days of October. From November 1 to December 9, 270,000 snow geese were present and a peak of 360,000 was present on 11/22. By 12/13 numbers had dropped to 130,000 snow geese but mild weather resulted in 40,000 snows remaining to the end of December. Fall Canada goose use was nearly double what has been observed here the last several years with a peak of 21,500 recorded on 11/15. White-fronted geese were here in higher numbers and for a much longer time than usual. A peak of 2,500 was recorded on 11/8 and a total of 97,000 use days occurred.

Whistling swans are relatively rare visitors to the refuge; however they were present during the fall of 1982 as in 1981. A family group of three adults and two immatures were present from 11/11 through about 11/25. Two adults (believed not to be members of the previous family group) were present from 11/29 through the end of the year.

#### 4. Marsh and Water Birds

The most abundant birds in this category are the pied-billed grebe, white pelican, great-blue heron, and sora rail. Pied-billed grebes were at normal levels with a spring peak of 65 on 4/19 and a fall peak of 125 on 10/15. White-pelicans were near normal in the spring with a peak of 2,500 on 4/19 but numbers were rather low for the fall with a peak of 1,000 on 9/20. Great blue herons were common except when



refuge pools were frozen over; however, they do not nest here. They were present in unusually high numbers in late July and early August when approximately 150 were present. Sora rails were common with a spring peak of 175 on 5/3 and a fall peak of 100 on 10/1.

Two other species in this group, least bitterns and cattle egrets were present this year in higher than normal numbers. Least bitterns were common during the summer and peaked at 30 during August. Cattle egret numbers were much higher than normal this year and they were present primarily in late September and early October. One migrating flock estimated at 350 passed through the area in the first week of October.

#### 5. Shorebirds, Gulls and Terns

Shorebirds were abundant during the spring migration with thirty different species recorded. Peak use was in the last two weeks of April and the first week of May. Snow Goose Pool provided excellent habitat conditions for shorebirds throughout the spring migration. In contrast, the fall use of the refuge by shorebirds was very low. Sixteen inches of rainfall during August resulted in flooded refuge impoundments and abundant shallow water areas in farm fields throughout the Missouri River bottoms. These conditions resulted in shorebirds being dispersed over wide areas off refuge.

Eight different species of gulls and terns were reported in what was considered a normal or slightly below normal year. One laughing gull, listed as accidental, was recorded on 5/3.

#### 6. Raptors

A total of 24 different raptor species occur on the refuge. Several birds in this category; the bald eagle, peregrine falcon, osprey, barn owl and Cooper's, sharp-shinned, red-shouldered and marsh hawks are also covered in the section on Endangered Species.

Squaw Creek NWR is near the eastern limit of the golden eagle's distribution and they rarely occur here. During 1982, golden eagle numbers were near normal with occasional sightings during spring and fall. One immature golden eagle was found dead along the road about three miles east of the refuge in January. Necropsy by Madison Wildlife Health Lab showed the bird died from "blunt trauma", likely struck by a vehicle.

Overall, hawk numbers were low for the year. Red-tailed hawk numbers were similar to 1981 with a fall and winter population of fifteen to twenty birds as compared to a normal population of about twenty-five. Red-shouldered, broad-winged, Swainson's, and rough-legged hawks were not sighted at all during the year. Goshawks, which are rare here, were sighted several times during the fall.

Two raptors, marsh hawks and short-eared owls, are normally common here during the winter. In 1982 as in 1981 their numbers were extremely low. It is not known whether this is a result of reduced populations or a shift in migration patterns.



Immature golden eagle found dead by the road. 2/82 KG

Three owl species, screech, great-horned and barred nested on the refuge during 1982. Great-horned and barred owl numbers appear to be about steady; screech owl numbers seem to be declining.



Grannemann holds barn owl which was part of a reintroduction program here. 7/82 BH

Barn owls are an endangered species in Missouri and in 1982 two of them were released at Squaw Creek NWR in a cooperative program with the Missouri Department of Conservation. The owls were raised at Tyson Research Center, St. Louis and were provided to us by James D. Wilson, Missouri Department of Conservation's State Ornithologist. The two owls were about 8 to 10 weeks old and fully feathered when they arrived here on 7/21. For the first five or six days they were kept in a box fastened to the rafters of our old dragline shed and fed a diet of both dead and live mice. After that time they were released from the box and had free roam of the entire building. They fed on live white lab mice which were provided in a 4x8x4 foot open top enclosure left on the floor. Normally, the two owls consumed a combined total of seven mice per night and after about ten days they were fed only on alternate days (leaving fifteen mice every other day). All went well until 8/18 when one owl was discovered missing. A search of the building resulted in no owl and no signs of anything wrong. Several subsequent searches of the building during the next couple of weeks resulted in no sign of the lost owl. The screened opening to the outside of the barn was opened on 8/18 to allow the second owl free movement in and out of the building. Food was still provided until 9/6. This owl returned to the building on a fairly regular basis but visits gradually became more infrequent. The last time the bird was observed was on 9/5.

#### 7. Other Migratory Birds

The refuge hosts a variety of migratory and non-migratory birds. Their abundance and seasonal occurrences are shown in the bird list attached to the back of the narrative.

The annual Christmas Bird Count was held on 12/19 with only seven participants. A total of 70 species were observed with a record 15 species of ducks.

The annual mourning dove coo count was completed in March on a route southeast of the refuge approximately 40 miles away.

#### 8. Game Mammals

White-tailed deer numbers seem to be slightly higher than average with about 300 individuals this year. Following is a summary of the deer population in winter for the past five years:

1982--300  
1981--300  
1980--275  
1979--225  
1978--225

Census is performed by counting deer in fields in evenings and after dark and estimating beyond that. Approximately 55 deer were killed in auto collisions in the refuge vicinity during 1982 based on data collected by the Holt County Conservation Agent.

The cottontail rabbit population has expanded from near zero several years ago to relatively common now (approximately 1-5 sighted per mile of tour route).



## 10. Other Resident Wildlife

Pheasant populations are high on the refuge with an estimated population of about 800. Areas most commonly used in rank of highest to lowest are: 1) area south of Snow Goose Pool, 2) area around the Squaw Creek roller gate, 3) prairie grass field west of the headquarters, 4) north and west of Bluff Pool, 5) Cross Levee #2.

Quail numbers are extremely low with only two covies of about fifteen birds each known on the refuge, near Gilland Gate and the east end of Cross Levee #2. Several possibilities for the decline are possible; severe winters with deep snow cover the past few years, a very wet spring this year and/or spraying grasshoppers with toxaphene two years ago in the farming areas around the refuge.

Turkeys (eastern race) are present in small numbers in the bluffs behind the office. Although they move on and off the refuge, approximately twenty may be found at any one time.

Muskrat houses at the end of December numbered as follows:

Eagle Pool	263
Pelican Pool	307
Mallard Marsh	61
Pintail Pool	14
Snow Goose Pool	0
Cattail Pool	4
Long Slough	24
Bluff Pool	82
Total	<u>755</u>



Lynn Thurnau and helper pack a beaver dam in the Bluff Pool with dynamite.

4/82 BH





Water flow restored. 4/82 BH

There are three beaver lodges known on the refuge; two are causing problems. Two dams were dynamited in April to restore flow.

### 13. Surplus Animal Disposal

One beaver was trapped and donated to the Savannah Museum for mounting and display. A dead kestrel was also donated to the museum for the same purpose.

### 15. Animal Control

Several nuisance beavers were trapped from the refuge during the year. Ninety-one wildlife assistance calls were handled during the year including such things as geese in wheat, injured and dead deer, owls, hawks and other wildlife, coyotes in cattle and hogs, starlings, blackbirds, beavers, bear tracks that turned out to be dog tracks, and many others.

Propane guns were loaned out for the following purposes:

- 1--geese in soybeans
- 3--geese in wheat
- 1--need to signal start of Midland Empire Fair
- 1--pelicans in fish farm
- 1--raccoons in sweet corn
- 1--starling roost in St. Joseph
- 1--beaver
- 1--blackbirds in milo
- 1--starlings in hog barn

## 17. Disease Prevention and Control

Many raccoons died from distemper this year and carcasses were commonly seen early in the year. Some were killed when found staggering around the refuge in early spring. It is estimated that 100 died this year on the refuge.



Only six dead geese were retrieved from Pelican Pool during the time cholera was found in Iowa flocks. 12/82 BH

No major waterfowl disease was noted this year. Loss from gunshot, leadpoisoning, aspergillosis, avian cholera and other causes is estimated at approximately 1,200 waterfowl during 1982, ninety percent of which were snow geese. Estimates are based on numbers of cripples and dead observed during the year.

The only disease that causes great concern here is avian cholera. Some years hundreds of waterfowl, primarily snow geese, are lost almost overnight, but almost no cholera was noted in either 1981 or 1982. There have been several theories advocated for minimizing spread of this disease, but it strikes so quickly that the epidemic is sometimes over before you realize it has happened. One control method that has been suggested is haze and disperse the birds out of the area. This is a tough job and there is the possibility that new areas will become infected with the bacteria. So maybe it is better

to let the disease run its course and try to clean up carcasses if you can beat the eagles to them.

## H. PUBLIC USE

### 1. General

A variety of public use activities, most of which are directly related to wildlife, occur at Squaw Creek National Wildlife Refuge. The majority of public use consists of wildlife observation and other self-guided activities. Although many local residents visit the refuge we also have a large number of visitors from the metropolitan areas of St. Joseph, Kansas City and Omaha.

During 1982 an estimated 35,000 people visited the refuge. Highest visitation rates occurred during late fall weekends when mild weather and large flocks of snow geese were present. Many visitors also came to see deer, pelicans and eagles.

A discussion of various public use activities at the refuge is included in the following sections.

### 6. Interpretive Exhibits

Three bulletin board type interpretive exhibits are maintained at the refuge on a permanent basis. One exhibit is located near the entrance of the main tour road, the second exhibit is located in the headquarters area and the third is located at the entrance to Loess Bluff Trail. Another exhibit is maintained at the Missouri Transportation Department's rest area on Interstate 29 which abuts the northeast corner of the refuge. These exhibits, which are periodically changed, are designed to either acquaint visitors with the refuge or explain some facet of wildlife ecology.

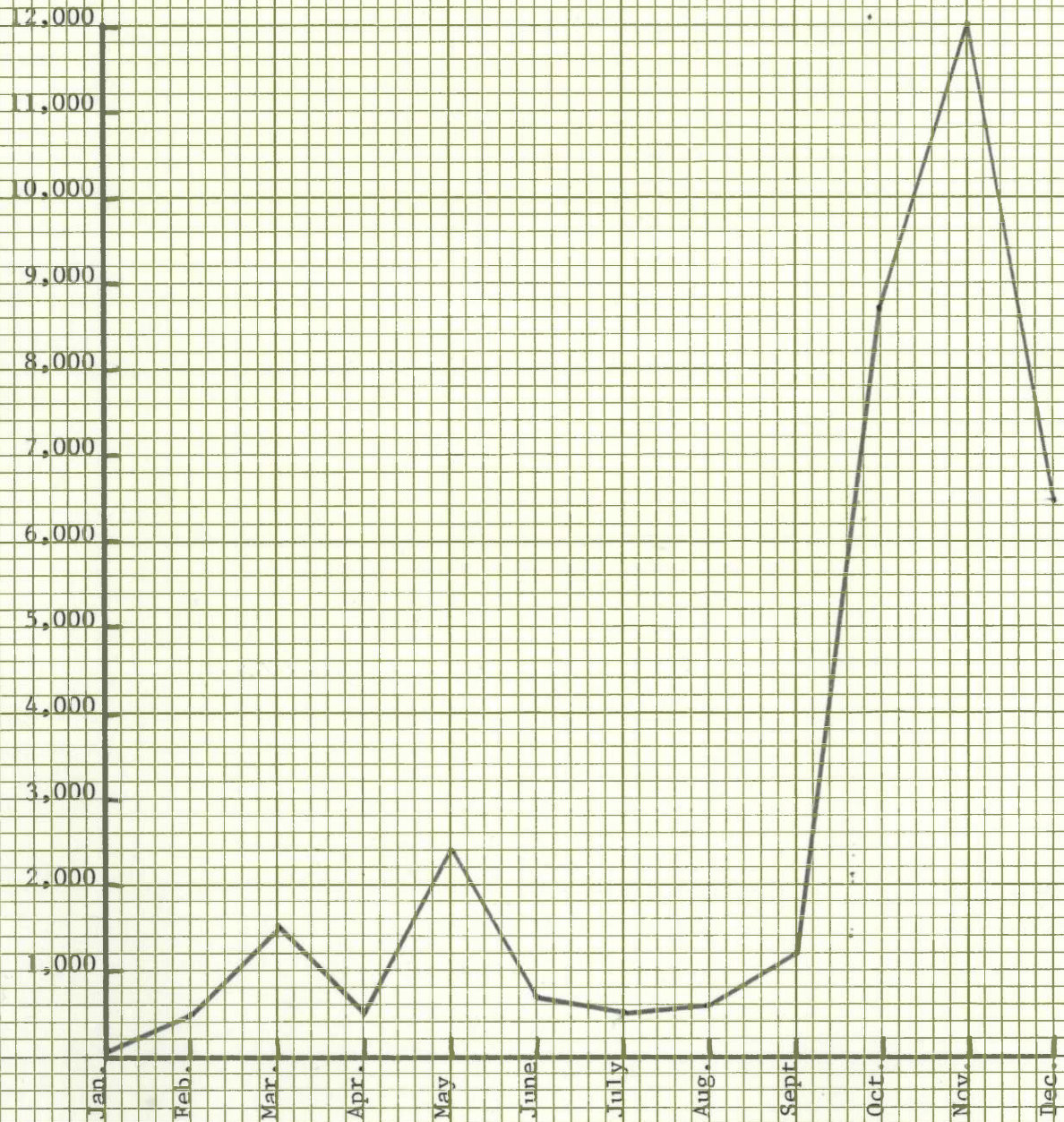
A second type of interpretive exhibit available to the public during regular office hours (8:00 a.m.--4:30 p.m., Monday through Friday) is the visitor contact area in the headquarters. Displays include maps, photographs, mounts of birds and mammals, etc. Refuge pamphlets are available for distribution and refuge staff members are available to answer questions.

### 7. Other Interpretive Programs

The major on-refuge interpretation effort has been in presenting slide talks to groups such as school classes, senior citizen's clubs, church groups and scouts. On-site programs were given to forty-six different groups (a total of 2,314 people) during the year with most of the programs being given at the same time of year as the spring and fall waterfowl migrations. Off-refuge slide/programs were given to fifteen different groups during the year (total of 613 people).



Total Visits to Refuge by Month--1982





A total of twenty news releases were issued during the year. Most of these were the "Squaw Creek Digest" which is a regular column published in the local newspaper. It informs the public about what we are doing and reduces much suspicion. It also stops numerous rumors and generally seems to increase support for the refuge.



Heck at "Evening With Wildlife" display at Mound City school.  
3/19/82 KG

A display was set up and manned at Mound City School March 19 as part of a program entitled "An Evening With Wildlife." It was during National Wildlife Week observances and the theme was "We Care About Eagles." The display was visited by approximately 250 people.

Refuge staff assisted in developing and staffing a display at the National FFA Convention in Kansas City November 10-12. More than 1,000 FFA members viewed the display.

Waterfowl identification posters were constructed and set up at the two commercial waterfowl picking establishments in the area to assist hunters in identifying their game.

The fifth annual "Eagle Days" programs this year were held on December 10 and 11 in cooperation with the Missouri Department of Conservation and Burroughs' Audubon Society from Kansas City. Friday was reserved for school groups and Saturday for the general public. Advanced training packets were sent to each school group and everything was "go" until Thursday night when an ice storm forced closing of all area schools on Friday. The program was presented several times that afternoon but it was generally a slow day. Saturday was a grand day and the public

responded well. The program consisted of a short film about eagles, then a talk by an employee of the Dickerson Park Zoo in Springfield which presently has one of the finest captive eagle breeding centers in the world. A captive eagle, trained to be handled, was also shown. Then participants were sent out on the refuge to observe wild eagles through binoculars and scopes manned by Audubon Society members. There were 170 eagles and 250,000 snow geese on the refuge at that time and 100 eagles were visible from the viewing site much of the day. A total of 1,050 participants went home happy.



Visitors view bald eagles on the refuge during the Eagle Day program.  
12/82 BH

#### 9. Fishing

The refuge is open to sport fishing all year with carp and bullhead being the common species. Refuge pools are too shallow to provide a great deal of sport fishing opportunity and, as a result, only about 205 people fished here this year. Bullfrogs are common on the refuge and are taken by some anglers during the late summer months. During snagging season, March to May, radial gates at the south end of Eagle Pool are opened slightly and provide great entertainment as carp ascend the stream from the River. Many carp in the 5-10 pound range are snagged providing a hefty fight and most people in this area eat carp.

#### 11. Wildlife Observation

Nearly every visitor to Squaw Creek comes to observe wildlife along the eight mile automobile tour route. It is an extremely high quality visit



due to the tremendous numbers and visibility of waterfowl, deer, eagles, pelicans and pheasants. It also provides more "accidental" bird sightings than any other location in Missouri so bird watchers find it extremely interesting.

In addition to the auto tour, a number of foot trails and six observation platforms are available to enhance viewing opportunities. The Loess Bluff Trail near refuge headquarters and the Pintail Point Trail near the center of the refuge are the two most popular trails.



Squirrels enjoying a meal in our picnic area..

11/82 BH

This fall some Boy Scouts contacted us for a conservation project. We asked them to construct a corn tree, among other work. They put it in the ground, drove spikes into it and then cut off the heads. Ear corn is impaled on the spikes. It has been very popular with the squirrels, birds and refuge visitors, but it requires daily replenishment of corn.

The wet summer and flooding caused problems on the auto tour this year, damaging it and restricting its use by the public during wet weather.



Walter clears debris left on the tour route by flood water.  
Picture made facing south about 1/4 mile south of County  
Road along Davis Creek. 7/82 BH

## 12. Other Wildlife Oriented Recreation

An activity that closely coincides with wildlife observation is wildlife photography. White-tailed deer are accustomed to visitors and many close up photos can be taken from vehicles as visitors travel refuge roads.

This year snow geese made extensive use of an area near the tour route on the west side of Pelican Pool. As a result many people had the opportunity to photograph snow geese at close range this fall. Wild flowers which attract visitors during spring and early summer months provide another popular subject for photographers.

Morel mushroom hunting on the refuge is very popular each spring and a few berry pickers try their luck here.

## 13. Camping

No established camping area is present on the refuge; however, special use permits are issued to allow primitive camping by scout groups. During 1982 twenty-one groups totaling 438 scouts camped on the refuge in designated areas near the refuge headquarters. Firewood is furnished by the refuge to prevent chopping trees and use of refuge restroom facilities is required. So far, things have worked relatively smoothly, and demand for the area has really grown.



#### 14. Picnicking

During 1982, an estimated 2,600 persons used the picnic area near refuge headquarters. Three grills and eight tables are available and are used quite extensively, almost always in conjunction with visits for wildlife observation.

#### 17. Law Enforcement

No record of cases was maintained at the refuge. Most violations were found outside the refuge during waterfowl hunting season and generally consisted of unplugged guns, duck stamps, etc.



Grannemann with 60 lbs. of marijuana he seized.

7/82 BH

On-refuge violations included some trespass and one marijuana case. Two lads were apprehended on the auto tour route by Grannemann on July 20th with about sixty pounds of green marijuana plants which they were planning to use for garden mulch. The federal magistrate took pity and fined each about \$100.

### I. EQUIPMENT AND FACILITIES

#### 1. New Construction

The headquarters constructed last year was lacking any site work, and finishing around the facility required a great amount of time. A



thirty-five foot flagpole was ordered and received, and then came time to raise it. With only Heck and Szelag present at the time, it loomed as a formidable task. However, with the aid of three refuge visitors, guy ropes and the nearby roof of the headquarters, it was raised without mishap on April 13.



Szelag assesses the situation. It wasn't easy as we figured to go from horizontal to vertical. 4/82 BH

Bids were received for the new shop/storage building (40'x100') and visitor parking and access work around the headquarters building. Bids were opened September 28 and Great Plains Construction Company of Omaha got the low bid at \$215,300. This is all BLHP money.

Sodding of the lawn around the refuge headquarters was finally completed force account when 300 yards were laid in October.

A rug for the wooden basement steps in headquarters was purchased and installed force account in January.

## 2. Rehabilitation

Two stoplog water control structures were reset after beavers burrowed beside them and washed them out. One was the Snow Goose Pool outlet where the beaver was shot and the other was the Cattail Pool outlet where two beavers were trapped.

A large hole washed through the Squaw Creek west levee one-fourth mile north of the Napier bridge was repaired in June. The floodwater and silt destroyed about four acres of newly sprouted corn.



June washout in the west levee of Squaw Creek one-fourth mile north of the Napier Bridge. 6/82 BH

Several large holes washed in the auto tour route along Davis Creek were filled in July. Beans and corn planted in the flood area were either ruined or severely stunted, reducing yields.



Washout of tour route along Davis Creek at Cross Levee #3. 7/82 BH





Grannemann mans the mop after a shower brought water into the basement. It came in above the panel boxes and ran down inside and outside the insulated wall. 7/82 BH

The leak in the basement wall of the headquarters was finally repaired by refuge staff after a year and a half of bickering with the contractor, and having a wet basement after every rain. After we dug down to where the pipes went through the concrete wall (about six feet down), we found that the holes had never been sealed before backfilling by the contractor.

Refuge roads received 1,240 tons of 1½ inch road rock in September and October at a cost of \$9,850.00. This figures at \$7.95 per ton which is normal. Rock here is all crushed limestone which is very poor quality as it grinds up in two years, but that is all that is available. We researched all other possible sources of rock in 1979 but transportation costs from other areas were prohibitively expensive for hauling in hard rock. Asphalt is not feasible at present.

The D-8 required repairs in October. New seals and bushings were installed in the "Hyster" cable control drum for \$650. The Farmall tractor with the front loader required transmission work in October.

The underground electric service line for the headquarters was rerouted in October to run parallel to the telephone line to the west to allow slope work on the hill east of the headquarters.

Rip-rap was hand placed around three water control structures in July to prevent rodent damage. Snow Goose Pool outlet, Cattail Pool outlet and one on old Squaw Creek berm.



Rip-rap was placed in the Penny Lake Slough emergency spillway to repair flood damage in September.

#### 4. Equipment Utilization and Replacement



Our old but favorite mower after Szelag finished cleaning, fixing and repainting it. 4/82 BH

The International cub lowboy tractor was cleaned, serviced and repainted in February.

The engine on the 1952 model Lima dragline developed an unrepairable problem when oil pump drive gears on the crankshaft sheared. That ends the career of the machine as the engine is obsolete and no parts are available. Money will not be spent installing another engine due to the age of the machine. An old Loraine dragline with broken boom was received from DeSoto Refuge July 30. It will be repaired and used for small jobs. An old Trojan wheeled loader was received in November from Swan Lake NWR.

A new Pacific fire pump was received in October and mounted on an old trailer to provide fire protection. A new Western fire pump was later received and we found that a duplicate order had been sent from Area Office and Washington Office. The Western pump will be sent to Mingo NWR.



New fire pump (Pacific) mounted on old military trailer.  
11/82 BH

#### 6. Energy Conservation

Heck met with a representative of Energy Conservation Consultants, Inc. October 10th to discuss possible energy saving ideas. A report was sent to regional engineers but nothing has been heard back.

The refuge fought for and finally got a wood burning boiler heat system included in the new shop contract.

### J. OTHER ITEMS

#### 1. Cooperative Programs

The big event on the refuge was a team of blackbird researchers from Denver Wildlife Research Center who stayed March 3-17 to mark blackbirds. Using a fluorescent taggant in linseed oil carrier and spraying after dark with a helicopter, they marked an estimated eight million birds or about one-third of the blackbirds roosting on the refuge at that time.

Subsequently, blackbirds were collected from all over the central United States and Southern Canada (we collected five per week for ten weeks, territorial males only. Early results indicated that of thousands collected all over the central United States and Canada, more than twenty-one percent had been marked here. Conclusions will be made later but we do have quite a blackbird roost.





DWRC personnel mix flourescent taggant in the  
linseed oil/diesel fuel carrier. 3/82 BH



Solution poured into spray tanks on the helicopter.  
3/82 BH



## 2. Items of Interest

Bill Hamilton, Engineering Equipment Operator, WG-9, retired January 22 after more than thirty years of federal service. He is finally getting caught up on his fishing.

A revenue sharing check for \$23,132 was delivered to the Holt County Court on February 22.



Heck presents revenue sharing check to county court members.  
2/82 KG

Heck and Grannemann participated in a snow goose workshop at DeSoto NWR in February.

Heck, Grannemann and Szelag attended Fire Training School (S190 and S130) at DeSoto NWR, February 23-25.

Grannemann attended Law Enforcement School (FLETC) April 13-June 23.

Heck met with Regional and Area Office personnel along with Missouri Department of Conservation personnel at Jefferson City, Missouri May 10-11 to discuss plans, programs and problems.

Heck attended Law Enforcement training at DeSoto NWR August 9-12.

Grannemann and Szelag gave blood August 10. Grannemann received a "gallon donor" recognition from the blood center.

All employees completed the Missouri State Highway Patrol defensive driving program June 28.

Heck and Grannemann completed the pesticide applicator course offered by Missouri Department of Agriculture in June and got Certified Public Operator Licenses.

### 3. Credits

Assistant Manager Grannemann completed Sections B and G, other Sections were completed by Manager Heck. Refuge Assistant Zeliff edited and typed this report.

## K. FEEDBACK

### 1. Bird Banding (Heck)

Recreational banding, i.e., banding for the sheer fun of it, is expensive, provides little information and can harm the species banded.

I do not know the cost per banded bird but consider costs of bands, shipping, permits, data collection, computer time and other incidentals and it must total very high.

Each year refuges receive a list of species banded and number of encounters. I can only find the list for 1974 banded and birds processed through August 1979. But look at the number of non-game birds banded and the number of encounters. It is almost useless to band them, 3,049 least flycatchers banded, no recoveries; 1,353 yellow-bellied flycatchers banded in 1974, no recoveries by 1979; 7,126 barn swallows banded, no recoveries. No hummingbird recoveries of any kind. Have you ever seen a hummingbird tangled in a mist net? It is pathetic. These small birds struggle until they become so entangled that they resemble a ball of string in the net.

A 1981 study by Queens University in Canada on the effects of netting and banding snow geese has shown significant weight loss with possible long term effects. And yet, falcons and other hawks are trapped over and over each year as they migrate, particularly on the East Coast. I once picked up more than ten dead immature herons and egrets around the perimeter of a rookery near Brigantine NWR, each with a shiny new band put there by members of a bird banding club from Philadelphia during a blitz on the rookery. I call them the "ring and fling" club. They band strictly for recreation, stressing their prey, with no comprehension regarding need or consequences of their efforts.

Now for my proposal: banding permits should be issued only to individuals with a valid study proposal for a particular species. Only that number of bands required to complete the study should be issued. Upon completion or termination of the study all unused bands should be returned to the Bird Banding Lab. Refuges and other government bodies should band only birds for which a quota is assigned; no opportunistic banding because it is expensive. Tell me if I'm wrong.

## 2. Refuge Direction (Heck)

Over the years I have been outspoken about the apparent apathy of administrative support people toward programs at field stations. It seems that now and then an administrative person gets so wrapped up in what he is doing that his job becomes an end with field stations put there to support his job. At a meeting at DeSoto NWR this year Bob Gilmore from our Washington Office addressed this problem and provided some insight when he said that only a few of the thirty people in refuges there had ever worked on a field station. It is a tough problem to solve because they likely have no concept about our efforts and problems. Instead of taking all those training courses each year maybe the money could be used to send them to a field station each year to help with posting, transects, law enforcement, census, cooperative programs, public use and others. This is what I consider reality.

## 3. Incentive Awards Program (Heck)

I have seen many people handsomely rewarded for doing what I would consider to be their job. Because we are paid by the hour and not by the job, it is not logical that someone can do extra work and get extra pay while being paid by the hour to do his regular job. I think a job well done deserves praise, written recognition and/or a good rating, but not extra cash. Before you ask; no, I have never received an incentive award, but I know I would feel the same if I had.

## 4. Things I'm Satisfied With (Heck)

There are a multitude of things going right but I wouldn't dare mention one because I may find out I'm doing it wrong.

## 5. Refuge Housing (Grannemann)

A subject that has sparked considerable controversy in the last year has been the present refuge housing policy which appears to be moving in a direction which will eventually eliminate refuge housing. As a resident of the house here at Squaw Creek NWR I see numerous advantages (both to the Fish and Wildlife Service and to the wildlife resources we are charged to protect and manage) to the continued stationing of an employee in the refuge house. The house is positioned on a hill that overlooks a major portion of the refuge including the equipment storage area, the main entrance road, the shop building, the headquarters building, and the picnic area. This provides an obvious security advantage and serves to deter potential burglaries, vandalism and poaching, etc. In addition, this position offers an excellent vantage point for viewing flocks of migrating birds. The wildlife observations made outside of regular working hours add considerably to our knowledge of wildlife use of the refuge.

Being located near refuge headquarters also reduces response time to calls concerning wildlife violations, road-killed deer, etc. It also makes it easier to make a middle-of-the-night trip out to our main water control structure which must be changed during or shortly after a thunderstorm in order to prevent potentially costly flooding problems. Living



near the main entrance road also allows for better service to visitors ranging from such simple things as providing general information or helping start a stalled vehicle to more complex problems such as assisting a visitor who has been bitten by a rattlesnake (this incident did occur here last fall outside of regular working hours).

Refuge houses are a beneficial element in the refuge system and they should be recognized as such. While outlays of large amounts of money for new houses or extensive rehabilitation should be carefully scrutinized (as are other such projects), I believe that in most cases the continued maintenance of existing refuge houses is a bargain (in most cases, one house per refuge would most likely be sufficient). In the case of the house here at Squaw Creek, for example, the annual income from rent is more than is needed for routine maintenance. Another economic advantage to the Service of maintaining refuge housing is that moving costs for occupants that change stations are much reduced because no realtors fees are involved. This not only saves dollars but also results in more diversified experience which upgrades employee abilities.

In summary, I believe that in general one refuge house per station should be maintained and a member of the staff should be required, not allowed, to live there. I fail to understand the trend away from refuge housing as eliminating refuge housing will detrimentally affect the Service as an organization, and more importantly the wildlife resources themselves.