

MINGO NATIONAL WILDLIFE REFUGE

Puxico, Missouri

ANNUAL NARRATIVE REPORT

Calendar Year 1994

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

REVIEW AND APPROVALS

MINGO NATIONAL WILDLIFE REFUGE

Puxico, Missouri

ANNUAL NARRATIVE REPORT

Calendar Year 1994

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3/28/95
Date

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4.3.95
Date

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4/13/95
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INTRODUCTION

Mingo National Wildlife Refuge is located in portions of Stoddard and Wayne Counties in southeast Missouri, approximately 150 miles south of St. Louis. It was established in 1945 under authority of the Migratory Bird Treaty Act as a resting and wintering area for migratory waterfowl. The refuge contains 21,676 acres and lies in a linear basin formed in an ancient abandoned channel of the Mississippi River. The area is predominately a bottomland hardwood swamp bordered on the west by the foothills of the Ozark Uplift and on the east by a terrace called Crowley's Ridge. Elevations along the top of these ridges range as high as 405' msl compared to the 340' msl elevation of the basin.

Historically, the Mingo National Wildlife Refuge area was a haven for wildlife before logging, drainage, and conversion to agriculture altered the area. Bankruptcy of the Mingo Drainage District in the 1930's set the stage for federal acquisition and subsequent restoration of the swamp and its productivity. Peak waterfowl populations of 125,000 mallards and 75,000 Canada geese have been recorded.

The refuge contains approximately 15,000 acres of bottomland hardwoods, 1,275 acres of cropland and moist soil units, 700 acres of grasslands, and 5,000 acres of marsh and water. There are 7 natural areas on the refuge and 99 identified archaeological sites. In 1976, 7,730 acres were designated as a wilderness area. The Mingo Job Corps Civilian Conservation Center with 224 enrollees is located on the southeast corner of the refuge.

Recreational activities such as fishing; waterfowl, squirrel, turkey, and deer hunting; canoeing; and wildlife observation are very popular on the refuge. Annual visitation to the refuge the past 5 years has averaged about 150,000 visits. Facilities available to the public include a visitor center, a cooperative association sales outlet, a 3/4-mile self-guided boardwalk trail, a 25-mile self-guided auto tour, four observation towers, picnic tables, and a picnic shelter.

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A. HIGHLIGHTS

- ▶Visitor Center Exhibits receive a major renovation (H-6,I-2).
- ▶Ditch 1 bridge replaced (I-2).
- ▶National Fishing Week activities in June again a success (H-2).
- ▶Viewing scopes were permanently installed at the quarry and boardwalk observation sites and were very popular (I-2).
- ▶Dragline was transferred from Cannon refuge (I-4).
- ▶Compatibility determinations required a major work effort (D-4).

B. CLIMATIC CONDITIONS

Climatic information for the refuge was provided by the U.S. Army Corps of Engineers at Wappapello Lake. The data collection point is located approximately one mile from the southwest corner of the refuge boundary.

1994 Weather Data

<u>Month</u>	<u>Actual Prec.</u>	<u>Normal Ave.</u>	<u>Max. Temp.</u>	<u>Min. Temp.</u>	<u>Ave. Temp.</u>	<u>Normal Ave. Temp.</u>
JAN	4.98"	3.50"	60°F	-06°F	29.8°F	34.4°F
FEB	3.16	3.29	75	12	37.7	37.9
MAR	3.48	4.53	76	23	47.4	46.1
APR	7.07	4.44	85	32	59.5	58.9
MAY	1.05	4.99	86	38	64.5	67.2
JUN	3.07	3.75	94	62	78.0	75.8
JUL	1.28	3.38	95	61	78.9	79.5
AUG	5.66	3.39	99	55	75.8	78.2
SEP	2.07	3.56	92	47	68.4	70.8
OCT	4.05	2.96	86	34	61.2	60.3
NOV	10.40	3.70	74	27	53.8	47.4
DEC	3.91	3.25	64	20	42.3	37.2
Total	50.18"	44.74"			58.1°F	57.8°F

The weather year began with all appearances of being a rough year. A snowstorm on January 17 dropped 8" of snow over an inch of ice. A March storm dumped 16 inches of snow. The rough beginning became a mild year. Temperatures were moderate throughout the remainder of the year. A wet fall facilitated flooding of moist soil units and decreased the need for pumping.

C. LAND ACQUISITION

4. Farmers Home Administration Conservation Easements

Status of all Farmers Home Administration properties is as follows:

Easements deeded to the Service:

<u>County</u>	<u>Owner Last Name</u>	<u>Original Last Name</u>	<u>Acreage</u>	<u>Type</u>
Barton	Achey	Lenz	42	riparian
Barton	Seltz	Reaves	50	riparian
Butler	Fuemmeler	Eaton	14	wetland
Butler	McGruder	McCombs	17	wetland
Butler	Petty	Petty	36	wetland
Cape	Hahs	Seabough	10	riparian
Cape	Wessell	Propst	30	riparian
Dade	Mareth	Decker	20	riparian
Dunklin	Fieser	Eaton	35	wetland
Lawrence	Mattledge	Mattledge	4	wetland
Perry	Hermann	Hermann	6	riparian
Ripley	Bliss	Asher	32	riparian
Stoddard	Kleffer	Kleffer	13	riparian
Stoddard	Moore	Crowell	19	riparian
Stoddard	Lynch	Lynch	29	wetland

Easement proposals under review:

<u>County</u>	<u>Original Last Name</u>	<u>Acreage</u>	<u>Type</u>
Butler	Trout	14	wetland
Dunklin	Morris	9	riparian
Stoddard	Pullen	5	wetland
Texas	Wagner	24	riparian
Vernon	Ast	84	riparian

D. PLANNING

2. Management Plan

Annual proposals for water management, trapping, and prescribed burning were submitted and approved. The Hunting Plan was revised, updated and approved.

4. Compliance with Environmental and Cultural Resource Mandates

To comply with the compatibility lawsuit settlement this station prepared 22 compatibility determinations, twelve Recreation Act fund assessments, and two environmental assessments (hunting and forest management). It was a major work effort. All current uses were found to be compatible.

5. Research and Investigations

Project Proposal No. 91556 Effects of Disturbance on Avian Use of Seasonally Flooded Wetlands. Gaylord Memorial Laboratory-University of Missouri conducted by Jeff Raasch under the Challenge Grant Program. Completion date is September, 1995.

Objectives:

1. This study will focus on how water birds are influenced by different types and intensities of human activities. The goal is to develop management guidelines to provide a better balance between the needs of wildlife and the needs of recreationists and others that interact with wildlife.

Pilot Study:

The pilot study was conducted during 1993 on four moist soil units located at Mingo National Wildlife Refuge. The pilot study verified Mingo National Wildlife Refuge as a suitable study area. Mingo provides multiple areas that can serve as study sites. Mingo's close working relationship with Gaylord Lab helps to more effectively control variables relating to habitat use.

Results:

The results from the pilot study suggest that the full study can be approached using similar experimental methodologies. Many flaws and problems were discovered during the pilot study that enabled a better designed study to be developed. Future studies on waterfowl and shorebirds can incorporate design features developed during the pilot study.

The full scale project was begun in 1994. The heron portion of the study was completed in August 1994, and data analysis is in progress. The waterfowl portion of the study was started in January 1995 and will continue through March 1995. Both portions of the study used similar time budget techniques which allowed for comparison of behaviors before, during, and after the disturbance. This data will be used to determine the cumulative effects and habituation to disturbance by waterbirds, and also determine any changes in the birds' normal life-cycle. These results, when completed, will allow managers to make informed management decisions on their areas.

Pilot Study:

Hooded Merganser Response to Interspecific Parasitism by Wood Ducks. being completed by Lia Bollman (UMC-Gaylord Lab). Emphasis was placed on hooded merganser nest success. Those nests were checked about every 10 days while wood duck boxes were checked monthly for an index of their success. We were able to check 89 of the 93 boxes on Mingo. There were 122 nest attempts made and broken down as follows:

	<u>Attempts</u>	<u>Successful</u>
Hooded mergansers	48	32 (67%)
Wood ducks	74	28 (28%)

These attempts produced 279 hooded merganser ducklings and 86 wood duck ducklings. New bands were placed on 10 hooded merganser hens and 21 wood duck recaptures.

Results: (Including Mingo and Duck Creek Nest Boxes)

Nineteen nests were monitored in the interspecific parasitism study. One nest was abandoned after eggs had been added, and one of the non-manipulated nests was abandoned. Eighty-nine percent of the nests successfully hatched ducklings. Thirty-seven percent of the nests were missing all of the added wood duck eggs by their hatch date. Forty-two percent of the nests retained some of the added eggs until the hatch date, and twenty-one percent of the nests retained all of the added eggs until hatch. Missing eggs were searched for in and around the nest box but no evidence was ever found to indicate the fate of these missing eggs.



E. ADMINISTRATION

1. Personnel



12 8 4 10 14
 11 2 7 6 5
 9 1

12/94 R. Peacock

<u>Name</u>	<u>Title</u>	<u>Grade</u>	<u>EOD Year</u>	<u>Type of Appointment</u>
1. Gerald Clawson	Project Leader	GS-12	1971	PFT
2. Terry Peacock	Refuge Operations Specialist	GS-11	1992	PFT
3. Charles Shaiffer	General Biologist	GS-12	1988	PFT
4. Raymond Portwood	Refuge Operations Specialist	GS-9	1991	PFT
5. Nancy Barnfield	Administrative Technician (OA)	GS-6	1991	PFT
6. Judy Plunkett	Biological Science Technician	GS-5	1985	PFT
7. Brenda Foster	Office Automation Clerk (transferred 5/1)	GS-4	1982	PFT
8. Phyllis Ford	" " " , EOD 5/1	GS-4	1994	PFT
9. Howard Shelton	Maintenance Work Leader	WL-8	1965	PFT
10. Douglas Siler	Engineering Equipment Operator	WG-8	1977	PFT
11. Clifford Ray Placher	Engineering Equipment Operator	WG-8	1988	PFT
12. Rudy Williams	Tractor Operator, RTD 5/2, furlough 11/13	WG-7	1991	CSFT
13. Bridget Jackson	Information Receptionist, Stay-in-School	GW-2	1992	TPT
14. Pete Sifford	General Maintenance (20 hr./wk.)		02/93	Green Thumb
15. Patrick Kincaid	Student trainee (Bio.Science) resigned 8/23	GS-4	06/12	Coop
16. Raul Vega	Natural Resource Camp Counselor (6/25-8/5)			University Appointment

Personnel actions during the year included the following:

►Brenda Foster transferred to the Job Corps Center on 5/1 as Secretary (Office Automation) for the Center Director.

►Phyllis Ford transferred from the Job Corps Secretary position to the refuge as Information receptionist (office automation clerk) effective 5/1.

The following table compares on board strength for the past 5 years.

<u>Year</u>	<u>PFT</u>	<u>PPT or Seasonal</u>	<u>Temporary</u>	<u>Total FTE</u>
1994	10	1	2	10.6 (authorized)
1993	10	1	3	10.6
1992	10	1	1	10.5
1991	9	2	1	10.1
1990	9	2	1	10.3

2. Youth Programs

There was no Youth Conservation Corps (YCC) program this year. Youth from the Sears Youth Center (a correctional facility) did assist with several projects including maintenance of handicap accessible hunting blinds and development of the handicap access to the Bluff road overlook viewing platform.

The Mingo Job Corps Center heavy equipment crew began development of a moist soil unit in Farm unit 4 at the north end of the refuge. Levee construction is approximately half complete and the culvert for the stoplog structure was installed. The Gritman Lake levee at the Job Corps Center was completed and the entire area reseeded. Major projects on Center included a rehab of the vocational training building used by the painters and maintenance trades. The weight room was rehabed as was the recreational building basement. Rehab of what used to be Dorm 3 into space for the dispensary and health services vocation was also completed.

The welding program fabricated some items for the refuge including a couple of the money vaults used in fee collection at refuge entrances. Job Corps students also helped with refuge cleanup, removal of tree stands, ecology days, etc.

3. Other Manpower Programs

The Green Thumb program continued. Green Thumb Worker Pete Sifford worked 20 hours per week all year. He was transferred to the Puxico school system in early January 1995. The duties of this position include keeping buildings, roadsides, and public use areas clean and litter-free, and assisting with light mechanic and carpentry projects.

4. Volunteer Program

A total of 2,364 volunteer hours were recorded in 1994 which is about the same as the year before. A local Audubon Society group provided assistance to visitors on Fry Bluff and Monopoly Lake overlooks during the spring and fall auto tours by assisting with eagle nest viewing. This adds a personal touch to the tours.

Most of the volunteer effort, however, is centered around special events such as Ecology Days and National Fishing Week. These events would not have been possible without volunteer help. Other volunteer projects included banding eagles in the nest, recording readings from water level gauges and traffic counters, assisting with construction and maintenance of handicap accessible trails and blinds, removing abandoned deer stands, picking up litter, checking wood duck boxes, and assisting with deer check stations.

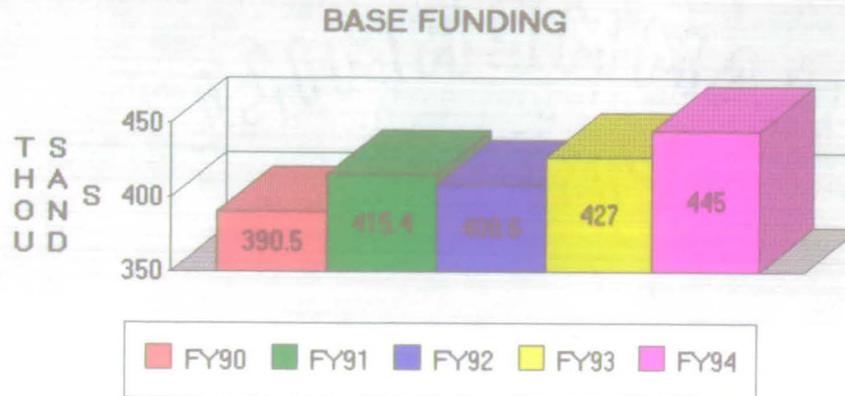


Refuge volunteers assist with National Fish Day Activities
6/94 Refuge Volunteer Charles Wilson

Refuge volunteer Charles Wilson updated and added to a flowering plant inventory of the southwest portion of the refuge and submitted a new report. His time was spent surveying and documenting the flowering plants in this area.

5. Funding

Base funding for the past 5 years was as follows:



Additional special funding over the last 5 years was as follows:

FY90	Flexible funding (regional additions)	\$ 43,000
FY91	" " " "	\$174,415
FY92	" " " "	\$152,696
FY93	" " " "	\$ 84,850
FY94	" " " "	
	Coop education	\$ 8,000
	Volunteers	\$ 1,350
	Watchable Wildlife	\$ 5,000
	Fire pre-suppression	\$ 800
	Non-game/neotropical (Univ. of MO study)	\$ 14,000
	Vision project	\$ 10,000
	Private lands	\$ 10,000
	Other-refuge operations (RH marsh project)	\$ 10,000
	Maintenance management	\$ 45,000
	" " (visitor center displays)	\$120,000
	" " (Stanley Creek bridge)	\$203,000
	Denver Job order project (Ditch 2 radial gate)	\$159,000

In addition, \$544 in "no year" funds were used for quarters maintenance (8610) and \$1426 for fee collection (4960).

Entrance fees

Entrance fees are collected March 15 through November 30. An honor system is used where visitors put money in an envelope and deposit it in a pipe safe at four refuge entrances. Permits are also sold at the visitor center.

The number of permits sold again declined. Although we do not keep records of number of envelopes deposited without money or with less than \$3, the number once again appeared to increase significantly. This may be partially explained by weather and the closure of the visitor center during the summer months.

Entrance Permits

<u>Type of Permit</u>	<u>Number*</u>	<u>\$ Receipt</u>
Single Visit	3432 [4862]	\$10,297.06 [13,944.78]
Group/Commercial	4 [2]	90.00 [50.00]
Golden Eagle	16 [9]	400.00 [225.00]
Golden Age**	52 [344]	520.00 [0]
Golden Access	44 [61]	0
Duck Stamp***	<u>277 [309]</u>	<u>\$ 4,155.00 [4635.00]</u>
TOTAL	3825 [6,729]	\$15,462.06 [18,854.78]

* Numbers in [] indicate 1993 totals

** \$10 fee was assessed for Golden Age permits in 1994

*** Station sales totals include stamps sold for waterfowl hunting

6. Safety

Safety meetings were held monthly with program responsibilities rotated among employees. Films available through the Minnesota Safety Council were shown each month.

No motor vehicle or personal injury accidents were reported during the year.

Station safety committee members were Project Leader Gerald Clawson (chairperson), Office Automation Clerk Phyllis Ford (secretary), and Engineering Equipment Operator Doug Siler (first aid officer).

7. Technical Assistance

The refuge continued to provide plans upon request for bird feeders, wood duck nest boxes, bird houses, etc. Judy Plunkett and Brenda Foster are certified as hunter education instructors and assisted the Missouri Department of Conservation with hunter education courses provided at the refuge visitor center in April, August and October. Charles Shaiffer responded to numerous requests for assistance related to moist soil management and private lands development.

The Natural Resource Conservation Service consults with the U.S. Fish and Wildlife Service on swampbuster provisions of the latest farm bills. The following is a summary of swampbuster consultations where minimal effect determinations were being requested.

<u>County</u>	<u>Consultations</u>
Butler	2
Dunklin	1
New Madrid	1
Pemiscott	1
Scott	6
Stoddard	6

A project involving mitigation banking for Swampbuster was carried through to completion in Butler County. The county Soil and Water Conservation District purchased a forty acre tract containing prior converted [PC] wetlands and allowed six landowners to "buy in". They then converted the PC land back to wetlands and in turn were allowed to convert farmed wetlands on their own property. There is a lot of interest in this and we anticipate seeing more proposals in 1995 which will not be limited to "farmed wetlands."

F. HABITAT MANAGEMENT

2. Wetlands

During 1994 Rockhouse Marsh was drawn down as planned. The one fourth mile of ditch 3 that was cleared of beaver dams, downed trees and silt during the 1993 drawdown improved drainage in 1994. During 1994 an additional one mile of ditch was cleared of debree, improving the management capabilities. Hopefully, with improvements accomplished during 1993-94 the ditch 3 drainage system improvements for Rockhouse will be completed during the summer drawdown of 1995.

Monopoly Marsh remained flooded as planned. The surface area of the marsh covered by American lotus remained at approximately 70 percent with no visual increase of reduction in stem density. Submergent vegetation increased apparently in response to water clarity improvement. The increase in water shield and water primrose plants and the expansion of giant rye cutgrass was also noticeable in 1994. This marsh provides excellent brood habitat for wood ducks and is a well-used waterfowl roosting area. The past two years has seen an increase of waterfowl observed feeding in Monopoly, particularly diving duck. This may be due to increased food resources as a result of water clarity and vegetation changes. (FLASHBACK - 1954 - The beginning of Lotus growth on Mingo National Wildlife Refuge)

The Stanley Creek impoundment was held at the upper limits to enter in a variation of water management.

The green tree reservoirs (Pool 5 and Pool 8) mast production was good in 1994. Waterfowl use of the pool area during winter was high due to the good mast production. Pool 5 will remain flooded

during the spring waterfowl migration period. This will provide important food resources such as invertebrates for use by migrating waterfowl.

Moist soil unit plant production was average with an estimated 1,100 pounds per acre. Water levels and habitat conditions are described in detail in the 1994 Annual Water Program.

3. Forests

The timber harvest initiated as a result of the 6/4/93 wind storm was continued in 1994. Additional trees were marked in the sale area or were scaled as they were hauled out.

The harvest operations on sales #93-1 (Stanley Creek Area) were completed mid-summer. John Jones Lumber Company was billed for an additional 119,973 board feet of lumber. He paid \$10,150.74 (70%) in cash. The remaining 30% (\$4,350.32) was provided in gravel for road rehabilitation. A total of 304,493 board feet of lumber was salvaged in this sale.

The harvest in #93-2 (Red Mill Drive) was completed in late summer. Additional trees were marked by Missouri Department of Conservation Forester Laura Wright and Refuge Operations Specialist Terry Peacock in May. John Jones Lumber Company was billed for 74,371 additional board feet of timber. This amounted to \$5,242.36 (70%) in cash with the remaining 30% (\$2,246.72) provided in gravel for road rehabilitation. A total of 252,718 board feet of timer was salvaged in this sale.

GU 12-1 (16 acres) was planted to white oak acorns March 29. In addition, the Bluff Tower Hill (3 acres) was planted with white oak acorns.



Logging crews completed the salvage timber harvest in late summer
3/94 TDP

4. Croplands

Refuge permittees cooperatively farmed 488 acres. Farming in Units 2, 3, 4, 5, 6, and 8 was done in a traditional manner using corn/milo in rotation with soybeans. The refuge received one-third of the corn which was left in the field. The permittee received all soybeans but also provided all the fertilizer and chemicals and planted wheat following soybean harvest. Wheat was not planted following the milo on fields 1 & 5 in Farm Unit 8. The farmer planted a soybean crop that was entirely depredated by deer. The milo followed the destroyed soybean crop. The farmer was allowed to harvest all of the milo in those two fields.

The wheat is intended for winter browse and was plowed down the following spring.

Moist Soil Unit 4 South was cooperatively farmed this year. The unit was planted in milo. The refuge received one-fourth of the crop which was left standing in the field.



Corn production was fair averaging 55 bushels per acre. Soybean production averaged 25 bushels per acre. Milo production averaged 70 bushels per acre. Wheat green browse production ranged from fair to good. Crop acreage by unit were as follows:

<u>Unit</u>	<u>Permittee</u>	<u>Acres Farmed</u>	<u>Corn</u>	<u>Beans</u>	<u>Wheat Planted</u>	<u>Milo</u>
2	W. Payne	100	43	57	57	
3	R. Walk	44		44	44	
4	G. Payne	35		35	35	
5	R. Walk	28	28			
6	G. Payne	105	28	55	55	22
8	G. Payne	98				98
4S	G. Payne	78				78
	Total	488	99	191	191	198

In addition, the Missouri Department of Conservation planted corn in half (16 acres) of Unit 1 leaving the remainder in moist soil. They also planted half (16 acres) of Unit 10 to corn. Refuge staff planted Japanese millet at Pierman Lane (6 acres) and Pool 6 (4 acres). The refuge staff also planted an additional 61 acres of wheat for browse as follows:

Unit 26	(Goose Pen)	10 acres
Unit 9	(Southwest of MSU-4)	15 acres
Unit 12W	(Schoolhouse)	9 acres
Unit 27	(Sassafras)	13 acres
Unit MS 2S	(Moist Soil 2 South)	14 acres

We had a problem finding affordable wheat seed at planting time. Thanks to some assistance from Crab Orchard National Wildlife Refuge, we had approximately 340 bushels of seed donated by the Pioneer Seed Division in Litchfield, Illinois. The seed was from the previous year and could not be sold. The only cost we had was transportation.

The primary purpose of the farming program is to provide habitat diversity and to benefit the wintering goose flock. Without farming, fields would revert to hardwood timber, losing edge effect and diversity. The open fields provide good viewing areas for wildlife. Deer and turkey use the corn fields in the winter, particularly if there is a mast crop failure. Deer make good use of the soybean fields in the summer helping reduce off-refuge depredation problems.

5. Grasslands

The refuge manages 659 acres of grasslands in 20 different units. Most of the units are a fescue/clover mix. Some attempt is being made to convert the hay fields from fescue to a redtop, timothy, and clover mixture.

The following grassland units were overseeded with Ladino Clover March 1 and 2 at a rate of 1 1/2 pounds of clover per acre:

<u>Field Number</u>	<u>Name</u>	<u>Acres</u>
19	Sifford Pasture	38
25-1	B&M	8
22-A	Indian Mound	3
30	Bluff Tower (S)	3

All grassland units are maintained by haying, grazing, mowing, or burning.

7. Grazing

Grazing was permitted on nine grassland units totaling 481 acres. All permittees remained the same. Grazing on Grassland Unit 19 will be discontinued after 1994. The unit will be planted with acorns.

The grazing season ran from April 1 through October 15 on six of the units and April 1 through November 15 on Units 11, 18, and 19. The grazing rate fee for the season was \$6.26 per AUM, a decrease of \$0.22 from last year. Cows with calves are calculated at \$1.25 AUM and yearlings as \$.75 AUM. The grazing rate is calculated each year using the 3-year average beef price formula described in the Refuge Manual and data furnished by the Missouri Department of Agriculture.

Each permittee was required to top dress a portion of their unit with fertilizer or lime. The permittees grazing fees were reduced by one-half to cover the cost of purchasing and applying the soil amendments. Permittees were also required to mow their entire unit at the end of the grazing period (September or October) for waterfowl use and brush control. Mowing was suspended on Units 19, 7, & 15. These units are scheduled for future conversion to timber. Top dressing was also suspended on Unit 19. The permittee paid the full AUM amount for the cattle.

A portion of GU-19 was planted with pin oak acorns in March. No trees were observed by year's end.

AUM rates and refuge receipts from the grazing program are shown in the following table:

<u>Unit</u>	<u>Acres</u>	<u>AUM</u>	<u>Receipts</u>	<u>Permittee</u>
GU-11	45	185.63	\$ 581.02	Donald Reinert
GU-7 & 15	112	398.13	1,246.15	Claud Walk
GU-16	45	133.50	417.85	Herman Wilfong
GU-17	45	138.38	433.13	Wayne Elledge
GU-18	117	362.50	1,134.61	E.C. Elledge
GU-19	45	200.63	1,255.88	Eddie Sifford
GU-21 & 22	72	290.11	908.04	Herman Wilfong
Totals	481	1,708.88	\$5,976.68	

8. Haying

Haying is usually conducted on units where grazing is not feasible due to a lack of water or inadequate fencing.

The hay fields made available for bid in 1994 were as follows:

<u>Unit</u>	<u>Acres</u>	<u>Price/Ton</u>	<u>Total Tons</u>	<u>Receipts</u>	<u>Permittee</u>
GU-8-6	15	\$ 6.27	15.00	\$ 94.05	Carolee Wilfong
GU-14	17	\$16.31	29.20	476.25	Hobart Scott
GU-19	36	\$15.07	35.63	536.79	Ellsworth Hancock
GU-20	30	\$14.14	11.86	167.70	Ellsworth Hancock
GU-22-A	3	\$ 8.17	4.07	33.25	Ellsworth Hancock
GU-25-1	8	\$20.06	20.00	401.20	Gene Hon
GU-28	9	\$12.00	10.00	120.00	Ellsworth Hancock
GU-18	<u>40</u>	<u>\$12.62</u>	<u>37.80</u>	<u>477.03</u>	E.C. Elledge
Totals	158		163.55	\$2,306.27	

GU 12-1 (16 acres) was planted to white oak acorns March 29. In addition the Bluff Tower Hill (3 acres) was planted with white oak acorns on March 2-3.

9. Fire Management

Refuge Operation Specialists Terry Peacock and Ray Portwood responded to a report of a wildfire in the native grass pasture of GU-18. The fire occurred on March 19, 1994. It was reported to the refuge at approximately 7:00 p.m. The fire was declared out at approximately 7:30 p.m. No control measures were necessary. The fire of unknown origin burned the 40 acre native grass pasture. No resource damage occurred.

10. Pest Control

The following herbicides were used in 1994:

<u>Herbicide</u>	<u>Acres</u>	<u>Crop</u>	<u>Target</u>
2-4D Amine	218	Corn & Milo	Broadleaf/Weeds
Basagran	133	Soybeans	Broadleaf/Weeds
Fusilade	133	Soybeans	Broadleaf/Weeds
Roundup	290	Soybeans, Corn, Milo	Grasses/Broadleaves
Pursuit	72	Soybeans & Corn	Grasses & Broadleaves

Roundup was used before planting soybeans and corn in minimum till fields.

Pursuit was used on a new brand of corn resistant to grass herbicides.

12. Wilderness and Special Areas

In 1985, the Missouri Department of Natural Resources developed a State Implementation Plan (SIP) dealing with visibility protection of Federal Class I areas which includes the Mingo National Wildlife Refuge wilderness area. The plan identified a need for visibility monitoring.

If a plume, or unnatural haze is observed, the plan calls for notification of the local Department of Natural Resources office as soon as practical after the occurrence. There were no plumes or unnatural haze noted in 1994.

14. Farmers Home Administration Conservation Easements

Activity on easements was as follows:

<u>County</u>	<u>Landowner</u>	<u>Activity</u>
Barton	Achey	Inspected, checked boundary posting.
	Seltz	Inspected, checked boundary posting.
Butler	Fuemmeler	Inspected, checked boundary posting. We were informed in December that the Fuemmelers sold the easement to Leonard Deken in 1992.
	McCombs	Inspected, checked boundary posting. Easement size was increased to 17 acres to include a natural wetland. FmHA sold to William McGruder.
	Petty	Inspected, checked boundary posting. Landowner cleaned ditch to north of easement to help alleviate beaver damn problems.
Cape	Propst	Inspected, checked boundary posting. Installed magnetic markers. Planted 29 acres in pin oak acorns. FmHA sold to Mark Wessell.
	Seabaugh	Inspected, checked boundary posting. Installed magnetic markers. FmHA removed old dump. FmHA sold to Hahs family.
Dade	Mareth	Inspected, checked boundary posting.
Dunklin	Fieser	Inspected, checked boundary posting. Landowner removed approximately 1 acre of dirt to increase size of wetland.
Lawrence	Mattlage	Inspected survey markers lost in 1994 fall floods.
Perry	Hermann	Inspected, checked boundary posting, installed magnetic markers.
Ripley	Bliss	Inspected, checked boundary posting.
Stoddard	Crowell	Inspected, checked boundary posting. Installed magnetic markers. Crowell sold to Jerry Moore. Planted 7 acres of pin oak acorns.
	Kleffer	Inspected, checked boundary posting.
	Lynch	Met with landowners, FmHA had survey completed.

15. Private Lands

Wetland Reserve Program

Five Wetland Reserve Program contracts were accepted in our area of responsibility in 1993. Two of these in Mississippi County required no development work. Development work on two in Butler County was completed in 1993. Development work was completed on the one in Stoddard County in 1994.

Assistance was again provided on the 1994 signup but was not a major workload.

Partners for Wildlife

The refuge constructed five wetlands under the Partners For Wildlife program. These were seasonally flooded basins where the refuge did the dirtwork and the landowner provided the structures. Landowners were: Fox in Butler County and McGrath, Dygert, Plunkett, and Lucas in Stoddard County.

Two wetlands are under contract from FY93, to be constructed by private contractor. One on Mike Richards farm in New Madrid County is near completion. Little progress was made on the Scott Taylor project in Stoddard County. A third carryover project in Dunklin County on the Fred Chandler farm was dropped.



Five private land wetlands were constructed by the refuge staff.
8/94 TDP

G. WILDLIFE

1. Wildlife Diversity

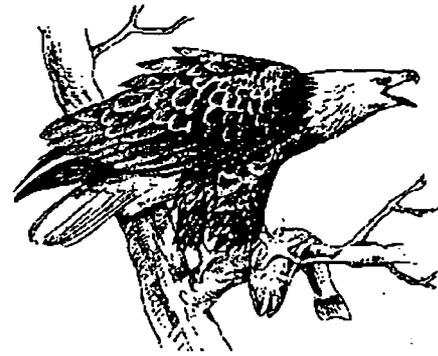
Mingo National Wildlife Refuge encompasses some of the most diverse wildlife habitat and resultant wildlife species in Missouri. In all, Mingo National Wildlife Refuge hosts over 240 species of birds, 38 mammals, 64 reptiles and amphibians, and 49 species of fish.

2. Endangered and/or Threatened Species

The peregrine falcon, bald eagle, and Indiana bat are the only three nationally listed endangered species that occur at Mingo National Wildlife Refuge or on satellite areas. Several state listed endangered species are found on the refuge such as the osprey, sharp-shinned hawk, Cooper's hawk, red-shouldered hawk, barn owl, Swainson's warbler, double-crested cormorant, trumpeter swan, northern harrier, king rail, and green water snake.

Peregrine falcons are rare visitors to the refuge. One was observed by a refuge staff member during 1989. This was the first and last sighting since 1986.

However, bald eagles are a common sight on Mingo National Wildlife Refuge, especially from November through February. The wintering bald eagle population can peak at 50 birds. The peak population of eagles went up slightly from the 93/94 population of 19 to 22 during the winter of 94/95.



The first eagle nest was built in 1981. It was not until 1985 that the first young were fledged from this nest. This original nest is still active and fledged three birds in 1994. These three birds were banded in May, 1994. From 1985 through 1994 it fledged a total of 24 birds. In 1989 a second nest was discovered and was successful in fledging one young that year, but has been unused since. In 1990 a third nest was discovered and fledged four young before being destroyed by a storm in March of 1993. To summarize Mingo refuge from a period beginning in 1981 through 1994 Mingo has had up to three active nests which fledged a total of 29 young. Currently the original nest is the only active nest on the refuge.

A pair of bald eagles fledged two young in 1994 on Pool 1 at Duck Creek State Wildlife Management Area. This is the seventh year eagles have been fledged from this nest. Duck Creek State Wildlife Management Area is a 6,500-acre state waterfowl area on Mingo National Wildlife Refuge's northeast boundary. For the first time Lake Wappapello (COE) near our southwest boundary has successful nests. Three birds were fledged from two nests.



Three eaglets fledged on the refuge this year.
5/94 RHP

Occasional sightings of osprey, double-crested cormorant, sharp-shinned hawk, and Cooper's hawk have occurred in 1994. No sightings of barn owl, king rail, Swainson's warbler, or green water snake were recorded in 1994. The red-shouldered hawk is a common bird on the refuge with several known nest locations. Northern harriers are on the refuge in abundance during the winter months. Trumpeter swans are discussed in Section G.3.

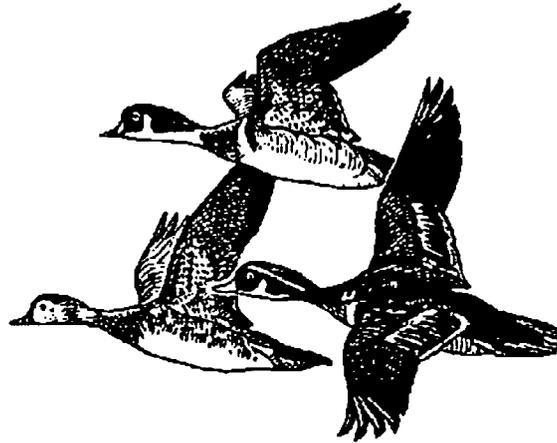
3. Waterfowl

During 1994 Mingo National Wildlife Refuge received above normal rainfall. The precipitation amounts were adequate during the period which favored moist soil plant germination. Waterfowl use on these areas was below average, with use days approaching 900,000 thousand on 837 acres of moist soil. Lower waterfowl use of the moist soil units was contributed to high use of the mast crop in the green tree reservoirs. Increased use of moist soil units has been noticed as spring migration time approaches.



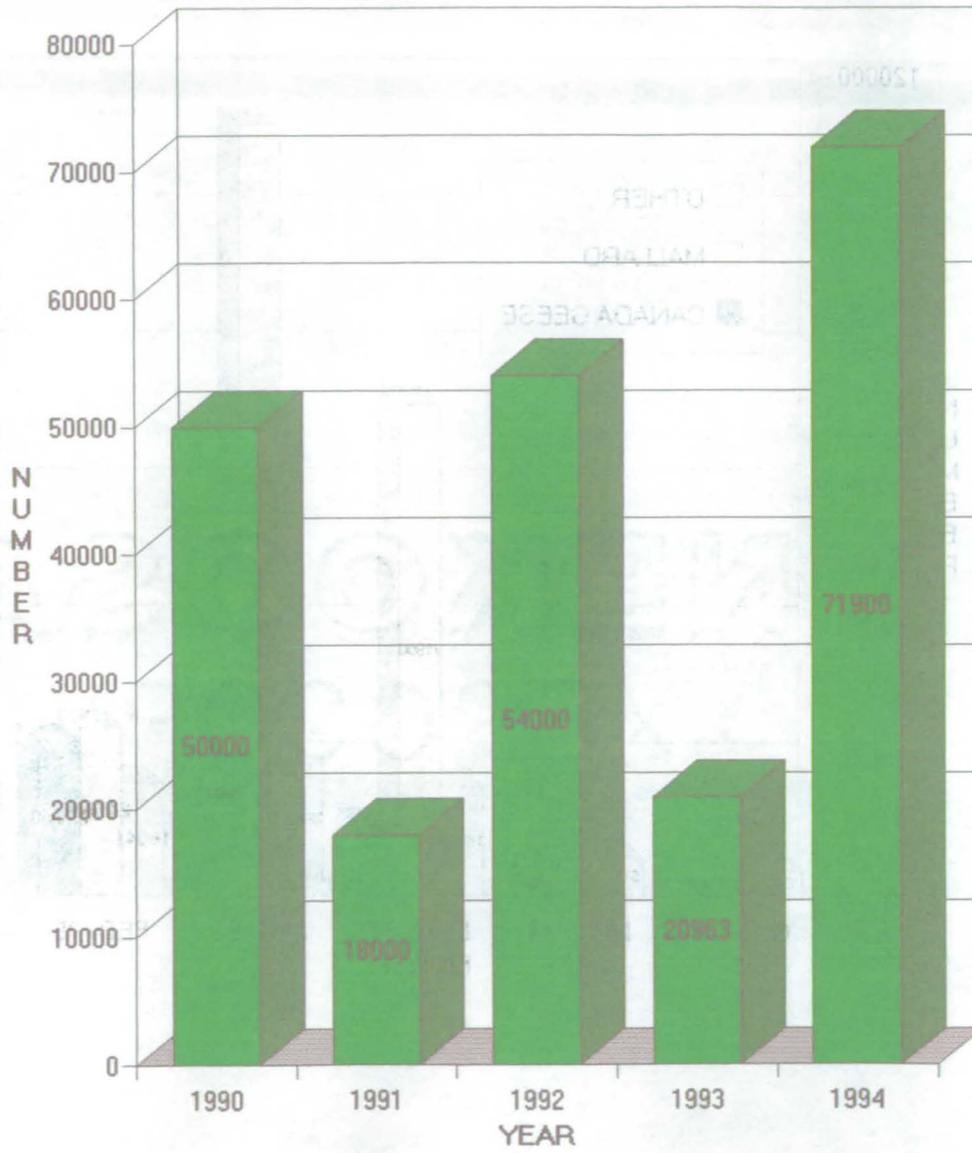
Peak waterfowl populations during the period of November 1 through March 31 for the past 5 years are shown below.

<u>Winter</u>	<u>Month</u>	<u>Canada Geese</u>	<u>Winter</u>	<u>Month</u>	<u>Ducks</u>
1994-95	Jan.	30,000	1994-95	Jan.	125,000
1993-94	Jan.	35,000	1993-94	Dec.	26,709
1992-93	Dec.	16,000	1992-93	Dec.	76,900
1991-92	Jan.	17,800	1991-92	Nov.	40,500
1990-91	Jan.	47,000	1990-91	Dec.	52,000



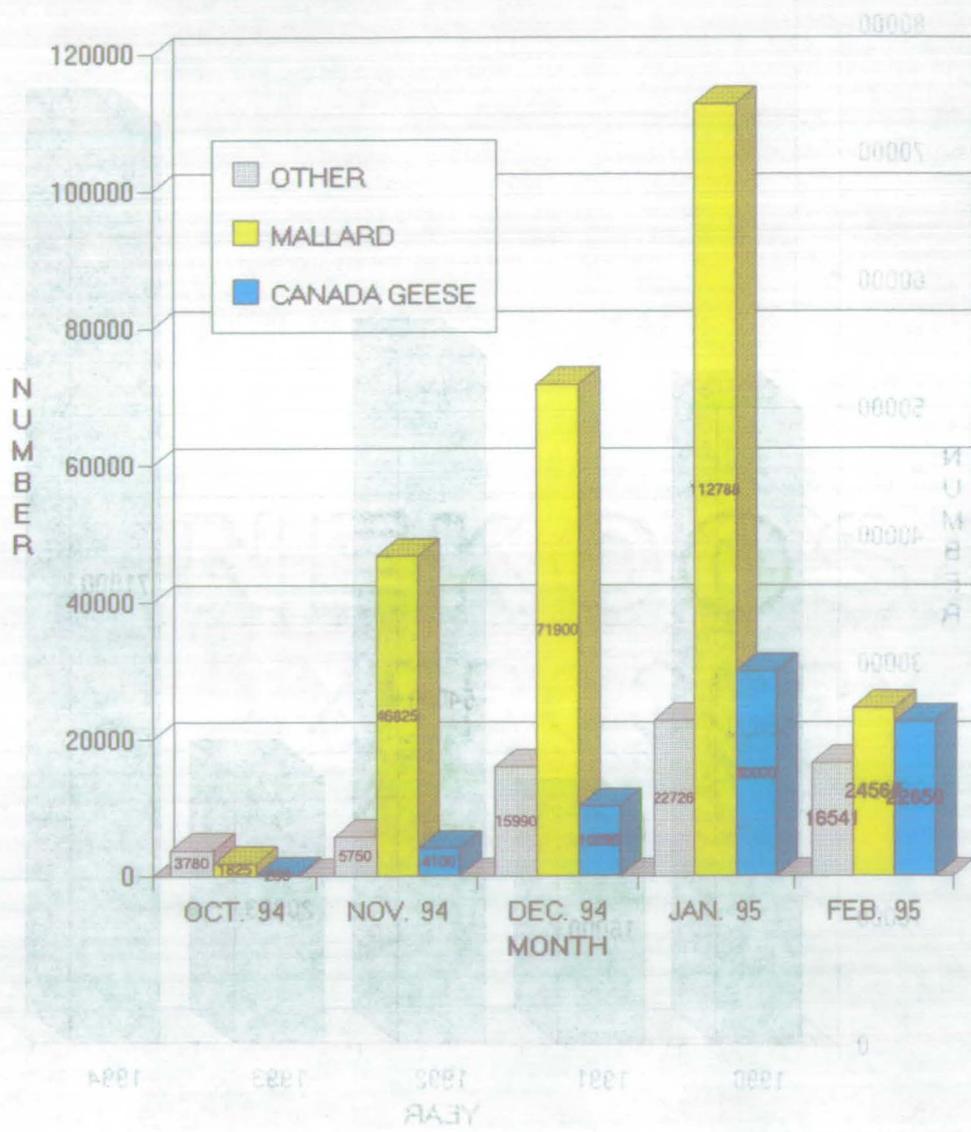
PEAK NUMBER OF MALLARDS

1994-95 PEAK WATERFOWL GROUND SURVEY



PEAK NUMBER OF MALLARDS

1994-95 PEAK WATERFOWL GROUND SURVEY





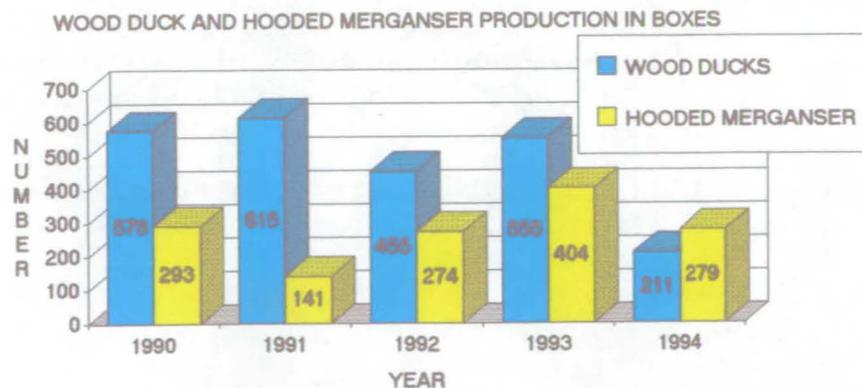
In the last several years, snow geese populations have been increasing in southeast Missouri. These birds primarily stay on Otter Slough State Wildlife Management Area and on private lands in Stoddard and Butler Counties. Over 200,000 birds have been passing through the Missouri bootheel for the past few years. The trend is apparently in response to increased rice production in southern Missouri. For the last few years it has been common for large numbers of snow geese to roost on and off the Mingo Refuge during January and February. During 1994, beginning in late December and continuing to February, approximately 15,000 snow geese have used Mingo as a feeding and resting place on a daily basis.

A few pairs of Canada geese nest at Mingo National Wildlife Refuge each year. These geese are spillovers from Duck Creek State Wildlife Management Areas resident giant Canada flock. The best estimate during the 1994 nesting season 64 young were hatched in various locations of the refuge.

Graduate students from Gaylord Lab have been monitoring wood duck nest box activity on Mingo National Wildlife Refuge since 1987. All nests are checked at the beginning of nesting and then rechecked after hatch for success or failure and some ducklings are web-tagged.

Wood duck box production is presented below.

*1994 represents 89 boxes checked compared to 100 boxes in previous years.



A peak population of eighteen swans was observed during 1994. Seven of the eighteen were identified possibly as trumpeters and eleven definite as tundra swans.

4. Marsh and Water Birds



Mingo National Wildlife Refuge is the home to a variety of marsh and water birds. Commonly observed birds in this category include sora rail, little blue heron, green-backed heron, great blue heron, yellow-crowned night heron, pied-billed grebe, and cattle egret.

5. Shorebirds, Gulls, Terns, and Allied Species

During the migration period seven species of shorebirds and eight species of waders used the moist soil units. The more commonly seen shorebirds are common snipe, pectoral sandpiper, spotted sandpiper, semipalmated sandpiper, and greater yellowlegs. Moist soil units, which are in slow drawdown phases during the first two weeks of April, seem to encourage higher use by shorebirds and wading birds. Three units were not drained in 1994 to assist a University of Missouri graduate student in conducting a research project to determine the biological effects of disturbance on certain species of herons and waterfowl in seasonally flooded impoundments. (See Research Investigation)

6. Raptors



Raptors observed on Mingo National Wildlife Refuge include red-tailed hawk, red-shouldered hawk, cooper's hawk, sharp-shinned hawk, American Kestrel, Northern harrier, bald eagle, turkey vulture, black vulture, barred owl, great horned owl, and screech owl.

Other raptors seen but not as numerous as the above include: osprey, rough-legged hawk, peregrine falcon, Mississippi kite, saw-whet owl, barn owl, and short-eared owl.

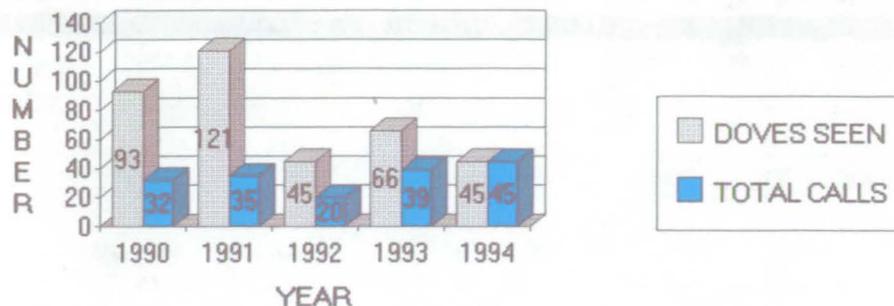
The Mississippi kite, a nesting species on Mingo National Wildlife Refuge, is on Missouri's rare species list. During 1994 a Missouri Department of Conservation employee confirmed a Mississippi kite nest on the Old Mingo River.

7. Other Migratory Birds

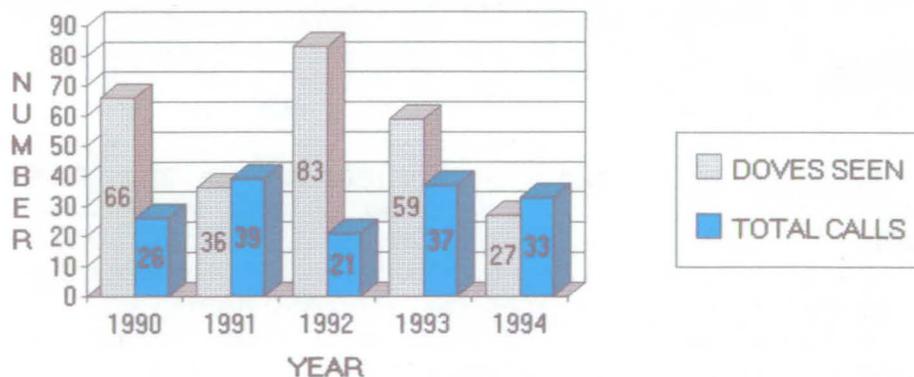
The refuge conducted two mourning dove coo counts. Results of the past 5 years are shown below.



DOVE SURVEY - BUTLER/STODDARD COUNTY



DOVE SURVEY - NEW MADRID COUNTY



The Mingo National Wildlife Refuge Christmas Bird Count, which also includes nearby Wappapello Lake, was held January 2, 1994. The Farmington Chapter of the Audubon Society coordinated the count which recorded 94 species, 12 species more than in 1993.

8. Game Mammals

Several of Missouri's game mammals occur on the refuge. They include white-tailed deer, fox squirrel, gray squirrel, red fox, gray fox, coyote, woodchuck, cottontail rabbit, and swamp rabbit. **(FLASHBACK - 1947 - FIRST DEER TRACK CONFIRMED AND THE FIRST DEER SIGHTING WAS CONFIRMED IN 1950)**



Also, the following furbearers are on the refuge. Mink, muskrat, opossum, striped skunk, beaver, raccoon, weasel, river otter, and bobcat are included in this group. **(FLASHBACK - FIRST BEAVER WAS OBSERVED IN 1955 AND THE FIRST RIVER OTTER OBSERVED IN 1978)**

11. Fisheries Resources

Mingo National Wildlife Refuge's fisheries management centers around two impoundments and the old Mingo River channel. Management includes occasional shocking for population status, limited stocking, and enforcement of fishing regulations. Most refuge impoundments are subject to annual flooding and summer drawdowns for moist soil plant production. Management of the ditches, creeks, and rivers is restricted by seasonal flooding. Active management occurred in May and Fox Ponds.



To improve the quality of the bass populations no bass may be kept from Fox Pond and no bass under 12 inches may be kept from May Pond. In all other waters state regulations apply. May and Fox Ponds were checked by the Fisheries Biologist during the summer of 1994. May Pond fish populations were found to be stable and the Missouri Department of Conservation stocked 600 catfish. However, Fox Pond was showing a decline in the large age classes of bass while bluegill populations are good. The Fisheries Biologist has recommended that a good bluegill fish population be the management goal for Fox Pond. Efforts began in 1991 to increase fishing opportunities by improving access to fishing areas. The Pool 6 and Ditch 3 levee was improved to provide better access to Ditch 3 and Gumstump fishing areas. As other possibilities become available efforts will continue to improve fishing and access to fishing areas.



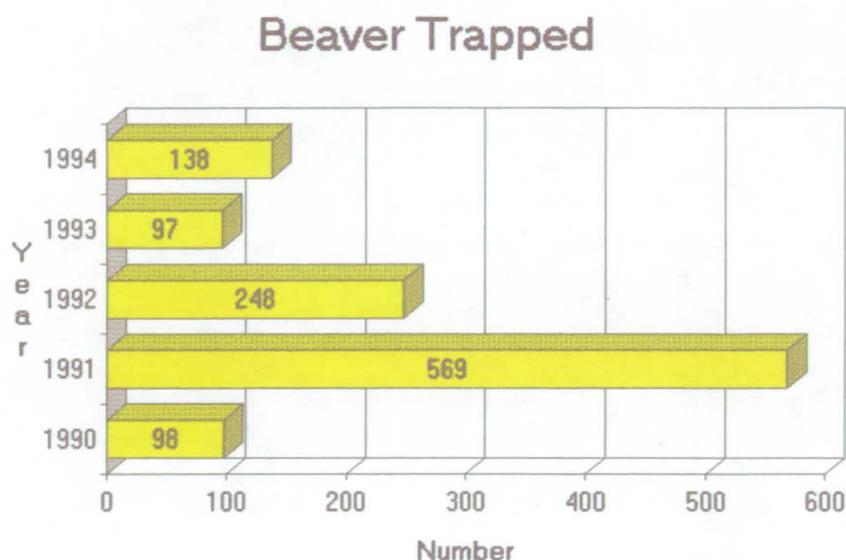
14. Scientific Collections

No collections were made on Mingo National Wildlife Refuge during 1994.

15. Animal Control

Beaver remain a major nuisance on Mingo National Wildlife Refuge by undermining roads, girdling trees, and plugging culverts and water control structures. The refuge continues to address this problem by permitting a local trapper to take beaver. Although the trapper has been quite successful in removing impressive numbers of beavers annually, very little change in annual problems are noted.

Beaver Removed By Calendar Year



16. Marking and Banding

At present Mingo National Wildlife Refuge is not participating in any banding or marking program. Some collar readings are taken as opportunities present themselves.

H. PUBLIC USE

1. General

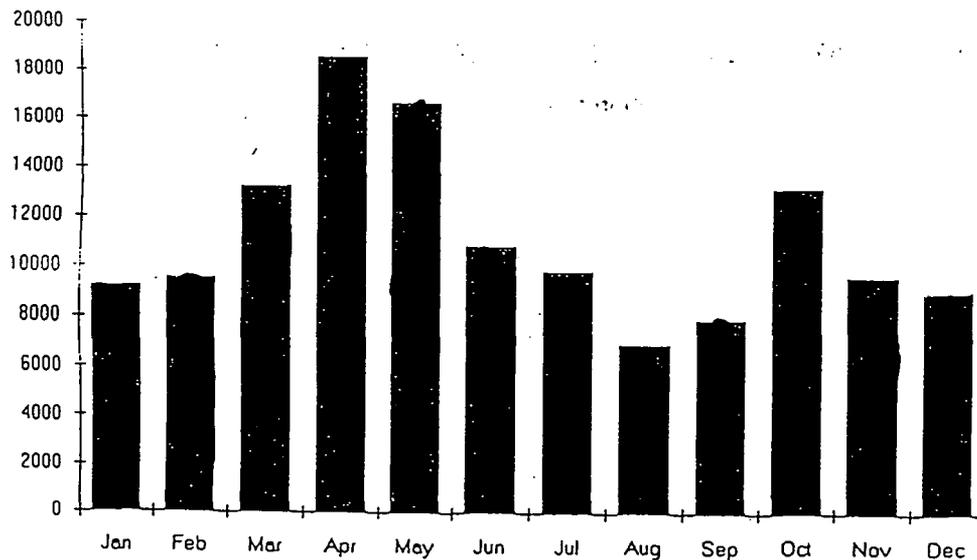
Fishing, hunting, environmental education, and wildlife observation continue to be popular public use activities. Annual visitation to the refuge in 1994 dropped to 135,576; a 24 percent decline from the previous year's 177,335 visits. Much of the decline can be attributed to the closing of the visitor center from June to August for renovation. In addition, the method for calculating visitation was revised in October 1994. The more conservative estimates used during the last three months of the year also give the appearance of a decline in visitation which may not be the case. The annual visitation to the refuge during the past 5 years averages 159,450 visits per year.

Annual Visitation

Year Visitation

1994	135,576
1993	177,335
1992	153,965
1991	161,486
1990	168,886

1994 Visitation by Month



For the second consecutive year, the refuge was one of 84 locations in Missouri to participate in the Missouri Division of Tourism Traveler Intercept Studies. Refuge volunteer May Jackson collected 309 survey questionnaires during three survey periods; May 27-30, July 22-25 and September 23-26. The results indicate several general characteristics of refuge visitors.

Most visitors to the refuge are Missouri residents on a 1-day trip who will spend the night at home as opposed to at a resort, motel/hotel, campground, or with family or friends. Very few visitors indicated they would visit a theme park, historical site, professional spectator sport, country and western show, gourmet restaurant, cultural attraction, winery, or shopping area while on their trip. Eighty-four percent noted the purpose of their trip was to enjoy Missouri's beauty and 40 percent indicated they would visit a national or state park.

Visitors were asked to grade the refuge by assigning a grade from A-D in several categories. The refuge received the highest grade of "A" from 99 percent of those surveyed as ENJOYABLE, 99 percent as VALUABLE, 98 percent as FRIENDLY, 94.1 percent in CLEANLINESS, and 98 percent gave an "A" in LIKELIHOOD OF RETURNING.

In May 1988 the refuge initiated an entrance fee program which required visitors to purchase a \$2 daily entrance fee permit for each vehicle entering the refuge between March 15 and November 30. Beginning in 1993 the cost of a daily entrance fee was increased to \$3. The \$3 entrance fee program was continued in 1994.

News releases are periodically issued throughout the year to inform the public of current events on the refuge. The refuge issued eight news releases in 1994. In addition, refuge staff spoke on several radio talk shows regarding recreational opportunities and special events at the refuge.

Television coverage by KFVS-TV, a Cape Girardeau, Missouri, CBS affiliate, broadcast refuge activities on the "Heartland Outdoors" program. News announcements of upcoming refuge auto tours, National Fishing Day programs, recreational opportunities and hunting seasons attracted many new visitors to the refuge.

2. Outdoor Classrooms - Students

The refuge places high emphasis on the outdoor classroom program for students and encourages schools, scouts, 4-H, and other youth groups to participate in refuge environmental education programs. During April and May volunteers assist youth groups at the visitor center when available and free refuge staff from conducting time-consuming activities. The volunteer participation benefits the students, volunteers, and the refuge.

The refuge hosted the second annual Stoddard County Ecology Days event on April 5 and 6 with 252 fifth grade students from five area schools attending the program. Staff from many agencies, including the Missouri Department of Conservation, University of Missouri Extension Office, the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service taught seven workshops. Topics included forest trees, flowering plants, native fish, wildlife habitat, animal adaptations, weather, and soils.

Seven Mingo Job Corps students served as tour guides. They led students from one workshop to the next and ensured the groups adhered to the time schedule. Ecology Days reinforces what

students learn about Missouri's natural resources in the classroom through active student participation in the workshops. The objective of the program is to better prepare students for the Missouri Mastery Achievement Test; a statewide test administered in public schools. Ecology Days received very good reviews from students and teachers alike and will likely continue to be an annual event at the refuge.



Approximately 892 Stoddard and Butler County Students attended Ecology Days in April and May.

5/94 PMF

The refuge hosted Butler County Ecology Days on May 10th, 11th, 12th and 13th for 640 Poplar Bluff fourth grade students. The program was reduced to 5 learning workshops due to the additional travel time from Poplar Bluff. This program was also well received.

Listed below are environmental education visitation figures for the past 5 years.

<u>Year</u>	<u>Visits</u>
1994	2,523
1993	2,671
1992	3,179
1991	2,041
1990	2,271

In recognition of National Fishing Week, refuge staff and Job Corps staff teamed up and hosted a fishing clinic at Gritman Lake on June 11. The event featured a 12-station "Pathway to Fishing" program to teach new anglers about aquatic ecology, fishing techniques and angler ethics. Over 42 children and 52 adults attended the event. Fish biology, fish location, knot tying, and the hands on casting stations received the most favorable comments. Graduates then applied their fishing skills in the 3-acre lake stocked with over 1200 pounds of channel catfish and 100 hybrid sunfish. By day's end, participants had landed 148 fish weighing 258 pounds including several catfish exceeding 4 pounds. The success of the event can be attributed largely to the hard work of over 19 volunteers and 10 staff.



Mingo Job Corps employee Greg Clanahan teaches National Fishing Day participants what not to do.

6/94 Refuge Volunteer Charles Wilson



A successful fishing day participant.
6/94 Refuge Volunteer Charles Wilson

The refuge hosted three Missouri Hunter Education programs during 1994. Forty-four students attended the March 19 program, 58 students attended the August 27 class and 56 attended the October 1 program. This class is a required pre-requisite for any person born on or after January 1, 1967, to purchase a Missouri firearms hunting permit. Biological Sciences Technician Judy Plunkett, Office Automation Clerk Brenda Foster, Missouri Department of Conservation Agent Mic Plunkett, and several volunteer instructors taught the classes.

3. Outdoor Classrooms - Teachers

Universities make frequent use of the refuge on field trips. Periodically throughout the year local teachers request environmental educational materials to aid in teaching their classroom students. Teachers become aware of new materials that become available through letters, bulletin board information, and mainly through the teacher "grapevine."

4. Interpretive Foot Trails

There are two interpretive foot trails on the refuge: the Boardwalk Nature Trail and the Hartz Pond Trail.

The Boardwalk Nature Trail is a major attraction to the public. The trail is constructed of a raised boardwalk traversing bottomland hardwoods and Rockhouse Marsh. It is .8-mile long with a .2-mile spur leading to an observation tower overlooking Rockhouse Marsh. A SeeCoast spotting scope was added to the tower in 1994 to enhance wildlife viewing. An interpretive

brochure, keyed to numbered stops, explains the ecology of the area. During 1994, 9,652 visitors enjoyed this trail. Many local residents routinely walk the trail for exercise in a tranquil atmosphere.

The Hartz Pond Trail is a .2-mile loop around the pond, originating from the visitor center parking lot. A lesson plan to familiarize students with basic aquatic organisms is available on request. This makes the trail popular with school groups for aquatic biology studies and other interpretive classes.

5. Interpretive Tour Routes

The refuge auto tour is open each Sunday in April, October, and November. An auto tour brochure interprets points of interest, refuge management techniques, and wildlife habitat for the visitors as they drive the 25-mile tour route. The spring tour attracts many visitors who come to view the abundant blooming wildflowers. The changing of the leaves to beautiful autumn colors attracts many in the fall.

New auto tour signs featuring the Blue Goose symbol replaced the old turkey signs this year. Several favorable comments on the new signs were received.

In 1994, 2,031 visitors enjoyed the spring auto tour compared to 1,125 visitors in 1993. Beautiful sunny days and warm weather attracts many visitors. During the fall, 5,008 people drove the auto tour route, up 33 percent from 3,752 visits in 1993.

During two Sundays in April and two Sundays in October, the Scenic Rivers Audubon Society set up spotting scopes at Fry Bluff overlooking the eagle nest on Monopoly Lake. Many visitors driving the tour route stopped to learn about bald eagles and other wildlife.

Each year during August the community of Puxico celebrates it's annual homecoming. Native sons and daughters return home to visit relatives and renew acquaintances. In support of this event, the refuge opens the auto tour during homecoming week. This year 800 visitors enjoyed the tour.

6. Interpretive Exhibits/Demonstrations

The visitor center continues to be the center of the interpretive program. The building houses exhibits, dioramas, audio-visual programs, an aquarium and interpretive displays featuring topics on wildlife management, swamp ecology, archaeology, geology, and history. During 1994 the visitor center was closed from June 6 to August 30 while undergoing a complete renovation. Despite the closure, 9,042 people from 31 states and 7 foreign countries visited the center. The refuge staff has received numerous positive comments about the visitor center since the renovation.



Many visitors enjoyed the new exhibits after the renovation was completed in the Visitor Center.

11/94 RHP



New display as you walk into the Visitor Center.

11/94 RHP

The refuge joined with the Missouri Department of Conservation and set up an exhibit in the conservation building at the 1994 Cape Girardeau district fair. A "touch and feel" stuffed beaver and river otter along with a large set of deer antlers attracted visitors of all ages to the booth for a closer look and/or information. A considerable amount of written and verbal information was dispensed to a crowd of 97,000 during the 6-day event, the largest crowd in many years.

Refuge Operations Specialist Ray Portwood manned a booth and Duck Stamp exhibit at the second bi-annual Duck Days event at Duck Creek Conservation Area on October 22. Over 800 people attended the event.

Refuge Operations Specialist Ray Portwood judged a poster contest at Greenville junior and senior high schools on April 12. This year students chose waterfowl as a topic and used the Missouri Junior Duck Stamp Contest as a guide.



Refuge Operations Specialist Ray Portwood and the poster contest winners from Greenville senior high school.

4/94

7. Other Interpretive Programs

Several overlooks exist along the main bluff road and the auto tour route. One of these, Monopoly overlook, has an interpretive panel explaining the history of Monopoly Lake.

8. Hunting

a. Squirrel



Squirrel hunting is permitted on Mingo National Wildlife Refuge from the Saturday preceding Memorial Day through September 30. Season totals for 1994 indicate that 214 hunters bagged 36 fox and 90 gray squirrels for a hunter success rate of .59 squirrels per hunter. The table below lists squirrel hunting information for the past 5 years.

<u>Year</u>	<u># Hunter Visits</u>	<u># Squirrels harvested</u>
1994	234	153
1993	338	374
1992	344	214
1991	420	656
1990	342	593

b. Deer

The archery deer and turkey season opened October 1 and closed December 31, 1994. Archery hunters are permitted to harvest two deer and two turkeys with archery equipment. Mast production in the bottomland timber was very good this year and may have limited deer movement. Many archery hunters commented that they had seen fewer deer while hunting this year than in past years. The table below lists archery hunting information for the past 5 years.



<u>Year</u>	<u>Bucks</u>	<u>Does</u>	<u>Unk</u>	<u>Total Deer</u>	<u># Hunter Visits</u>	<u>Deer Harvested 100 Visits</u>
1994	45	38	7	90	4,439	2.0
1993	59	52	11	122	5,015	2.4
1992	56	47	5	108	5,840	1.8
1991	70	76	13	158	6,819	2.3
1990	58	44	4	106	5,801	1.8

The muzzleloading firearms deer hunt is a continuing effort by the U.S. Fish and Wildlife Service and the Missouri Department of Conservation to provide hunting opportunities through sound wildlife management. Beginning in 1993 the hunt was expanded from one 3-day hunt to two 2-day hunts in an effort to increase deer harvest. The number of permits issued through a random computer selection is limited to 125 per hunt to maintain a high

quality experience while allowing optimum harvest. During the January 7-8 hunt, antlered or antlerless deer could be harvested. The January 21-22 hunt regulations allowed hunters to harvest antlerless deer only. Favorable weather conditions during both hunts allowed for a good harvest. Listed in the table below is the muzzleloading firearms deer hunting information for the past 5 years.

<u>Year</u>	<u>Bucks</u>	<u>Does</u>	<u>Total Deer</u>	<u>Quota/Applied</u>	<u># Hunted</u>	<u>Success Rate</u>
1995 (Jan 7-8)	21	16	37	125/1,137	105	35.2 percent
1995 (Jan 21-22)	9	29	38	125/ 378	113	33.6 percent
1994 (Jan 8-9)	8	28	36	125/1,297	115	31.3 percent
1994 (Jan 22-23)	4	7	11	125/ 306	111	9.9 percent
1993 (Jan)	28	24	52	150/1,574	133	39.1 percent
1992 (Jan)	15	26	41	150/1,019	135	30.4 percent
1991 (Jan)	9	11	20	150/1,910	124	16.1 percent



c. Turkey

The spring firearm turkey season began April 18 and ended May 1. One hundred eighty eight hunters signed in (representing a 6 percent decrease in number of hunter visits from 1993.) Hunters were successful in harvesting 10 gobblers for a success rate of 6.5 percent. The table below lists spring turkey hunting information for the past 5 years.



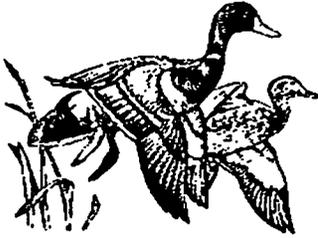
<u>Year</u>	<u># Turkey Harvested</u>	<u># Hunters Visits</u>	<u>Success Rate</u>
1994	10	188	5.3 percent
1993	13	201	6.5 percent
1992	17	332	5.1 percent
1991	17	147	11.6 percent
1990	9	161	5.5 percent

The archery turkey season runs concurrent with the archery deer season, October 1 through December 31. In 1994 archers bagged 5 turkeys, a comparable figure to previous years.

d. Waterfowl

Waterfowl hunting is permitted on Pool 8, a 2,000-acre green tree reservoir, in the northeast corner of the refuge. This unit is managed through a cooperative agreement with the Missouri Department of Conservation as a wade-in hunting area. Duck Creek Conservation Area conducts the duck hunt on a reservation/draw operation where hunters may opt for a blind or the wade-in hunting area. Many hunters prefer to hunt the flooded timber in the wade-in hunting area rather than a blind.

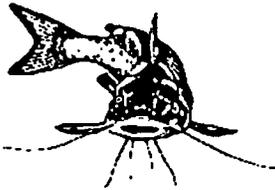
The 1994 season began November 5 and ended December 14. Acorn production in Pool 8 was good this year and attracted many mallards and wood ducks to the flooded timber. Hunting in the pool was excellent. During the 30-day season, 810 hunters



harvested 1064 mallards, 131 wood ducks and 10 black ducks. Listed in the table below is the waterfowl hunting information for the past 5 years.

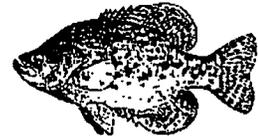
<u>Year</u>	<u>Ducks</u>	<u>Geese</u>	<u>Hunters</u>	<u># Bird/Hunter</u>
1994	1,205	0	810	1.49
1993	257	1	371	0.69
1992	612	4	535	1.15
1991	62	0	274	0.23
1990	1,475	0	1,069	1.37

9. Fishing



Fishing continues to be one of the most popular recreational uses of the refuge. In 1994, an estimated 37,874 fishermen visited the refuge. Many fishermen live in the local area and visit several times each year. Fishing opportunities fluctuate with local weather conditions and water management objectives.

Water flowing through the Ditch 4 culvert between Monopoly Lake and Gumstump Pool created good fishing conditions around the structure from March to April and yielded several large stringers of crappie. Several anglers discovered that Monopoly Lake offers some outstanding brim fishing. Many limits of large bluegill and redear perch were harvested by those anglers willing to paddle a boat or canoe.



10. Trapping

Beaver trapping is covered under Section G. Wildlife (Animal Control).

11. Wildlife Observation

Wildlife observation is the most popular public use activity on Mingo National Wildlife Refuge. During 1994 an estimated 58,960 people came to the refuge to view wildlife, down 16 percent from last year's 70,154 visits. The largest number of wildlife observers visited the refuge during December. Many are attracted by the white-tailed deer and wild turkeys that are commonly seen along the Bluff Road. Visitors also enjoy seeing growing concentrations of ducks, geese, swans and bald eagles.

12. Other Wildlife Oriented Recreation

Collection of blackberries, mushrooms, and, to a lesser extent, nuts occurs on Mingo National Wildlife Refuge. On September 17, over 100 members of the Missouri Mushroom Society spent the day searching for mushrooms. A mycology professor from Southern Illinois University assisted the group in identifying their many specimens. The refuge rarely attracts large crowds for mushroom hunting, however, it does remain popular among local residents.

Wildlife photography is a form of recreation practiced by a relatively small, but growing number of people. The use of video cameras on the refuge is becoming very popular among wildlife photographers.

14. Picnicking

A picnic pavilion is available near the visitor center and picnic tables are provided at May Pond, Red Mill Pond, Flatbanks, the Job Corps spillway, and Ditches 5 and 11. The tables are primarily used by fishermen, although people visiting the refuge for other types of recreation also make use of them.

17. Law Enforcement

Enforcement efforts centered around activities on the refuge. Refuge Officers have developed good working relationships with U.S. Fish and Wildlife Service special agents, Missouri Department of Conservation Agents and the Stoddard County Sheriff's Department. Refuge Operations Specialists Terry Peacock and Ray Portwood have law enforcement authority.

Enforcement of the Entrance Fee Program was stepped up this year in an effort to increase the level of compliance. Twelve citations and 57 warnings were issued for entrance fee violations in 1994.

The use of pole climbing spikes and screw in steps are becoming popular among area bowhunters. The steps have become less expensive and more readily available over the past couple of years. Five violation notices were written last year for the use of climbing spikes and screw in steps on the refuge. Complaints from other archery deer hunters initiated the investigation into these violations.

Several cases involving the possession of marijuana and driving while intoxicated were made on the refuge in 1994. These cases were referred to the Stoddard County Sheriff's Department and the Missouri Highway Patrol for prosecution.

Refuge Operations Specialist Ray Portwood assisted refuge officers at Crab Orchard National Wildlife Refuge during a firearms deer hunt from November 30 - December 2.

This year, due to the nature of some infractions, the refuge officers received assistance from state, county, and local law enforcement agencies. Table 1 itemizes violations that were

disposed of in U.S. District Court or FOC and Table 2 reports on-refuge violations that were filed through judicial systems other than Central Violations Bureau.

SUMMARY OF 1994 VIOLATIONS

Table 1

<u>VIOLATION</u>	<u>#</u>	<u>AMOUNT PAID EACH VIOLATION</u>
Trespass on Mingo NWR after official closing hours.	6	\$ 50
	1	Pending
Trespass on Mingo NWR without a valid entrance fee permit	12	\$ 50
Trespass in a closed area of Mingo NWR	2	\$ 50
	1	\$ 100
Operating a motorized vehicle on Mingo NWR in excess of 25 mph speed limit or posted speed limit: 15-25 miles over limit.	1	\$ 50
Operating a motorized vehicle without a valid state driver's license.	2	\$ 25
	2	\$ 50
Archery deer hunting in a closed area on Mingo NWR.	2	\$ 100
Hunting on Mingo NWR without a valid and proper state permit.	1	Dismissed
Attempt to take migratory waterfowl without a valid State duck stamp.	2	\$ 50
Attempt to take migratory waterfowl without a valid Federal duck stamp.	2	\$ 50
Attempt to take migratory waterfowl without a valid state hunting permit.	1	\$ 50
Attempt to take migratory waterfowl while in possession of lead shot.	1	\$ 50
Take migratory waterfowl in violation of refuge regulations: shooting hours, pool-8	1	\$ 100
Possession of migratory waterfowl taken in violation on Mingo NWR	1	\$ 100
Hunting from a tree in which a metal object has been driven; climb spikes/screw-in-steps	5	\$ 100
Archery deer hunting in a closed area of Mingo NWR	2	\$ 100
Possession of a loaded firearm on Mingo NWR except as authorized	3	\$ 50
	1	\$ 150
Fishing on Mingo NWR without a valid state permit	2	\$ 50
Littering on Mingo NWR	1	\$ 100
Totals	52	\$3200

Table 2

<u>Violation</u>	<u>#</u>	<u>Disposition</u>
Possession of a controlled substance (marijuana)	1	180 days in jail - suspended, 24 mo. probation, \$400 plus \$50 court costs (SC)
Possession of a controlled substance (marijuana)	1	\$417 fine (Puxico)
Possession of a controlled substance (marijuana)	1	Pending (SC)
Driving without a valid license (DWI Susp)	1	\$35 fine + \$25 court cost (MHP)
Driving While Intoxicated	1	Driving privileges revoked (MHP)
Take Canada geese on Mingo NWR	1	2 years suspension of hunting privileges;
Take over limit of Canada geese		2 years unsupervised probation;
Unlawful use of a weapon - shoot from road		\$78 fine + \$26 court costs (SC)
Arrest of subject for (3) active warrants	1	Subject was taken into custody and transported to Stoddard County Sheriffs Department DWI, Driving while revoked, Felony theft by check

18. Cooperating Associations

The refuge experienced a successful year of sales in cooperation with Midwest Interpretive Association. The refuge sold a total of 2,535 items for an annual gross sale of \$4,947.35. The number of available sale items increased from 285 to 289. The book sales area was redesigned during the visitor center renovation to provide a more versatile and attractive display. A new poster cabinet was built which allows visitors to directly access posters they want to purchase and provides a more efficient way of selling these items.

Midwest Interpretive Association donated the following items to the refuge in 1994:

- ▶ Lotus 1,2,3 Computer Program \$396.95
- ▶ Topographical Maps \$ 37.50

I. EQUIPMENT AND FACILITIES

1. New Construction

Entrance fee collection areas were constructed at the Rabbit Ridge and McGee entrances.

2. Rehabilitation

During 1994, several rehabilitation projects were undertaken by the maintenance crew.

- ▶The shop crew assisted with rehabilitation of the visitor center exhibit area. They cleared out the old exhibits, painted the walls and ceiling, and installed track lighting. They constructed the boardwalk, curved wall, book sale area, and mini theater. In addition, they installed trim on the completed exhibits. Wilderness Graphics of Tallahassee, Florida completed the rehabilitation including the exhibits. The \$120,000 contract allowed for the development of the exhibits.



Marv Cook of Wilderness Graphics and Audubon Society volunteers building the eagle nest inside the visitor center.

8/94 Refuge Volunteer Gayla Hickey



Completed Eagle Nest Exhibit.

12/94 TDP

- ▶The Bluff Tower trail was asphalted and a bench was added at the half way point. An accessible viewing scope was added to the tower.
- ▶The floors in the maintenance shop were painted.
- ▶The levee at Luken Farm was breached at a damaged site. Once the unit was dry, the levee was repaired. A portion of Ditch 1 was maintained at the same time.
- ▶The east ditch bank on Ditch #3 in Rockhouse Marsh was cleaned in preparation of cleaning Ditch #3 in 1995.
- ▶The offices of the Administrative Assistant and the Refuge Operations Specialist were rehabilitated along with the Visitor Center. The offices were painted and carpeting was installed. The hall and the stairway were also carpeted and painted.
- ▶A viewing scope was added to the Boardwalk Nature Trail Tower.



The SeeCoast viewing scope was a popular addition to the Boardwalk nature trail. 12/94 RHP

- ▶A large culvert was replaced on the west side road south of Stanley Creek hill.

►Willows were removed from Moist Soil Units 2 North, 3, 4 South, and 4 West by mowing and discing.

►The screw gate and culvert were replaced in Moist Soil Unit 4S.

Mingo Job Corps Civilian Conservation Center began working on the conversion of Farm Unit 4, Field 2, from farming to moist soils. The project was approximately 50% completed by year's end.

Some rehabilitation projects were contracted during 1994 including:

►The Ditch #1 bridge was torn out and a new bridge was constructed. The contract for the bridge construction was awarded to J.W. Githens Company of Poplar Bluff, Missouri. The Final cost was \$100,892.00. Wage Grade Leader Howard Shelton was the construction site inspector.



Ditch #1 bridge was rehabilitated by J.W. Githens Company of Poplar Bluff, Missouri. 8/94 HGS

►Four garage doors were installed at the carpentry shop by installed by Bluff City Garage Door Company at a cost of \$2,315.08.

3. Major Maintenance

Refuge roads were periodically bladed and road ditches were pulled. All roadsides and levees were mowed. Beaver damage to roads and levees was repaired as necessary.

The pump and holding tank were replaced on the well that services the visitor center and the residences.

One thousand four hundred and thirty four tons of gravel were added to refuge as a result of the timber sale.

4. Equipment Utilization and Replacement Vehicles

The Mita copier was replaced with a Canon NP 2120 copier.

Vehicles

- ▶The 1989 Chevrolet Celebrity was replaced with a 1994 Chevrolet Corsica.

Heavy Equipment

- ▶The front end on the 310 John Deere backhoe was reconditioned.
- ▶A 1981 American model 4120 crawler mounted crane and one yard dragline bucket were transferred to Mingo National Wildlife Refuge from Mark Twain, Annada District. Once we received the crane we serviced and painted it.

Farm Equipment

- ▶The frame and radiator were repaired on the John Deere 3020.
- ▶The tongue on the cultmulcher was repaired.
- ▶The exhaust on the John Deere 4640 was repaired.
- ▶The maintenance crew replaced the fire wagon. The pumper was placed on a new trailer. They also installed a tool box and brackets for drip torches.
- ▶The hood on the John Deere 2640 was repaired.
- ▶We continued to have problems with the Rhino mower. The gear boxes had been repaired yearly. After talking to French Implement Company in Charleston, Missouri, they replaced both gear boxes at no charge. The mower finished out the season. We will withhold our cheering until next year. We have yet to complete a season without having to repair the mower.
- ▶A tie-rod was replaced on the John Deere 2640.

- ▶The brush hog was overhauled.
- ▶The refuge purchased a 10 yard Reynolds dirt scoop to assist with wetland construction.



The new 10 yard Reynolds dirt scoop makes wetland construction a breeze. 10/94 TDP

- ▶The woods mower was replaced by another 6 foot woods mower. The mower was purchased from Aufdenberg Equipment for \$4,449.00.
- ▶The PTO shaft on the Case tractor was replaced.

5. Communications Systems

The old modem was replaced by a Microcom Destporte TM, Fast, EP 28.8 Modem.

6. Computer Systems

The following items were purchased in 1994: Dell Optiplex 466/LE computer, Dell Ultrascan monitor, Compuadd monitor, and a Hewlett Packard Laser Jet 4 Plus printer.

7. Energy Conservation

Electrical and Fuel Usage

	<u>1994</u>	<u>1993</u>	<u>% Change</u>
Electricity	85,263	85,929	- 1%
Gasoline	4,866	5,001	- 3
Propane	4,560	4,415	+ 3
Diesel	6,199	4,191	+48

Diesel use increased because of the completion of several projects using heavy and farm equipment. We also provided diesel fuel to the Mingo Job Corps Heavy Equipment unit for work on the conversion of Farm Unit 4.

J. OTHER ITEMS1. Cooperative Programs

Mingo National Wildlife Refuge continues to work closely with the Missouri Department of Conservation. Joint ventures this past year included waterfowl hunting and the historic weapons deer hunt. We have an agreement with the Missouri Department of Natural Resources regarding visibility monitoring on the wilderness area. All of these are covered in more detail in other sections of the narrative.

General Biologist Charles Shaiffer, working in tandem with Dr. Leigh Fredrickson at Gaylord Memorial Laboratory-University of Missouri, conducted two continuing education workshops. Topics covered were wetland invertebrate ecology and moist soil management. A total of 61 people from 14 different states including representatives from state agencies, federal agencies, county agencies, and private organizations attended the workshops. The field work was conducted on the refuge and Duck Creek Conservation Area. Classes were held at the nearby University of Missouri forestry camp. Lodging and food were provided by the University of Missouri forestry camp.

Engineering Equipment Operator Ray Placher assisted Cypress Creek National Wildlife Refuge with water control structure construction.

Refuge Operations Specialist Ray Portwood served as a fire fighter on an interagency crew at Kootenai National Forest in Troy, Montana. He was on the fire two weeks in August.

Office Automation Clerk Phyllis Ford assisted with administrative duties at the Southern Missouri Ascertainment Office during the summer. Biological Sciences Technician Judy Plunkett assisted them with administrative and biological duties from September-December.

Natural Resources Career Camp (NRCC)

Refuge Operations Specialist Terry Peacock and General Biologist Charles Shaiffer served as committee members for the Natural Resource Career Camp. The Natural Resource Career Camp is a rural area recruiting program designed by the U.S. Forest Service. Thirty African-American students are selected to participate in each camp. The students spend three summer sessions in the company of resource professionals from U.S. Forest Service, Missouri Department of Conservation, Missouri Department of Natural Resources, U.S. Soil Conservation Service, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, University of Missouri, and Lincoln University.



Students from the NRCC camp attended a fishing day on Mingo.
7/94 TDP

Refuge Operations Specialist Terry Peacock chaperoned one student to the Missouri Forest, Fish, & Wildlife Conference in February at Osage Beach, MO. A total of 16 students were sponsored by the cooperating agencies. Terry also drove several of the students to the conference.



Native American students Patrick Kincaid and Raul Vega served as NRCC counselors. 7/94 TDP

Refuge Operations Specialist Terry Peacock and General Biologist Charles Shaiffer assisted with recruitment of the 1994-1996 class February 28-March 5.

The Fish and Wildlife Service provided 2 counselors and the Service van to the two sessions of the camp (5 weeks total). The counselors were Native American students Raul Vega and Patrick Kinkaid. Students from each session spent 2 days on the refuge.

The Refuge hosted an orientation for the 58 students in the program in December. Only 8 of the students were able to attend due to bad weather.

3. Items of Interest

Refuge revenue sharing checks were sent to the following counties.

	<u>1994</u>	<u>1993</u>	<u>1992</u>	<u>1991</u>	<u>1990</u>
Stoddard County	\$15,698	\$16,460	\$18,055	\$21,833	\$18,171
Wayne County	\$14,152	\$14,839	\$16,276	\$17,521	\$14,582
Iron County	\$ 149	\$ 156	\$ 171	\$ 149	\$ 136
Lawrence County	\$ 164	\$ 171			

The payment this year was 77.90 percent of the amount authorized by law compared to 81.65 percent in 1993.

Meetings and Other Travel**January**

- 10-12 Siler and Placher traveled to western Missouri to inspect FmHA easements and Ozark Cavefish NWR.
- 27-28 Terry Peacock attended a NRCC meeting in Jefferson City, MO.

February

- 2-4 Peacock and one NRCC student attended the Missouri Fish and Wildlife Conference, Osage Beach, MO.
- 2-4 Clawson attended the private lands meeting, Osage Beach, MO.
- 14-15 Shaiffer attended a wetlands meeting in Columbia, MO.

March

- 1-4 Portwood attended an Environmental Education meeting in Lawton, OK.
- 7-9 Siler and Placher traveled to Annada, MO to pick up a dragline.
- 9-11 Clawson attended a WAM 2 meeting in Grafton, IL.

June

- 12-13 Clawson attended NRCC meeting in Jefferson City, MO.
- 20-23 Clawson attended an Ecosystem Management meeting in Neosho, MO.
- 28-30 Clawson attended an Ecosystem Management Meeting in Lacross, WI.

July

- 6-8 Clawson attended an Ecosystem Management meeting in Vicksburg, MS.
- 13-15 Clawson attended and Ecosystem Management meeting in Neosho, MO.

August

- 14-18 Peacock attended an Ozark Ecosystem Management meeting in Neosho, MO.
- 14-16 Shaiffer traveled to Jefferson City, MO for a NRCC meeting.

- 31-9/1 Peacock attended an Ecosystem Management meeting in Memphis, TN.
- 31-9/2 Clawson attended the Walnut Creek NWR visitor center dedication ceremonies at Prairie City, IA.
- 25-9/4 Portwood served as fire fighter on an interagency crew at Kootenai National Forest.

September

- 25-30 Shaiffer attended Wetland Delineation Class in Clinton, MO.

October

- 11-12 Clawson assisted with bat surveys at Pilot Knob NWR, Pilot Knob, MO.

November

- 2-3 Shaiffer assisted Squaw Creek NWR in manning a recruiting booth at Haskell Indian College in Lawrence, KS.
- 8-11 Barnfield and Ford traveled to Kansas City, MO to assist at the FFA convention.
- 30-12/2 Portwood traveled to Crab Orchard NWR to assist with law enforcement patrol.

December

- 5-9 Portwood attended Watchable Wildlife Conference in Jefferson City, MO.

Training

Clawson 10/25 Food Security Act Manual, Cape Girardeau, MO

Peacock

Region 3 Management Training Program

1/10-14 Module 1, Minneapolis, MN

3/20-25 Module 2, St Charles, IL

7/10-15 Module 3, Bellaire, MI

9/12-16 Module 4, Minneapolis, MN

3/27-4/1 Law Enforcement Refresher, Des Moines, IA

10/25 Food Security Act Manual, Cape Girardeau, MO

Portwood

3/27-4/1 Law Enforcement Refresher, Des Moines, IA

7/24-20 Supervisor training, Kansas City, MO

Barnfield

8/28-9-3 Small Purchase, Kansas City, MO

9/14-17 IBM training, St. Louis, MO

Ford

9/14-17 IBM training, St. Louis, MO

Plunkett

1/25 Oil Spill workshop, St. Louis, MO

5/15-18 NEPA training, Minneapolis, MN

10/21-22 Dobie Computer training, St. Louis, MO

12/21 Windows training, St. Louis, MO

All employees attended an AIDS/HIV awareness workshop at Mingo Job Corps Center.

Other

Siler was awarded the Naval Achievement Medal by the United States Naval Reserves September 29, 1994.

Shaiffer became a proud grandpa when Taylor Hamann was born on May 14, 1994. Taylor is the son of Charley's daughter Mandy Shaiffer Hamann.

4. Credits

Sections A, E, and K - Clawson

Sections B, C, D2, F3-14, I, and J - Peacock

Section H - Portwood

Sections D5, F1-3, F-14, and G - Shaiffer and Plunkett

Word Processing, Assembling, Proofreading, Etc. - Ford

K. FEEDBACK

The compatibility issue all refuges had to deal with this summer took a lot of time and killed a lot of trees. No question it is an important issue, but we seem to go to extremes in dealing with such things. Surely some of that effort could have been reduced and the time spent working on it used more productively.

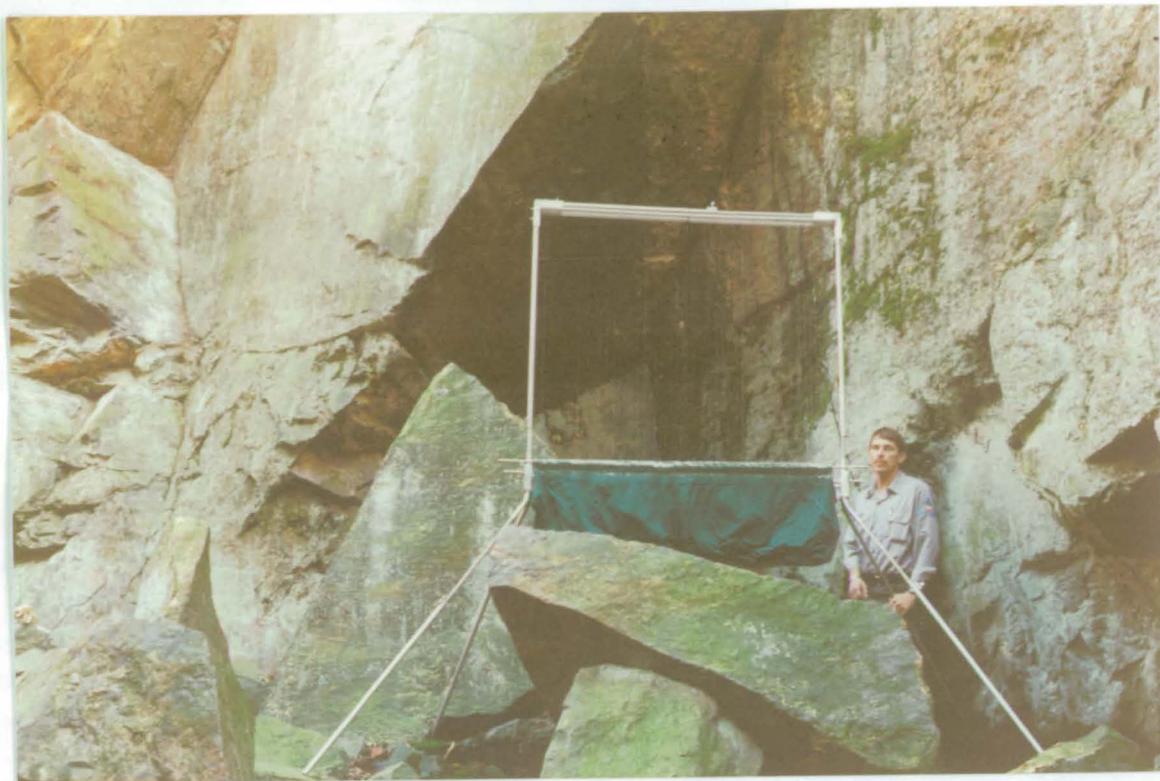
Pilot Knob National Wildlife Refuge

Pilot Knob National Wildlife Refuge is a 90-acre tract on top of Pilot Knob Mountain in Iron County, Missouri. It was acquired by donation from the Pilot Knob Ore Company on July 22, 1987, for conservation purposes. More specifically, it contains some iron mine shafts created in the mid-1800's which are critical habitat for the endangered Indiana bat. A memorandum of understanding with the Missouri Department of Conservation, signed by the Regional Director, August 25, 1987, calls for sharing of law enforcement and land management responsibility.

In 1988 a 3,910-foot long, 8-foot high chain link fence was constructed to restrict access for public safety and liability reasons. Bats enter the shafts in the fall to hibernate and exit in the spring. Since all entry to the mine shafts is prohibited for safety reasons, good population estimates are not available. However, population trends can be monitored by setting up a harp trap over the opening in the evening hours during the spring or fall to trap and count exiting bats. In cooperation with MDC a 4 x 5 harp trap was set up on October 12 for 1 3/4 hours. A total of 236 Indiana bats were captured compared to 592 in one hour of trap time in 1992. MDC Biologists have noted similar declines in Indiana bat populations in other hibernacula within the state.

Department of Natural Resources personnel (Geological Survey-Rolla) conducted at least five field trips to the site during the year. Maintenance personnel made one trip to the site in March to repair holes in the fence and repost as necessary. This followed a report of an incident involving placement of a large white flag with the letters "KKK" on top of the mountain in early March. The flag was taken down by MDC personnel.

An endangered species permit was issued by the Regional Office to a group referred to as Environmental Services, Inc., of Cincinnati, Ohio, to capture up to ten Indiana bats in conjunction with a study being conducted at Fort Leonard Wood. Ten bats were captured on November 11.



MDC Biologist Rick Clawson surveyed bats at Pilot Knob
NWR 10/94 GLC

Ozark Cavefish National Wildlife Refuge

Ozark Cavefish National Wildlife Refuge was established in 1991. It is a forty acre tract twenty miles west of Springfield in Lawrence County, Missouri. Turnback Creek cave spring is located on this property which is the outlet of an underground stream known to contain a population of endangered blind cavefish. Access to the stream is gained via Turnback cave which has openings on adjacent property owned by the Missouri Department of Conservation. Purpose of acquisition was concern over potential development of the property.

One visit was made this year to check posting and general condition. The access road on the east side which leads to the spring had a fair amount of use but did not appear to be a problem. Cave openings on MDC property were also checked and were gated and locked.

A purchase agreement to acquire an additional 1.3 acre unit adjacent the Neosho NFH in Newton County was extended and accepted. This unit is a lot with buildings that lies between the hatchery and the spring which is the primary source of water for the hatchery.