

REVIEW AND APPROVALS

HATCHIE NATIONAL WILDLIFE REFUGE
Brownsville, Tennessee

ANNUAL NARRATIVE REPORT
Calendar Year 1993



REFUGE MANAGER

4-11-94

DATE

REFUGE SUPERVISOR

DATE



REGIONAL OFFICE APPROVAL

4/21/94

DATE

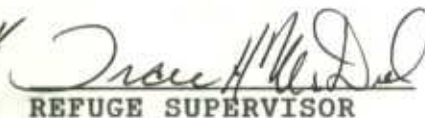
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REFUGE SUPERVISOR

4-20-94
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REGIONAL OFFICE APPROVAL

4/21/94
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INTRODUCTION

Hatchie National Wildlife Refuge is located approximately 4 miles south of Brownsville in Haywood County, Tennessee. The northern boundary of the refuge lies along 24.5 miles of the Hatchie River. The Hatchie River is designated as a Class I Scenic River under the Tennessee Wild and Scenic Rivers Act and is the last major unaltered stream in West Tennessee and the entire Lower Mississippi Valley. The refuge is bisected by Tennessee Highway 76 and Interstate 40. It lies about 55 miles east of Memphis, Tennessee and 30 miles west of Jackson, Tennessee. Over two million people live within 60 miles of the refuge.

Hatchie NWR was established in 1964 by the Migratory Bird Conservation Commission. The first land was acquired and the first manager assigned in 1965. All land, except the 335-acre Porter Tract, was acquired with Duck Stamp funds. The Porter Tract was purchased in 1977 with receipts from a timber sale, bringing the refuge to its present size of 11,556 acres. The primary purpose of the refuge is to provide habitat for wintering and migrating waterfowl, particularly dabbling ducks.

The dominant habitat type, making Hatchie a special place, is approximately 9,400 acres of seasonally flooded bottomland hardwood timber. Despite the high grade logging of 4,500 acres in the 1970's, due to a condemnation proceeding, Hatchie's bottomland hardwood forest remains one of the finest and quite possibly the best example of this habitat type in the refuge system. Due to natural flooding from the unaltered Hatchie River, the refuge's forested wetlands function under nearly natural wetland cycles. They provide a singular prime example of the oak dominated forests of the upper delta that were historically the principal wintering habitat for continental mallard populations.

Other refuge habitats include 400 acres of upland forests, 545 acres of water in ten oxbow lakes, 5 highway borrow pits, 4 water storage reservoirs and natural sloughs, creeks and swamps. Approximately 1,300 acres of upland and lowland agricultural areas are managed as combination cropland, moist soil, and old field habitats.

Facilities include approximately thirty miles of gravel roads and seven diked seasonally flooded impoundment complexes. The only uplands occur in the Hillville Area in the southeast corner of the refuge. A wooden storage barn with fenced storage area, the maintenance shops and equipment storage yard are located at Hillville. The refuge headquarters is housed in a GSA leased building located on Highway 76 about one-half mile north of the refuge boundary. The Mississippi Valley District Forester's office is co-located in the refuge headquarters building.

REVIEW AND APPROVALS

INTRODUCTION

A. HIGHLIGHTS

B. CLIMATIC CONDITIONS

C. LAND ACQUISITION

Page

1. Fee Title.....	NTR	
2. Easements.....	NTR	
3. Other.....	NTR	
4. Farmers Home Administration Conservation Easements.		3

D. PLANNING

1. Master Plan.....	NTR	
2. Management Plan.....	NTR	
3. Public Participation.....	NTR	
4. Compliance with Environmental and Cultural Resource Mandates.....		3
5. Research and Investigations.....		4
6. Other.....	NTR	

E. ADMINISTRATION

1. Personnel.....		4
2. Youth Programs.....		6
3. Other Manpower Programs.....		6
4. Volunteer Programs.....		7
5. Funding.....		8
6. Safety		9
7. Technical Assistance.....		10
8. Other.....		16

F. HABITAT MANAGEMENT

1. General.....		17
2. Wetlands.....		17
3. Forests.....		21
4. Croplands.....		22
5. Grasslands.....	NTR	
6. Other Habitats.....	NTR	
7. Grazing.....	NTR	
8. Haying.....	NTR	
9. Fire Management.....	NTR	
10. Pest Control.....		23
11. Water Rights.....	NTR	

F. HABITAT MANAGEMENT

	Page
12. Wilderness and Special Areas.....	23
13. WPA Easement Monitoring.....NTR	
14. Farmers Home Administration Conservation Easement..NTR	
15. Private Lands.....	23
16. Other Easements.....NTR	

G. WILDLIFE

1. Wildlife Diversity.....	23
2. Endangered and Threatened Species.....	23
3. Waterfowl.....	24
4. Marsh and Water Birds.....	29
5. Shorebirds, Gulls, Terns, and Allied Species.....	29
6. Raptors.....	29
7. Other Migratory Birds.....	29
8. Game Mammals.....	30
9. Marine Mammals.....NTR	
10. Other Resident Wildlife.....	32
11. Fisheries Resources.....	33
12. Wildlife Propagation and Stocking.....NTR	
13. Surplus Animal Disposal.....NTR	
14. Scientific Collections.....	33
15. Animal Control.....	34
16. Marking and Banding.....	34
17. Disease Prevention and Control.....NTR	

H. PUBLIC USE

1. General.....	34
2. Outdoor Classrooms - Students.....NTR	
3. Outdoor Classrooms - Teachers.....NTR	
4. Interpretative Foot Trails.....NTR	
5. Interpretative Tour Routes.....NTR	
6. Interpretative Exhibits / Demonstrations.....NTR	
7. Other Interpretative Programs.....	35
8. Hunting.....	36
9. Fishing.....	38
10. Trapping.....NTR	
11. Wildlife Observation.....	45
12. Other Wildlife Oriented Recreation.....NTR	
13. Camping.....NTR	
14. Picnicking.....NTR	
15. Off Road Vehicling.....NTR	
16. Other Non-Wildlife Oriented Recreation.....NTR	
17. Law Enforcement.....	46
18. Cooperating Associations.....NTR	
19. Concessions.....NTR	

I. EQUIPMENT AND FACILITIES

	Page
1. New Construction.....	47
2. Rehabilitation.....	47
3. Major Maintenance.....	48
4. Equipment Utilization and Replacement.....	49
5. Communications Systems.....NTR	
6. Computer Systems.....	50
7. Energy Conservation.....NTR	
8. Other.....NTR	

J. OTHER ITEMS

1. Cooperative Programs.....	50
2. Other Economic Uses.....NTR	
3. Items of Interest.....NTR	
4. Credits.....	51

K. FEEDBACK

L. INFORMATION PACKET (inside back cover)

LIST OF TABLES

I. 1993 Weather Data on Hatchie NWR.....	3
II. Hatchie NWR Operating Funds for Past Five Years	9
III. Waterfowl Use Days 1965-1993.....	26
IV. Age Class by Sex for 4-Day Quota Gun Deer Hunt.....	30
V. Hatchie Deer Herd Growth Since Acquisition (1965)..	31
VI. Law Enforcement Cases Processed 1993.....	46

A. HIGHLIGHTS

Hatchie Pride, a pilot project to reduce erosion and siltation in the Hatchie River Watershed, continued to gain public and landowner support. (Section E.7) Page 10.

Two adult bald eagles utilized Oneal Lake during January, February and March. This has been the most extensive use by eagles in the refuge's history. (Section G.2) Page 23.

The Third Annual Tennessee Peach Festival Jr./Sr. Fishing Rodeo was the highlight of the fishing season. A total of 450 participants competed and enjoyed the special event on National Fishing Day. (Section H.9) Page 38.

Project Fish, an innovative project for developing and monitoring fishing access facilities for disabled fishermen, moved from the planning to the development stage at Oneal Lake during 1993. (Section H9c.) Page 39.

B. CLIMATIC CONDITIONS

A relatively mild winter and spring with fairly wet conditions, during January through June, characterized the early part of the year. This was the fourth consecutive year with mild winter temperatures. Over five inches of rainfall during April and almost four inches during May and June delayed crop planting until July. The normal rainfall amounts during the summer period resulted in good production of agricultural crops and moist soil plants. The normal dry weather during the fall period created a deficit in rainfall of almost 5.0 inches from the 10 year average. This limited waterfowl use to permanent waters including oxbow lakes, water supply reservoirs and their receiving field impoundments and the Hatchie River. Significant rainfall required to bring waters to desired levels in the Hatchie River bottoms and other refuge impoundments did not occur until early December.

Table I.

1993 HATCHIE WEATHER SUMMARY

MONTH	TEMPERATURE:		PRECIPITATION:			DEVIATION FROM:	
	HIGH	LOW	1993	1992	TEN YEAR MEAN	PREV. YEAR	TEN YEAR MEAN
January	68	21	4.36	2.43	3.45	+1.93	+0.91
February	72	14	3.21	2.66	4.26	+0.55	-1.50
March	82	20	4.52	6.99	4.63	-2.47	-0.11
April	80	32	5.04	2.18	5.02	+2.86	+0.02
May	88	45	3.93	3.43	5.62	+0.50	-1.69
June	93	50	3.26	7.56	3.91	-4.30	-0.65
July	98	68	2.13	4.46	3.97	-2.33	-1.84
August	97	63	3.05	1.80	2.28	+1.25	+0.77
September	92	46	4.42	4.86	3.61	-0.44	+0.81
October	84	29	3.36	1.23	3.54	+2.13	-0.18
November	78	20	4.12	3.53	5.17	+0.59	-1.05
December	65	20	5.38	3.88	6.13	+1.50	-0.75
TOTAL:			46.78	45.01	51.59	+1.77	-4.81
ANNUAL HIGH:	98			ANNUAL LOW:	14		

C. LAND ACQUISITION4. Farmers Home Administration Conservation Easements

An inspection of the 360-acre Hardeman County FmHA Conservation Easement was made by refuge staff on October 27. Development potential on the area of beaver ponded wetlands, wooded uplands and old fields is limited. Upland fields are reverting to native forest. Wood duck nest boxes were erected during 1991.

An identified need/request for \$22,900 was submitted to the Regional FmHA Easement Coordinator on September 29. FmHA Easement needs identified were boundary survey (\$20,000), 50 wood duck nest boxes (\$2,000) and property review/monitoring and enforcement (\$900).

D. PLANNING4. Compliance with Environmental and Cultural Resource Mandates

The refuge filed a Section 404 permit application and Tennessee Water Quality Certification application in May following on-site inspections with Corps of Engineers and Tennessee Department of

Environment and Conservation personnel during March and April. The application identified 15 planned projects which could impact 10 acres of wetland. The projects would also create 43 acres of permanent wetland and protect or improve 298 acres of existing refuge wetlands. The permits were finally issued in early 1994.

Compatibility and endangered species Section 7 requirements were accomplished by the refuge staff for a 450-acre timber salvage sale planned during October.

5. Research and Investigations

Management study 42424-01-90 "Ecological Studies of White-tailed Deer in West Tennessee" commenced in December 1990. The study seeks to compare movement patterns and home ranges of deer in bottomland forests versus agricultural lands in this area. The influence of micro habitat and habitat modification on movement patterns and home ranges will also be examined. University of Memphis doctoral candidate Rob Kissell dropped out of the program in 1992. Dr. Michael Kennedy will continue the study as soon as a new investigator can be recruited.

E. ADMINISTRATION

1. Personnel

The Hatchie Refuge staff was reduced to six full-time, permanent positions in October 1992, following the transfer of the satellite refuges, Chickasaw and Lower Hatchie, to Reelfoot NWR.

On May 16, Linda Baxter was converted from Biological Technician GS-5 (Temporary) to Refuge Operations Specialist GS-7 (Permanent), increasing the refuge staff to seven permanent, full-time positions.

Forester Leif Karnuth returned to the Hatchie staff on May 25, following a detail assignment to Mississippi Valley District Forester Clyde Stewart on April 5, 1992. Leif accepted a transfer to White River NWR on July 11.

Office Assistant Janice Hinsley received a promotion to GS-6 on May 2.



2,6,5,4,7,1

1. Marvin L. Nichols	Refuge Manager, GS-12, PFT
2. Glenn H. Stanley	Assistant Refuge Manager, GS-11, PFT
3. Leif A. Karnuth	Forester, GS-07, PFT (Transferred July 11)
4. Janice L. Hinsley	Office Assistant, GS-06, PFT
5. Linda B. Baxter	Refuge Operations Specialist, GS-07, PFT
6. Jerry W. Lewis	Equipment Operator, WG-08, PFT
7. Lloyd Watson	Equipment Operator, WG-08, PFT

NUMBER OF EMPLOYEES AT HATCHIE

	Permanent		Temporary	Total FTE
	FT	PT		
1993	7	0	*3	7.0
1992	**10/6	0	*2	**10/6
1991	10	0	*1	10.0
1990	11	0	0	11.0
1989	11	0	0	11.0

* Includes Youth Conservation Corps

** Change in personnel due to transfer of Lower Hatchie and Chickasaw NWR's, October 1, 1992.

2. Youth Programs

Two Youth Conservation Corps (YCC) participants assisted refuge staff for eight weeks during the summer. Artavious Graves, a Haywood High School sophomore, performed a variety of tasks including building and sign maintenance, wood duck banding, erosion control, planting and litter pick-up.

Farah Gibson, a Haywood High School junior, assisted in the office with hunt application processing and general clerical tasks.



YCC Enrollees Artavious Graves and Farah Gibson received their Certificates of Completion from Refuge Operations Specialist Baxter and Office Assistant Hinsley. (R200-8-93, GHS)

3. Other Manpower Programs

The refuge participated in the Job Training Partnership Act Program for the second consecutive year in 1993. David Brasfield, a Haywood High School junior, completed eight weeks of work assignments, June 14 - August 4, assisting with maintenance projects and wood duck banding.



David Brasfield, Job Training Partnership Act Program Enrollee (R200-8-93, GHS).

4. Volunteer Programs

Hatchie maintains an active volunteer program with 42 volunteers receiving a newsletter that keeps them abreast of refuge activities. Members of 7 organizations and 19 additional individuals contributed a total of 2,092 hours to refuge programs.

During January eight volunteers assisted the refuge staff in planting approximately 1,500 cypress seedlings in and around Oneal Lake. Seven volunteers were members of the Haywood County Bass Club. The purpose of the planting was to improve fish cover, shade and aesthetic values.

The Annual Jr./Sr. Peach Festival Fishing Rodeo was made possible with the help of 36 volunteers. The Haywood County Bass Club continues to sponsor the event which awarded donated prizes and trophies worth \$450.00

<u>Volunteer</u>	<u>Hours Donated</u>	<u>Accomplishment</u>
University of Memphis -14 people	477	Operated Check Station for refuge raccoon and quota deer hunts
Bird watchers-Tennessee Ornithological Society	73	Recorded sightings of birds on Hatchie NWR and TOS Breeding Bird Survey
Haywood County Bass Club, Brownsville Chamber of Commerce, National Guard Unit, Haywood County Emergency Management Unit, Explorer Scouts and others	248	Assisted in Fishing Rodeo activities during National Fishing Week
Haywood County Bass Club, Explorer Scout Jason Byrd	44	Planted cypress trees at Oneal Lake
Billy Wayne Pittman	190	Maintenance Assistance
N. Crafton, R. Thornton, J. Barnes, M. Barnes, H. Rushing, S. Lamer, E. Mosley, M.L. Mosley	43	Wood duck banding efforts
Bill Stoddard, Mike Busbey	35	Photography-Fishing Rodeo and general
30 Project Fish Volunteers	960	Attended 4-day meeting in Memphis
Explorer Scouts	16	Attend organizational meeting and orientation
Eric Mosley	6	Litter pick-up
Total Hours:	2,092	

5. Funding

Initial allocations of base operation and maintenance funding for FY 1993 were \$190,500 and \$82,200, respectively. Specific allocations for other programs included goose collar observations (1230-\$500), volunteer efforts (1261-\$900), Watchable Wildlife - Project Fish (1261-\$20,000), YCC (1261-\$2,800), Project Fish - Fisheries (1332-\$45,000) and reimbursable account, Chickasaw-Shiloh RC&D Council, Project Fish (1971-\$25,000). Challenge Grants for Project Fish (Director's Award) (1261-\$20,900), Hatchie Pride Habitat Restoration (Director's Award) (1261-\$60,000) and Impoundment Construction Project (Regional Award) (1261-\$12,000)

were awarded. Specific maintenance projects were rehabilitation of Friedman GTR and Bear Creek Impoundment Levees (1262-\$20,000 and \$11,000, respectively).

Table II. Hatchie NWR Operation Funds for past five years x 1000

COST CODE	FY	FY	FY	FY	FY
	1993	1992	1991	1990	1989
1130		26.8			
1221		5.0	2.0	5.0	
1230	0.5	0.5			
1261	307.1	414.3	296.1	321.0	294.4
1262	113.2	158.2	136.7	130.6	92.6
1332	45.0				
1971	25.0				
6860	20.0	20.0	20.0	10.0	10.0
8421				5.0	
8441				5.0	
9120	4.0	2.0	5.0	1.0	
TOTALS	514.8	626.8	459.8	477.6	397.0

6. Safety

The refuge staff was alert to avoid safety hazards while performing routine operations and maintenance projects. Informal safety sessions were held before operating unfamiliar equipment or conducting potentially dangerous work projects. Safety meetings were held on a monthly basis for all employees with a variety of topics presented including first aid, vehicle operation and proper use and handling of fire extinguishers, chemicals and firearms.

Engineering Equipment Operator Lewis experienced an eye injury while welding on October 10. The injury was incurred even though Lewis was using proper safety equipment and resulted in his having to be off duty for two days.

The refuge staff participated in annual hearing tests at Haywood Park General Hospital during February.

All refuge fire extinguishers were inspected and/or recharged as necessary on February 22.

The refuge headquarters building was inspected for fire regulation compliance and air quality compliance, including radon gas, on December 7 and 9, respectively. The inspections were conducted by GSA contractors.

7. Technical Assistance

a. Hatchie Pride

A major part of the rich natural heritage of West Tennessee is the Hatchie River which winds some 175 miles from the State of Mississippi to its confluence with the Mississippi River about 60 miles north of Memphis. Early in the pioneering history of the region, the Hatchie River served as a major transportation artery with the associated bottomland hardwoods producing an abundance of timber and wildlife. Hatchie Refuge was established along the south bank of the Hatchie in 1964. In 1969, the meandering, timber-lined Hatchie was designated a State Scenic River and today remains the last unchannelized river of its type in the whole Lower Mississippi River Valley.

However, the value, function and beauty of the Scenic Hatchie River is rapidly declining. Due to severe erosion rates, exceeding 100 tons/acre per year in places, and the channelization of nearly all of the 33 major tributaries, this beautiful, last-of-its-kind river is filling with silt causing inordinate flooding, killing vast acres of hardwood timber and endangering valuable wildlife habitat. The demise of this valuable system affects everyone including landowners who lose agricultural crops and timber, county residents through loss of revenues in inordinate repair of roads and bridges along the river and its tributaries, as well as, citizens throughout the nation with the deterioration of a major National Wildlife Refuge.

Hatchie Pride, which stands for Protection, Restoration, Information and Education, and Development in an ecosystem approach, began in June 1991 after little success with numerous previous efforts to address the mounting river problems adversely impacting the refuge. During 1992, Hatchie Pride cooperator numbers grew to include the following: Tennessee Conservation League, Haywood County Soil Conservation District, Hardeman County Soil Conservation District, Fayette County Conservation District, University of Tennessee Extension Service, Tennessee Department of Agriculture, Tennessee Farm Bureau, Tennessee Division of Forestry, Tennessee Department of Environment and Conservation, U.S. Geological Survey, U.S. Corps of Engineers, U.S.D.A.-Soil Conservation Service, US Weather Service, Chickasaw-Shiloh RC&D Council, NASA and U.S. Fish and Wildlife Service.

Representatives from these agencies and groups meeting together decided to approach the problems of the Hatchie on a sub-watershed basis. The watershed selected for the initial treatment was Bear Creek, which enters the river on Hatchie Refuge. The Bear Creek watershed has a drainage area of 31,500 acres and includes portions of Haywood (13,930 acres), Hardeman (3,814) and Fayette (13,814 acres) Counties, Tennessee. Of this 31,500 acres, about 15,000 acres of cropland are in row crop production. Over 6,200 acres of the 15,000 cropland acres are considered Highly Erodible Land as defined by the 1985 Food Security Act and the 1990 Food Agriculture Conservation Trade Act.

On-site and off-site adverse economic and environmental impacts result from excessive erosion on upland cropland, gullies, ditches and road banks. Reasons for excessive erosion include:

1. Prolonged production of row crops using conventional tillage methods.
2. Failure to cultivate on the contour.
3. Lack of acceptance of new technology.
4. Insufficient resources, including cost-share and technical assistance available for installation of land treatment practices.
5. The influence of absentee landowners with the philosophy of an annual income and the high cost of annual rental payments.

Annual damages due to these high erosion rates include:

1. Loss of bottomland hardwoods within the watershed and Hatchie NWR.

Refuge Timber Impacts			
Dead:	200 acres @ 3,000 BF/AC =	600 MBF=	\$150,000
Stressed:	600 acres @ 4,000 BF/AC =	2,400 MBF=	\$780,000
Additional loss expected if unabated			
	300 acres @ 3,000 BF/AC =	900 MBF=	\$225,000
Total =	1,100 acres,	3,900 MBF=	\$1,155,000

2. Loss of wildlife corridors due to existing land use trends. Travel lanes and nesting acres have been lost for game and non-game species of wildlife.
3. The sediment load contributed by tributaries continue to impair fish and aquatic life and recreation opportunities.
4. According to the Non-point Source Pollution-Surface Waters of Tennessee Plan, agriculture impairments for Bear Creek include: turbidity, pesticides, flow fluctuations, contamination with increased organic matter and settleable solids.
5. Loss and damage to roads and bridges.

Existing erosion rates for the highly erodible cropland within the watershed ranges from 6 to 135 tons per acre per year. The average for the entire watershed is 30 tons per acre per year. These erosion rates do not account for ephemeral gully and stream bank erosion.

The goals for the Bear Creek watershed project are:

- Goal 1. Reduce the adverse environmental impacts on the Scenic Hatchie River.
 - Objective 1a. Reduce sedimentation and erosion rates on upland cropland by 50 percent.
 - Objective 1b. Increase wildlife corridors and habitat through the development of filter strips and land use changes.
 - Objective 1c. Promote best agricultural management practices through increased financial and technical assistance.
- Goal 2. Enhance and promote the natural resource values of the Hatchie River System
 - Objective 2a. Increase wildlife habitat and possible income for landowners through hunting leases and non-game viewing.
 - Objective 2b. Protect and restore bottomland hardwoods.
- Goal 3. Evaluate effectiveness and efficiency of implemented best management practices.

- Objective 3a. Pursue a water quality monitoring station to monitor sediment, pesticide and nutrient loads within the watershed.
- Objective 3b. Develop a public involvement strategy.

The following list of Best Management Practices has been established to reduce erosion and sedimentation within the watershed. The technical standards and specifications established by the Soil Conservation Service, Tennessee Division of Forestry and the Fish and Wildlife Service will be used for design and implementation standards.

<u>Practice</u>	<u>Program Code</u>	<u>Goal</u>
Conservation Tillage	329	1,200 ac
Cover and Green Manure Crops	340	1,000 ac
Filter Strips	393	60 ac
Land Use Conversion (Grass/Trees)	512/612	200 ac
Grassed Waterways	412	55 ac
Water and Sediment Control Basins	638	10 ea
Grade Stabilization	410	3 ea
Diversions	362	5,000 ft
Buffer Strips (Strip Cropping)	586	25 ac
Critical Area Treatment	342	30 ac
Crop Residue Management	344	3,000 ac
Terraces	600	250,000 ft
Contour Farming	330	2,000 ac

Hatchie Pride funds will be administered by the Chickasaw-Shiloh Resource Conservation and Development (RC&D) Council, Inc. Landowners within the project area will receive financial and technical assistance through long term contracts. The RC&D coordinator and RC&D secretary will provide 10 percent of their time for administration. Technical assistance for contract development and administration will be provided through a contractual process and through a cooperative position to be established in 1993 and stationed in Jackson, TN.

On January 26 and 27 Assistant Manager Baxter met with Chris Moyers, Chickasaw - Shiloh R,C & D Council, Inc. (Council), and Mike Zeaman, SCS State Biologist, to work out water a quality testing regime for the Hatchie River and Bear Creek. Assistant Baxter will collect, analyze, and maintain the water quality data for this project area. This information will also be useful in management of the refuge.

On April 23 Manager Nichols conducted a tour of the Hatchie Pride initial project area, Bear Creek watershed, for eight managers of the Tennessee Department of Health and Environment. One of the participants was Chief Dr. Andy Barris, who indicated he would submit a proposal for EPA 319 funds for Hatchie Pride. The submission had not been acted upon by year's end.

In 1993 the Service provided a \$60,000 challenge grant for Hatchie Pride. Hatchie Refuge has agreed to monitor water quality on the river and in Bear Creek, therefore a portion of the grant was used to purchase equipment and supplies to accomplish that task. The remaining funds, \$53,500, were covered in a cooperative agreement, No. 1448-0004-93-986, with the Council. The purpose of this agreement is to provide assistance to establish, maintain and/or promote soil conservation and water quality improvement practices on land contained in the pilot Bear Creek Project area of the Hatchie Scenic River watershed. This will be accomplished throughout the 31,500 acre project area where traditional farming practices exacerbate the extreme erosion potential.

In 1994 and 1995 the Council will enter into agreements with local landowners for the following practices only:

<u>ID</u>	<u>Number</u>	<u>Practice</u>	<u>Unit</u>	<u>Description</u>
FWS	1	Field Border	Ac	Establish and protect vegetative cover (trees and/or grass)
FWS	2	Riparian Zone	Ac	Establish and protect vegetative cover (trees and grass)
FWS	3	Grade Stabilization Structure	Ea	
FWS	4	Water and Sediment Control Basin	Ea	

Payment by the Council to individual farmer/landowners will fall within the following parameters:

- | | | |
|-----|---|--|
| FWS | 1 | Maximum one time payment of \$280 per acre for the establishment*, protection and maintenance of the practice for a period of at least 10 years. |
| FWS | 2 | Maximum one time payment of \$300 per acre for establishment**, protection, and maintenance of the practice for a period of at least 15 years. |

- FWS 3 A one time payment of 75 percent of actual establishment cost of the practice for establishment and protection of the practice for a period of 20 years. Council payment may not exceed \$7,500 per farmer/landowner.
- FWS 4 A one time payment of 75 percent of actual establishment cost of the practice for establishment and protection of the practice for a period of 10 years. Council payment may not exceed \$7,500 per farmer/landowner.
- * Actual establishment costs shall be reimbursed up to but not to exceed \$80. When establishment costs are less than \$80, payment will be \$200 plus actual establishment cost.
- ** Actual establishment costs shall be reimbursed up to but not to exceed \$100. When actual establishment costs are less than \$100, payment will be \$200 plus actual establishment cost.

Payments for any one farmer/landowner will not exceed \$7,500.

On October 12 Manager Nichols conducted a tour of the Hatchie River for Ann Murray, Executive Director of the Tennessee Conservation League (League), Sam Anderson, Vice-President of the League, and Joe Guinn, a Director for The Nature Conservancy. All aspects of the problems facing the river were discussed. The League is vitally interested in Hatchie Pride and will be assisting in making this unique coalition work more efficiently.

b. Partners for Waterfowl

The Haywood County wood duck box program continued this year with excellent cooperation between the Haywood High School Vocational Department, Haywood County Ducks Unlimited Chapter (DU) and the Service. Vo-tech students built 28 boxes and as last year DU oversaw the distribution of the boxes throughout the County. The refuge provided cypress lumber, posts and predator shields.

Several loads of donated pipe belonging to Ducks Unlimited were unloaded and stored at Hatchie Refuge during the year. The pipe will be welded to water control structures to be delivered in 1994 and distributed by the Memphis District Biologist Office to private landowners enrolled in the "Partners for Wildlife" program in West Tennessee. The refuge maintenance staff is responsible for handling, storage and welding operations.

c. FmHA Conservation Easement

A 360-acre easement in Hardeman County was conveyed to the Service on January 18, 1990, but several corners were questioned as to accuracy and beaver ponding hindered complete boundary posting. Some corners were identified and posting was completed during March and April 1991, except the east side of tract 2, which will require a cadastral survey to locate. There are also other sections of boundary that are in question and should be surveyed. The easement was inspected by Assistant Manager Stanley on October 27.

8. Other

Associate Manager Travis McDaniel and Tennessee Wildlife Resources Agency Regional Director Harold Hurst chaired the annual Hunt Coordination meeting in Jackson, Tennessee on February 3. Refuge personnel from Tennessee attended and presented their 1993-94 hunt proposals to TWRA for consideration and approval.

Associate Manager Travis McDaniel visited Hatchie NWR on February 3 and 4 to review proposed and on-going projects. Project Fish facility construction was also reviewed, although the construction phase was in the early stage.

Manager Nichols was elected District Director of the Tennessee Conservation League for three years at the leagues business meeting in Nashville on March 7.

Manager Nichols was the winner of a lantern in the Regional Duck Stamp Challenge Drawing.

Staff members completed a variety of training this year.

Staff

Training

Marvin L. Nichols
Refuge Manager

Law Enforcement Refresher; Pre-Retirement Seminar

Glenn H. Stanley
Asst. Refuge Manager

Law Enforcement Refresher; International Tracking System Training

Janice L. Hinsley
Office Assistant

Administrative Workshop

Linda B. Baxter
Refuge Operations Spec.

Aviation Safety Training;
International Tracking System Training

F. HABITAT MANAGEMENT

1. General

The dominant habitat type is seasonally flooded bottomland hardwood forest, comprising 81 percent or 9,400 acres of this 11,556-acre refuge. The Hatchie River overflows into the bottoms, usually between November and June, creating ideal dabbling duck habitat. Other habitats found on the refuge include upland forest (400 acres), permanent water (62 acres of oxbow lakes, 175 acres of reservoirs, 48 acres of borrow pit lakes, 316 acres of swamp, sloughs and streams), croplands (440 acres impounded and 565 acres un-impounded), grasslands (50 acres) and old field habitat (100 acres).

Habitat management is designed to meet the primary refuge objectives of waterfowl maintenance during wintering and migration periods. Primary emphasis in the bottomland hardwood forest is placed upon maintaining the mast producing capabilities through the use of a long-term rotation and other silvicultural practices. Management of seasonally flooded impoundments using both row crop and moist soil options provides supplemental foods for wintering waterfowl and enhances wildlife habitat, particularly during dry periods in the natural wetland cycle. A secondary objective of waterfowl production is pursued through a wood duck nest box program, and retention of cavity trees.

2. Wetlands

Eighty-five percent of the refuge is classified as wetlands. The majority of this habitat is seasonally flooded bottomland hardwood forests. Management of the forest is discussed in Section F.3.

Hatchie has approximately 400 acres of various un-managed wetland types. These include shrub and wooded swamps (scrub/shrub forested wetlands), open water (aquatic bed), and small swampy areas (emergent wetlands).

Seven manageable dewatering units consisting of 539 acres of seasonally flooded impoundments and two green-tree reservoirs (GTR) totaling 50 acres are scattered throughout the refuge. This year 300 acres were sown in milo, 48 acres in soybeans, 22 acres in Japanese millet and 60 acres were managed as moist soils areas. The late planting date permitted rotation of 24 acres of moist soil areas to cultivation in 1993.

a. Windrow Field Impoundment

Windrow field consists of 50 acres and is the only dewatering unit west of Interstate 40. For the second year in a row, drier weather conditions during July permitted a rotation of moist soil to cultivated crops.

The cooperators planted 22 acres of Japanese millet in lower portions of the field and 28 acres of soybeans were planted as the refuge/cooperators share. The millet was available to waterfowl during the winter period. Approximately 5 acres of moist soil vegetation also occurred in lower areas. During December over 2,000 mallards were observed feeding in portions of the field planted to millet. Overall use by waterfowl, wading birds and shorebirds was good during 1993.

b. McCool Field Impoundment

This field consists of 46 acres and is bisected by Tennessee Highway 76. The completion of Oneal Lake in 1986 provides the area with a readily available supply of water. A 36-inch pipe with stop-log structure is used to gravity flood the impoundment as needed.

Waterfowl use in the area east of the Tennessee Highway 76 was good in January. This area had a good supply of natural foods in the form of millet, sedges, and mast from trees located along the highway. Waterfowl use dropped sharply in late February with use by mallards and wood ducks into March. Wading bird use by primarily great blue herons was noted during the spring period as the field dried.

Twenty-one acres of corn were planted by refuge cooperator on June 15. Poor seed germination required the field to be replanted to milo in mid-July. The field was flooded in late October. Waterfowl response was not as immediate as past years. Mallards made use of the milo and natural seeds available.

In the McCool west unit drier conditions during July permitted the cooperator to plant twenty acres of soybeans, as his share. The soybean stubble in the unit did not attract as many ducks as the eastern unit, although some mallard use was observed in December.

The north levee in the east field also encloses a stand of hardwoods comprised mostly of oaks. When water was released from Oneal Lake to flood the fields the hardwoods were also flooded.

c. Friedman Dewatering Area

This area consists of two field impoundments totaling 41 acres and a 43-acre GTR. In January and early February the two field impoundments were heavily used by ducks. The largest concentrations were along the edge of the GTR in the north field where a good stand of bidens was produced and the east end of the south field where a good stand of other moist soil plants had developed. Duck use was good for a short time as the food supply was quickly used up. By the end of February most waterfowl had ceased use of this area.

Duck use was good in the GTR during January and early February as a good supply of acorns attracted both wood ducks and mallards. The GTR with its mast crop and the flooded impoundments with moist soils and corn made the Friedman Unit a very attractive area for ducks in January.

Both fields were planted in milo during July. Corn, first planted on sixteen acres of the refuge share in June, failed to germinate due to suspected insect damage and was replanted in milo.

The GTR is flooded by a 36-inch pipe in the Poplar Creek canal levee at the east end of the area. The pipe was opened in mid-November. Heavy rains during December flooded the GTR and adjacent field impoundments. Waterfowl use was immediate with 500-600 mallards and wood ducks utilizing the area in late November and December.

d. Morrison Field Impoundment

This impoundment consists of 48 acres and adjoins the Coffee Field Impoundment. A diesel driven pump in a 16-inch well provides a water supply for both fields. These impoundments were constructed in 1982.

This year started with flooded milo in the field impoundment with the cooperators' share being harvested on the higher portion of the field. Waterfowl use was light to moderate, with mallards being the primary users. During July the higher area was again planted in milo and the lower portions devoted to moist soil production. Waterfowl use was similar to the previous year as ducks made limited use of the flooded moist soils and milo stubble.

e. Coffee Field Impoundment

This unit contains 188 acres of agricultural fields of which approximately 80 acres can be flooded for waterfowl use. The Coffee Field adjoins the Morrison Field and is flooded by the 16-inch well

that serves both fields. Since its completion in 1982, the Coffee Field has consistently been the most heavily used by waterfowl at Hatchie.

In January large concentrations of ducks numbering approximately 7,000, used the Coffee field. The field provided a good supply of panic grass, sedges, and corn. Duck use gradually dropped until late February when most of the remaining ducks on the refuge concentrated in other areas. This unit usually remains very wet in the spring period due to poor drainage from the impoundment to the river. Also, overflows from Bear Creek have silted-in a ditch adjacent to the southern boundary forcing additional water through the unit.

The 58-acre refuge share and cooperator's share were planted to milo in July. Pumping operations began flooding the field in late November after the cooperator's share was harvested. At the end of the year approximately 2,400 ducks and 100 geese were observed utilizing the field. This was the highest use observed at any field impoundment during December.

f. Old Hillville Dewatering Area

This 56-acre complex includes four sub-impoundments that can be flooded by gravity flow from the 20-acre Big Lake reservoir. At the start of the year this area supported flooded corn and milo stubble. During peak times in past years up to five thousand ducks could be observed feeding and loafing in the fields. But, in 1993, duck use was rarely above 1,000 ducks during spring and winter periods.

One field was drained in late March and the three remaining fields (36 acres) were dedicated to moist soil management. Significant use by great egrets, great blue herons and shorebirds were noted in moist soil fields. During July, 20 acres of milo were planted in one field by the cooperator, as refuge share.

Water release from Big Lake was hampered by a deteriorated screw gate and a low lake level resulting from low rainfall during summer and fall. However, limited water was diverted from New Lake into the moist soil fields during the summer period. The Old Hillville Unit was dependant on rainfall and runoff to adequately flood the fields during December.

g. New Hillville Dewatering Area

This 105-acre unit consists of eight sub-impoundments situated immediately west of the Old Hillville Dewatering Area. Flooding in this area is provided by gravity flow from the 20-acre New Lake reservoir. At the start of the year all fields were flooded. Food

available for waterfowl included corn, moist soils, and milo stubble. Duck use during January and December was moderate, except during periods when the impoundments were frozen. Contrary to some years when upwards to 6,000 ducks could be observed feeding in the milo and moist soil, less than 1,000 ducks were noted in 1993. However, 200-300 Canada geese were often observed feeding throughout the unit and loafing on the levees around the impoundments. Herons and egrets also utilized wetter sites for feeding and loafing during the spring.

All fields were drained in late March. Milo was planted on 48 acres as the refuge share in July. The cooperater also planted 11 acres of milo on unflooded portions of one field as his share. Water releases from New Lake and rainfall during December permitted lower portions of five fields to be flooded by year's end. Moderate use by mallards was noted during November and December.

h. Bear Creek Impoundment

This impoundment, located north of the McCool Field Impoundment and immediately east of Tennessee Highway 76, was formed in 1971 when a levee was constructed across Bear Creek Canal and an adjacent slough. A 24-inch pipe with a stop-log structure was installed in the levee providing the capability to flood 200 acres and created a GTR. Unfortunately, beaver damage through the years has turned this area, plus an additional 200 acres of hardwoods, into a large deadening. This area has been managed as a moist soil/dead timber unit for wintering waterfowl and as a wood duck breeding and brood habitat area since 1985.

During 1991, the stop-log structure used to impound the area rusted out and was removed. Thus, the area flooded naturally during 1993. Funds to rehabilitate the impoundment were received in 1993, but Section 404 permit delays will postpone levee rehab and water control structure replacement until 1994, at the earliest.

3. Forest

After thinning 220 acres or 85 percent of the refuge's pine forest in the summer of 1992, a prescribed burn was accomplished on 182 acres on February 9 and 10. The removal of slash, resulting from the thinning cut, and leaf litter was very successful. Habitat conditions for upland forest wildlife species was noticeably improved during the summer and fall of 1993.

A 450-acre tract of bottomland hardwood timber was identified for timber sale during October. In recent years the forest tract had sustained significant damage from siltation from Bear Creek, beaver impoundments and girdling and flooding during late spring periods.

District Forester Stewart, with assistance from Chickasaw NWR Forester Lafleur, cruised and marked salvageable timber during August and September. Approximately 350 acres were classified as a salvage harvest. The remaining 100 acres were classified as a selective cut to improve forest habitat conditions for wildlife.

An invitation for formal bid during October identified 1,190,904 board feet of sawtimber and 1,153 cords of hardwood pulpwood. No bids were received by the October 18 deadline. However, a negotiated sale with Reelfoot Lumber Company was agreed to on October 21. Timber harvest operations commenced on October 22, but were forced to cease during mid-December due to wet conditions. Harvest operations will resume in the spring of 1994. Receipts of sale during the period totaled \$48,818.

4. Croplands

Hatchie formalized Cooperative Farming Agreements with two local farmers in 1993 to plant 925.2 acres. Field acreages were remeasured by the local Agricultural Stabilization and Conservation Service office prior to preparing agreements. This process, plus a deletion of portions of some fields with poor growing conditions, reduced the refuge cropland acreage from 1,011 in 1992.

Late planting, due to wet soil conditions during most of May and June, required milo be substituted for corn as previously planned. Therefore, the entire refuge share, except 21.5 acres of Japanese millet, was planted in milo. One cooperative farmer also planted his 653.9-acre share in milo. The other cooperator planted soybeans in his 91-acre share.

The elimination of the restricted herbicide Atrazine on refuge soils in 1993 had a negative impact on weed control. The cooperative farmer producing milo for the refuge and himself was required to increase mechanical cultivation effort and utilize 2,4-D as a post-emergent spray. Several alternative herbicides were considered prior to planting and Princep (Simazine) was tested by the cooperator with poor results. Therefore, Dual was the only pre-emergent herbicide used in milo production.

During May 398 tons of lime were spread over 200 acres of designated crop fields in the Hillville area by a refuge farmer per terms of his Cooperative Farming Agreement.

An informative newspaper article concerning the refuge farming program entitled "Farming in the Levees, the Hatchie Refuge Farming Program", was presented in the Brownsville States-Graphic during October.

10. Pest Control

Participation in the U.S. Forest Service's gypsy moth trapping program was accomplished again in 1993. The results were negative. Thankfully, the gypsy moth has yet to reach Hatchie Refuge.

12. Wilderness and Special Areas

Two areas originally proposed as public use natural areas have been established as designated Refuge Natural Areas (RNA). The Pike Hole RNA is 200 acres and the Shannon Tract RNA is 300 acres.

15. Private Lands

Plans were developed and implemented in 1990 and 1991 to flood part of a 300-acre tract under a PARTNER's project. The property belongs to D.R. Nunn in Crockett County, and lies along the Forked Deer River. To provide waterfowl habitat, three stop-log structures, two 24-inch and one 36-inch, were installed on existing drainage pipes enabling the flooding of 100 acres. In addition, hunting restrictions, which limit hunting to three 1/2 days per week, and a flooding timetable (November 1st to March 1st) were established.

G. WILDLIFE

1. Wildlife Diversity

Hatchie maintains several wetland and upland habitat types that provide requirements of resident and migrant wildlife. Management practices such as timber harvest, moist soil and farming programs, old field and edge maintenance, and beaver control programs are used to improve Hatchie's habitat for wildlife. The refuge has recorded over 200 species of birds and 50 species of mammals.

2. Endangered and Threatened Species

Two adult bald eagles was observed almost daily by the refuge staff during January-March 9 at Oneal Lake. The plentiful perches and abundant fish and waterfowl food sources should continue to attract bald eagles to the lake and adjacent bottomlands in the future. Hopefully the pair of bald eagles will also choose to nest at the refuge in 1994.



Oneal Lake's excellent habitat attracted a pair of adult bald eagles during January-March 9. (R200-01-93,GHS)

The Hatchie Refuge staff participated in monthly eagle surveys and meetings conducted by the Kentucky-Tennessee Eagle Management Team.

Several State listed species were also observed on Hatchie Refuge, including ospreys, sharp-shinned hawks, northern harriers, Coopers hawks, Mississippi kites and river otters.

3. Waterfowl

Duck use was slightly below the ten year average, while goose use was significantly less.

Low waterfowl use is attributed to several factors. Mild weather persisted into December prompting many prospective migrants to linger in the more northern latitudes. Lack of significant rainfall during the fall and early winter period also limited waterfowl use to reservoirs, lakes and field impoundments with alternative water sources.

Duck use days for 1993 totalled 1,238,100, or 83 percent of refuge objective and a nine percent decrease from the 1984-93 average. Peak numbers in January were 12,700. February's peak was 8,670 and

this downward trend continued into March. By mid-April almost all migrants had departed, while the usual summer complement of wood ducks and hooded mergansers increased. June provided numerous sightings of wood duck and hooded merganser broods. The first wintering mallards arrived in early November with a peak of 1,370 ducks by month's end. Duck activity increased in December, peaking at 12,590 ducks. Mallards contributed the most use-days with 90 percent. The remaining 10 percent was contributed by wood duck, black duck, gadwall, ring-necked duck, and hooded merganser.

Ducks used the Coffee and Morrison Fields, Oneal Lake, McCool Fields, Friedman Fields and GTR, and the Hillville Impoundments extensively. When flooding occurred in the bottomland timber, however, they dispersed throughout the refuge to feed on the abundant acorn mast.

Goose use days totalled 39,375, or 72 percent of refuge objective and a 60 percent decrease from the 1984-93 average. Peak populations of 315 geese during January and 204 during February marked highest winter populations. By the middle of March, most migrants had left, leaving only the resident flock of giant Canada geese, determined in June to number 75. The first winter migrants returned in December, with mild weather limiting migration to 350 geese by year's end.

Both resident and migrant geese used Big Lake and New Lake water storage reservoirs and the adjacent pasture areas as a primary roosting and loafing area. The reservoirs also provide brood rearing habitat during the summer period.

The refuge commenced participation in the Regional wood duck population monitoring initiative on March 17, with call counts being recorded along Powell and Windrow Roads (10 miles). Call counts were also recorded on March 22, 29 and April 6. In conjunction with the initiative, 116 nest boxes were inspected for use. A total of 95 active nests were reported or 82% use of nest boxes by wood ducks and hooded mergansers. On March 23 project coordinator Jim Kelley, Migratory Bird Management Office and Donald Orr, Wildlife Management Biologist, visited the refuge and inspected the survey route and nest box program and discussed study with Manager Nichols and Biological Technician Baxter, who is conducting the field work.

In November and December several wood duck nest boxes were checked along Windrow and Powell Roads. Box utilization was good by both wood ducks and hooded mergansers. The number of nest boxes and their use by these species and other wildlife are presented on the annual report form provided in this section.

Table III. WATERFOWL USE DAYS 1965-1993

<u>YEAR</u>	<u>DUCKS</u>	<u>CANADA GEESE</u>
1965	42,500	
1966	140,200	
1967	81,500	
1968	331,600	4,600
1969	310,800	300
1970	833,800	11,000
1971	578,612	2,233
1972	1,257,049	1,234
1973	1,287,410	3,000
1974	1,387,567	11,470
1975	1,900,282	5,458
1976	2,919,930	35,185
1977	3,195,806	878,688
1978	1,362,114	136,444
1979	1,541,547	144,679
1980	1,090,560	28,242
1981	916,328	44,326
1982	1,220,767	43,894
1983	1,308,141	38,652
1984	1,364,582	63,320
1985	1,590,474	63,300
1986	1,180,675	38,490
1987	1,696,698	55,201
1988	1,659,053	60,191
1989	1,800,560	211,558
1990	753,600	372,451
1991	1,168,000	46,675
1992	1,202,500	43,472
1993	1,238,100	39,375
Current Refuge Objectives	1,500,000	55,000

HATCHIE NWR
ANNUAL REPORT FORM
WOOD DUCK BOX PROGRAM INFORMATION
YEAR 1993

Total Boxes Up	<u>250</u>	
Total Checked Boxes	<u>210</u>	
Use by Wood Ducks of Usable Boxes	<u>175 (70%)</u>	
Number of Successful Boxes (Wood Ducks)	<u>113</u>	
Use by Other Ducks of Usable Boxes	<u>121 (48%)</u>	
Period Checked (Month)	<u>Dec-Jan</u>	
Use of Other Wildlife of Usable Boxes	<u>35 (14%)</u>	Owls, squirrels, raccoons, songbirds
*Total Wood Ducks Hatched	<u>1130</u>	
Wood Duck Broods Produced	<u>113</u>	
**Wood Ducks Surviving to Flight Stage	<u>565</u>	
Plans for Next Year (Indicate Number)		
<u>16</u> More Boxes	<u>0</u>	Entrance Holes
<u> </u> Fewer Boxes		Created in Trees
<u> </u> No Change		

***Remarks: Twenty unserviceable boxes were taken down. Sixteen new boxes on Powell and Windrow Roads. Bird predation was noted in boxes on Windrow Road. Raccoon use was noticeable in Swan and Hart #1 Lakes.

*Unless you can actually count egg shells, just multiply successful boxes by 10.

**If survival rate is other than 50 percent, please explain rationale in remarks section.

***Be sure and document periods that boxes were checked for use and repair.

HATCHIE NWR
 ANNUAL REPORT FORM
 WOOD DUCK BOX PROGRAM INFORMATION
 YEAR 1993
 HOODED MERGANSER USE

Total Boxes Up	<u>250</u>	
Total Checked Boxes	<u>210</u>	
Use by Hooded Mergansers Usable Boxes	<u>121 (48%)</u>	
Number of Successful Boxes (Hooded Mergansers)	<u>56</u>	
Use by Other Ducks of Usable Boxes	<u>N/A</u>	
Period Checked (Month)	<u>Dec-Jan</u>	
Use of Other Wildlife of Usable Boxes	<u>35 (14%)</u>	Owls, squirrels, raccoons, songbirds
*Total Hooded Mergansers Hatched	<u>560</u>	
Hooded Merganser Broods Produced	<u>56</u>	
**Hooded Mergansers Surviving to Flight Stage	<u>280</u>	
Plans for Next Year (Indicate Number)		
<u>16</u> More Boxes	<u>0</u>	Entrance Holes
<u> </u> Fewer Boxes		Created in Trees
<u> </u> No Change		

***Remarks: Twenty unserviceable boxes were taken down. Sixteen new boxes on Powell and Windrow Roads. Bird predation was noted in boxes on Windrow Road. Raccoon use was noticeable in Swan and Hart #1 Lakes.

*Unless you can actually count egg shells, just multiply successful boxes by 10.

**If survival rate is other than 50 percent, please explain rationale in remarks section.

***Be sure and document periods that boxes were checked for use and repair.

4. Marsh and Water Birds

Yellow-crowned night herons were seen occasionally in the spring in flooded areas along Powell and Windrow Roads. Double-crested cormorants were often observed at Oneal Lake during April. Great egrets were present at Oneal Lake and in moist soil areas during spring and summer. Great blue herons used the refuge in good numbers throughout the year.

5. Shore Birds, Gull, Terns, and Allied Species

Mud flats at Oneal Lake and around the draw-down zones of Big and New lakes provide the preferred habitats for shorebirds using the refuge. Yellowlegs and sandpipers were observed at Oneal Lake and most moist soil areas during the spring. A few ring-billed gulls also used refuge reservoirs during the winter period. Killdeer were the most numerous shorebirds seen, with numbers peaking in spring and fall.

6. Raptors

Red-tailed and red-shouldered hawks, barred owls, turkey vultures and black vultures were the most numerous raptors on the refuge and were seen year-round. American kestrels, northern harriers, Mississippi kites and broad-winged hawks were seen occasionally.

7. Other Migratory Birds

Hatchie's bottomland hardwood forest supports a large number of passerines throughout the year, but particularly during the spring migration period. As bottomland habitat continues to decrease, Hatchie becomes increasingly important as feeding and breeding habitat for these smaller migrants.

In response to declines in bird populations which mostly winter to the south of the United States, the National Fish and Wildlife Foundation initiated the Partners in Flight-Neotropical Migratory Landbird Conservation Program to address these concerns. Federal and local government representatives of Latin American and Caribbean Nations, the United States and Canada, a large cross-section of knowledgeable researchers, and a number of major non-governmental organizations are cooperating at local, national, and international levels in this initiative. The refuge's initial response to the initiative consisted of a Working Group Meeting held at the refuge on April 26-27, 1992, with 13 attendees. Specific information requested from the participants included management strategies for various bird species and their habitats. Several refuge areas were toured to observe habitat diversity, quality, improvement and management options.

Assistant Manager Stanley attended the Neotropical Migratory Bird (Partners in Flight) Workshop at Tallulah, Louisiana during August 9-10. The meeting presented an update on research and management strategies. Contacts with several researchers at the meeting and their input should benefit future neotropical bird habitat development and improvements on Hatchie NWR

The Tennessee Ornithological Society conducted the annual breeding bird survey during June.

A revised refuge bird list was printed and made available to the public in July. A reference to neotropical migratory birds was added and those species were noted by bold print.

8. Game Mammals

a. White-tailed deer:

For the past twelve years the Hatchie deer population has been estimated to be approximately 850. Mast production was considered only fair this year, but good body condition was noted in all deer checked during the 4-day quota gun hunt held in October. The good body condition was due to the abundance of agricultural crop vegetation and residue during the summer and fall periods.

Table IV shows the number of deer by age class and sex, taken during the 1993, 4-day Quota Gun Hunt.

Table IV. AGE CLASS OF DEER HARVESTED DURING THE 1993 GUN DEER HUNT

<u>Sex</u>	<u>0.5</u>	<u>1.5</u>	<u>2.5</u>	<u>3.5</u>	<u>4.5</u>	<u>5.5</u>	<u>6.5</u>	<u>7.5</u>	<u>8.5</u>	<u>UNK</u>	<u>Total</u>
Male	24	24	4	1	0	0	0	0	0	0	53
Female	<u>21</u>	<u>17</u>	<u>10</u>	<u>4</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>64</u>
Totals	45	41	14	5	1	2	1	2	3	3	117
Percents	38	35	12	4	1	2	1	2	3	3	

A total of 149 deer were taken by hunters on Hatchie Refuge during 1993. Thirty-two deer were taken by archers and these were checked in at TWRA checking stations where only sex and number of points are normally recorded. A total of 117 deer, 53 bucks and 64 does, were taken during the quota gun hunt. The average live weight of deer in the 1.5-year age class was 116 pounds for bucks and 92 pounds for does.

Table V. HATCHIE DEER HERD GROWTH SINCE ACQUISITION (1965)

<u>YEAR</u>	<u>ESTIMATED POPULATION</u>	<u>ARCHERY</u>	<u>HARVEST</u> <u>GUN</u>	<u>TOTAL</u>
1965	40			
1966	75			
1967	90			
1968	100			
1969	160			
1970	225			
1971	270			
1972	300			
1973	315			
1974	350			
1975	350			
1976	350			
1977	350	18		18
1978	350-400	31		31
1979	350-400	24		24
1980	500	44		44
1981	500-750	75		75
1982	900	80	98	178
1983	900	85	99	184
1984	900	74	82	156
1985	900	71	95	166
1986	800-900	51	70	121
1987	800-900	65	84	149
1988	800-900	31	189	220
1989	800-900	28	160	188
1990	800-900	15	224	239
1991	800-900	7	171	178
1992	800-900	23	129	152
1993	800-900	32	117	149

b. Squirrel:

Both gray and fox squirrels occur at Hatchie, with grays being the dominant species. Squirrel populations were high this year following good mast production in 1992. The outlook for the 1994 population is not favorable due to only fair mast production in 1993.

c. Rabbits:

Swamp rabbits occur throughout the bottomland areas, whereas cottontails occupy the higher sites. Sightings of swamp rabbits were infrequent this year, suggesting a low point in the population cycle. The cottontail rabbit population, however, increased on the refuge and in most of West Tennessee in 1993.

d. Raccoons:

Scent station studies conducted by Dr. Michael Kennedy of University of Memphis have shown the Hatchie bottom to have one of the highest raccoon densities in Tennessee. A suspected outbreak of distemper on the refuge and elsewhere in West Tennessee in 1992 and 1993 was responsible, however, for fewer raccoons during the same period.

e. Opossum:

Opossums are common throughout the refuge. Occasionally they are taken by raccoon hunters, but hunter interest is minimal.

f. Beaver:

Beaver are numerous in the Hatchie bottomland and pose a major threat to Hatchie's bottomland hardwood forest by virtue of their girdling and damming behaviors. They are a year-round Tennessee game species, but their harvest on the refuge is allowed only during other hunting seasons. The forest management plan allows 10% (940 acres) of the forest to be impacted by beaver. This acreage has been exceeded and beaver control activities are conducted by refuge staff. Twenty-seven beaver were removed in 1993.

10. Other Resident Wildlife

Resident wild turkey population estimates range from 100 to 150. Flocks were sighted periodically by staff and visitors as they travelled Powell and Windrow Roads. No gobblers were taken during the spring turkey hunt in 1993 due to flood water limiting access to bottomland areas and cool, rainy weather conditions.

Manager Nichols attended a meeting with the Tennessee Wildlife Resources Agency, University of Tennessee, Knoxville, and the Nature Conservancy on February 1, to discuss the possibility of reintroducing black bear in the Hatchie River bottoms. Due to a lack of thickets and the narrowness of the forested riparian zone, the project will not be recommended. However, the University of Tennessee will conduct further studies.

Dr. Michael Kennedy, University of Memphis, discussed innovative bat management techniques with refuge staff in April. A combination wood duck/bat box was erected near Oneal Lake on May 10. Additional bat boxes and an artificial bat cave will be considered in the future. Dr. Kennedy is interested in commencing a graduate study on the refuge, which supports habitat for twelve bat species, two of which may have low population levels in Tennessee.



Dr. Michael Kennedy (left) with refuge and other University of Memphis personnel erect wood duck/bat box. (R200-05-93, GHS)

11. Fisheries Resources

Ten oxbow lakes, two borrow pit lakes and various sloughs are stocked annually by the flooding of the Hatchie River and no management is conducted nor planned. Four water storage reservoirs and three borrow pit lakes totaling about 195 acres are covered by a fisheries management plan. Only Oneal Lake, 134 acres, has received management efforts during the last few years due to limited Fishery Services staff.

A management survey conducted on Oneal Lake this year revealed a decline in the size of largemouth bass and a reduced bream population. Management recommendations, including removal of certain overpopulated age groups of bass and habitat improvements are planned in 1994.

14. Scientific Collections

University of Memphis (UM) continued a multi-year study of diet and health condition of white-tailed deer. Data were gathered by Dr. Michael Kennedy and students of the UM Biology Department from deer harvested during the quota gun hunts held in October. Data collected included kidney and liver tissues, body and antler measurements and lower jaws for deer age identification.

15. Animal Control

Twenty-seven beaver were removed by snare or gun during the year by refuge personnel as part of the on-going program to control timber damage. Greatly intensified efforts are needed to curtail this ever-present problem.

16. Marking and Banding

One hundred thirty-two pre-season wood ducks were banded at Oneal Lake in July and August, using rocket nets for capture. A total of 84 Hatching Year, 45 After-Hatching Year and three unknown age birds were banded. For the first time in three years, the refuge failed to meet its banding quota. This was believed to be the result of moving the banding site to another location at Oneal Lake to permit Project Fish facility construction.

H. PUBLIC USE

1. General

Public use is primarily focused on fishing, hunting and wildlife observation programs. Several on-site environmental education, interpretation, and wildlife habitat management programs were conducted during 1993. The extensive bottomland hardwood resource, coupled with the fact that the Hatchie Scenic River remains the last unchannelized river in West Tennessee and entire Lower Mississippi Valley, provides a significant interpretative opportunity.

Public access is restricted from November 15 to March 15 annually on approximately 42 percent of the refuge to provide waterfowl sanctuary areas. Extensive spring flooding resulted in additional public access closures from March 29 through May 24. Floodwaters also required the closing of Powell and Windrow Roads from December 6-31.

During March Manager Nichols met with Haywood County leaders and Tennessee Tourism Commission members to discuss Hatchie Refuge and area tourism.

Public Lands Day was celebrated on September 12 with a litter pickup event. Volunteer response was poor, but two refuge employees removed several bags of litter.

7. Other Interpretative Programs

On March 4 Manager Nichols presented a refuge program and tour for the Haywood County Leaders Class, sponsored by the Haywood County Chamber of Commerce. Twelve leaders attended.

Assistant Manager Stanley presented a refuge slide program to a Cub Scout Pack at First Methodist Church, Brownsville on April 19.

On April 23 refuge staff, Stanley and Lewis, participated in Career Day activities at Brownsville High School and Whiteville Junior High School, respectively.

A wood duck nest box exhibit, prepared by refuge staff, was on display at the 13th Annual No-Till Crop Production Field Day at the Milan Agricultural Experimental Station on July 22. Cookeville Fish and Wildlife Enhancement Office personnel operated the Service's booth. An estimated 6,500 people attended the field day and approximately 100 requested and received construction plans for nest boxes.

Fifty-five West Tennessee 4-H Club members participated in a wildlife judging contest at Hatchie Refuge on September 9. University of Tennessee extension agents Bob Smith, Dr. Mike King and Dr. Tom Hill conducted the event. Assistant Manager Baxter accompanied the group during the judging and later conducted a refuge slide program for students and sponsors.

On September 24 Manager Nichols made a Project Fish presentation to a meeting of outdoor writers hosted by TWRA at Pickwick Lake near Savannah, TN. Several writers indicated an interest in writing an article on Project Fish for their publication.

Assistant Manager Baxter presented a refuge slide program for 19 Fourth Grade students and their teacher at Sunny Hill School in Brownsville on September 24.

Manager Nichols provided an in-depth tour of the refuge, the Hatchie River and the Bear Creek drainage system for Ann Murray, new Executive Director of the Tennessee Conservation League, Sam Anderson, Vice President of the League and Joe Guinn, Director for the Tennessee Nature Conservancy on October 12.

Assistant Manager Stanley participated in a panel group of local community helpers comprised of 12 City, State and Federal employees and business leaders on November 5. Approximately 100 first grade students of East Side Elementary School heard a short presentation about each speakers professional responsibilities and how they serve the local community.

Assistant Manager Baxter presented a refuge slide program to 126 6th grade students and their science teachers from Sunny Hill School on November 18 and conducted tours of the refuge on November 19.

Assistant Manager Baxter conducted a refuge slide presentation for 50 students at Haywood High School on December 8. Career opportunities with the Service were also discussed.

Assistant Manager Baxter conducted a refuge tour on December 22 for four local juvenile delinquents, the Haywood County juvenile officer and a social worker who is assigned to work with habitual juvenile offenders. The juvenile social worker requested an environmental education program for the youth as a rehabilitative measure.

8. Hunting

Since 1990, a general hunt permit has been required for all non-quota hunts. The free brochure/permit must be signed and in the hunters possession while afield. The brochures/permits are distributed to the State wildlife agency, local sporting goods outlets and made available at the refuge office and all entrances to the refuge. Since the regulation was initiated, compliance has been good and the requirement has helped generate public awareness of refuge regulations and programs.

A ten dollar permit fee has been charged for all quota permits to hunt wild turkey and deer with gun since 1991. The purpose of the fee is to recover the cost of administering these special hunts. Public acceptance of the permit fee has been good.

A new regulation requiring possession and use of steel shot only while hunting small game (squirrel, raccoon, opossum, quail and rabbit) and other migratory birds with shotgun was initiated in 1992. This regulation was warranted because the area, where most hunting occurs, floods during the winter-spring period attracting many ducks which concentrate and feed. The regulation was endorsed by the Tennessee Wildlife Resources Agency in May 1992. During 1993 news releases per subject were forwarded to all area news media. Most ammunition suppliers in the regional area were also provided news leaflets to be displayed in the stores. "Steel Shot Zone" signs were also erected at all refuge entrances. Hunter compliance has been good and most understood the purpose for the change.

The 1993 refuge turkey season attracted 215 applications in February for fifty permits, however, only 40 submitted the ten dollar permit fee. The hunts, April 9-11 and 23-25, produced a light turnout of approximately 30 hunters due to thunderstorms, windy conditions and floodwaters. This resulted in no turkeys being harvested during 1993.

The special three-night raccoon hunt, held on September 16-18, prior to the regular state season, allowed hunters during approximately 428 hunter-nights to harvest a total of 46 raccoons. The hunt is intended to increase harvest of a raccoon population determined by University of Memphis research studies to be among the highest in Tennessee. Unlike 1990, no animal rights activists demonstrated or protested the hunt. Their main concern then was that the early hunt would take nursing females, thus leaving young to die in the den. Dr. Michael Kennedy, University of Memphis, has collected data demonstrating a very low occurrence of lactating females during the early season. University of Memphis staff continue to collect biological data during the special season for ongoing studies of raccoon in West Tennessee.

The regular refuge raccoon season was concurrent with the Tennessee Statewide season (October 15 - February 15). An estimated 590 hunter-nights were expended to harvest approximately 250 raccoons.

The refuge small game seasons (squirrel, rabbit and quail) and other migratory bird seasons (mourning dove, snipe and woodcock) opened and closed with the Tennessee State seasons. Hunters expended approximately 1,672 hunter-days to harvest an estimated 2,500 squirrels, 35 rabbits and 30 bobwhite quail. The reason for the low harvest of rabbit and quail is due to their habitat on the refuge being minimal and the preferred habitat occurring within the waterfowl sanctuary areas which are closed November 15, allowing only one or two days of hunting exposure.

An estimated 1,140 hunter-days were expended during the 16-day deer archery season (September 25-October 10), resulting in the harvest of 32 deer. The quota gun hunt (October 16, 17, 23, 24) attracted an estimated 723 hunter-days with 117 deer harvested. The gun hunt was restricted to 610 permittees, ten of which were identified for wheelchair-bound hunters and their hunting assistants. For the second consecutive year, four deer were harvested by this group. A total of 1,371 applications were received.

Hunting during the State-wide 5-day wood duck season (September 11-15) was impractical due to poor access into the Porter Hole area. The Hatchie River is typically low during this time of the year and access to the hunting area requires a fairly high river stage. Duck and coot hunting was also permitted on Tuesdays, Thursdays and Saturdays until noon during the late 4-day (December 4-7) and 26-day (December 26 - January 20) seasons. During 1993 an estimated 190 hunter-days were expended to harvest approximately 75 mallards and 50 wood ducks.



Wheelchair hunter with his bag limit. (R100-10-93, MLN)

9. Fishing

a. General

The refuge fishing program is very popular with local and regional fishermen. The nine oxbow lakes, five borrow pit lakes, three water storage reservoirs, streams and sloughs and banks of the Hatchie River provide good sport fishing opportunities. An estimated 6,150 fishing-days were expended in 1993. Intermittent flooding conditions during the spring reduced sport fishing use during the normally active March-May fishing period. June was the most active period for sport fishermen with 2,100 fishing-days.

b. Special Fishing Events

The Third Annual Tennessee Peach Festival Jr./Sr. Fishing Rodeo was the highlight of the fishing season at Hatchie NWR and a tremendous success again in 1993. The special family fishing event was held on June 12 at Oneal Lake in conjunction with National Fishing Day and the Tennessee Peach Festival, a highlighted event in Brownsville and Haywood County. The event allowed 225 preregistered teams to compete for 28 trophies, with each team composed of one child and one adult. All prizes were awarded to the children and every child who registered received a prize. First, second and third place trophies were presented to children

in three age groups and three fish species categories. Participants were allowed to keep all fish caught. A total of 450 children and adults participated, catching over 538 pounds of fish. Approximately 100 non-participating visitors and family members observed. Workers included seven refuge employees and 36 volunteers. Eight volunteer organizations provided personnel, equipment and services while eleven local businesses donated \$150 for trophies and three lure companies donated fishing tackle valued at \$300. Co-sponsoring organizations included the Brownsville/Haywood County Chamber of Commerce, Haywood County Bass Club, Friends of the Hatchie and Tennessee Peach Festival Fishing Rodeo Committee. Baseball legend, Marvin Thorneberry, and local elected officials, Sheriff and Municipal Judge, presented trophies.



Winners show off their trophies won during the 1993 Jr./Sr. Fishing Rodeo. Marvelous Marv Throneberry (far left) said, "What am I doing in this picture?" (R200-06-93, GHS)

c. Project Fish

Since 1987, Hatchie National Wildlife Refuge along with the US Fish and Wildlife Service Region 4 Public Use Branch and Engineering Division have been involved in the development and implementation of what has evolved into Project Fish. The Service completed advanced plans for an office/visitor center in 1987 followed in 1988 by an updated Public Use Plan. This Plan centered environmental education and public use around Oneal Lake. Later refinements of the Public Use Plan included special fishing events

highlighting the sport of fishing and fishing structures, accessible not only to people in wheelchairs, but to people with all types of disabilities as well as the able-bodied.

The refuge staff set up working partnerships with the Veterans Administration and Baptist Hospital Recreational therapists, The Center for Independent Living, Alliance for the Blind, Jackson STAR Center, Haywood/Madison Developmental Services and other local groups who work with people having various disabilities. The refuge staff also made contacts with individuals throughout the U.S. which resulted in the formation of a nationwide accessibility review panel.

From the ongoing working relationship between the refuge, the Public Use Branch, the Division of Engineering and the nationwide panel, the idea of Project Fish evolved. The Oneal Lake site at Hatchie National Wildlife Refuge will serve as the Regional field test site for accessible facilities using the accumulated expertise of the nationwide review panel.

The overwhelming response to the May 3, 1992 television airing of the Bill Dance Outdoors show, which featured the Assistant Secretary of the Interior introducing Project Fish to the Nation, moved Project Fish from a Regional project to a Nationally significant one. To date groups or individuals in 22 states, Canada, England, and South Africa have requested assistance from Project Fish.

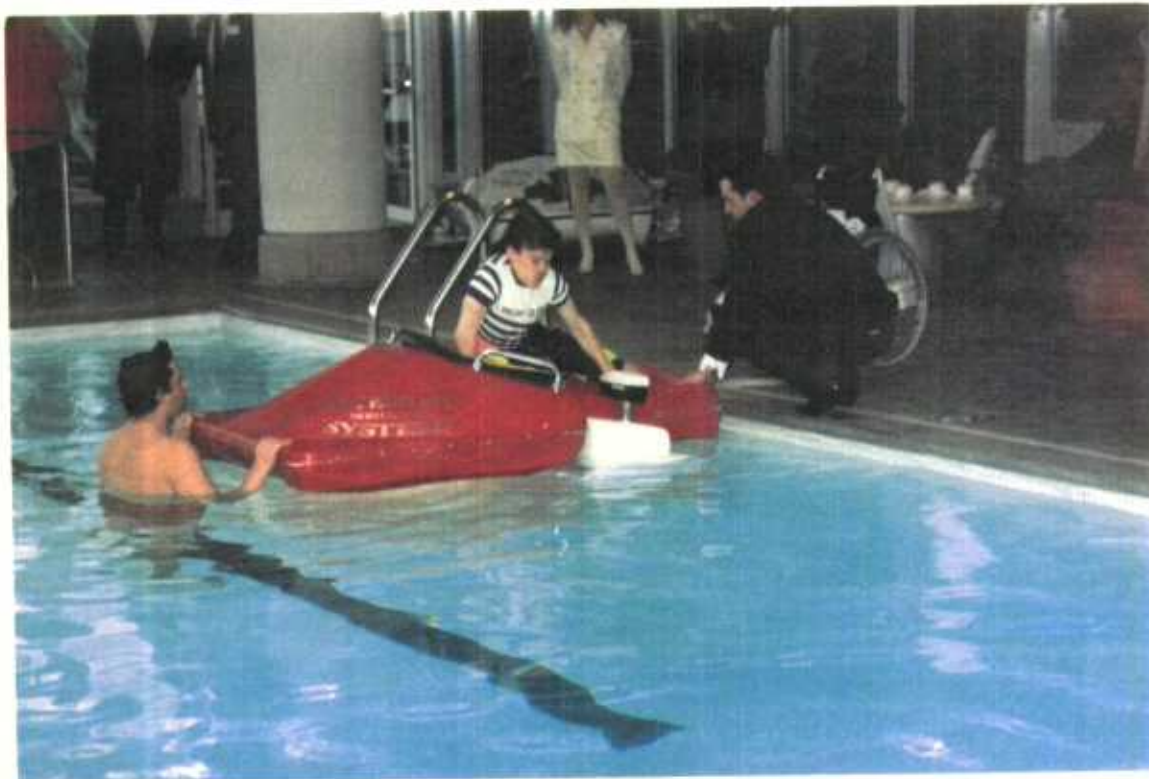
Funds to support this project have been received from private individuals, organizations (Bass Research Foundation, Moose Club), industry (Berkley), business (Brownsville Bank, Kroger), as well as other agencies (Soil Conservation Service-\$25,000). All non-Federal funds match a \$100,000 National Fish and Wildlife Foundation grant. To date nearly \$150,000 in public and private funds have been spent on the development of Project Fish. In FY-94 \$500,000 in construction funds were received from the Service to provide parking, bathrooms, and additional fishing structures to complete Phase 1 of Project Fish. Additionally there are about \$30,000 in private funds which will match \$15,000 of the National Fish and Wildlife Foundation grant.

In addition to donated funds, Berkley, Storm, Strike King, and Haywood County will donate equipment and materials (i.e., fish habitat structures, gravel) in 1994. In 1993 Tennaco Gas Co. donated 17 joints of 26 in. diameter thick-walled, gas pipeline pipe in lengths ranging from 14 feet to 42 feet. Also Clemson, Mississippi State University, University of Memphis, and perhaps the University of Tennessee at Martin will conduct research coordinated with this project.

Project Fish is intricately tied to the consumer both in design and modification of structures as well as in broad-based financial

support. The project revolves around the well-organized Nationwide Team comprised of private citizens and Region 4 Service support and implementation. Berkley, Storm, Fenwick, Strike King, Bill Dance Outdoors, Southern Forest Products Association, National Marine Manufacturers Association, and Alternate Mobilization Systems, Inc. (AMS) in British Columbia are industry partners in Project Fish. Project Fish is a unique association of consumers, industry, business, and government working together to provide improved fishing, not just for one segment of our society, but, for every citizen.

On January 28 Manager Nichols attended the Product Announcement ceremonies for Aquaccess, a boat built specifically for people with disabilities by Alternate Mobilization Systems, Inc. (AMS) of Burnaby, British Columbia. AMS as a partner in Project Fish not only donated two Aquaccess boats, but will also donate 3 percent of all U S sales to the project. Additionally, they are working closely with the Canadian Government to construct Project Fish facilities all across Canada. Vancouver is building a facility on Deer Lake within the city and the Provincial government will build one on Raleigh Lake. Furthermore the Canadian Parks Service is delighted with the tangible assistance received from the Service through Project Fish and will use Project Fish designs.



The Product Announcement for Aquaccess, a boat designed specifically for people with disabilities, was held in Vancouver, British Columbia. (R100-01-93, MLN)



The Aquaccess on Deer Lake in Vancouver, British Columbia. (AMS)



Manager Nichols accepted two specially designed boats from Alternate Mobilization Systems, Inc. Roger Shakespeare makes the presentation as Sven Robinson, Member of Parliament in British Columbia looks on. (AMS)

On January 18 Sammy Lee interviewed Manager Nichols for his radio show Tightlines with Sammy Lee. Three 3 minute shows on Project Fish aired over 80 affiliate stations.

On August 3 Memphis Channel 3, WHBQ, shot a 5 minute interview with Manager Nichols on the newly constructed Project Fish facilities.

On September 8 Manager Nichols along with Dr. Hal Schramm, Fisheries Coop Leader at Mississippi State, and volunteer Judy Pachner of California presented the Project Fish program to the National Marine Manufacturers Association's Boating Facilities Committee at the Chicago Boat Show. The Committee, who were already aggressively working in the accessibility arena, pledged support of the project.

About two weeks later Mr. Martin McDonald, Sales Manager for Atlantic Meeko, The Marina Company, who makes floating docks and marinas in McAlester, Oklahoma, offered the Company's assistance with the project. Then on October 21, Michael Shank of Bellingham Marine in Lake Ozark, Missouri made an on-site visit to see the facilities and look at future plans. Mr. Shank indicated they would do a "knock your socks off" project, if they became involved with Project Fish. Bellingham Marine had not made a final decision at year's end.

Dr. Schramm and two graduate students from Mississippi State visited the refuge on November 18 to conduct a fisheries survey of Oneal Lake. Dr. Schramm, now with the National Biological Survey, is planning to assist Project Fish by not only providing fishery management guidance, but also assigning up to two graduate students to work with Berkly and the Bass Research Foundation on design and placement of fish habitat structures. He is also interested in helping collect feedback data from the users. A close working relationship has developed with our new sister agency.

On December 28 Mark Trinko, Regional Market Manager for Southern Forest Products Association, made an on-site visit to see the facilities and discuss ways their association could help Project Fish. A working relationship will be developed over the coming year.

Construction of the first Project Fish facilities on Oneal Lake began under Contract No. 14-16-0004-92-108 in October 1992 by Graves and Graves Construction Company, Inc. of Parsons, Tennessee. Only earthwork was completed in 1992. Work resumed March 25, 1993 and by July the majority of the work was completed and engineering inspected the project July 27. Several minor problems were corrected by the contractor in August, but a major drainage problem will take additional earthwork in 1994 to correct.



Construction of the first Project Fish facility began October 1992.
(R100-04-93, MLN)



Sloan Lessley, who works for the Arkansas Game and Fish Commission and was the principal designer of this Project Fish facility, makes inspection of the completed structure. The feedback loop from users is a primary part of Project Fish development. (R100-07-93, MLN)

Facilities constructed include a shoreline structure with 5 fishing positions designed for wheelchairs and a 96 ft. pier with 12 fishing positions. Also completed was a portion of the planned parking and a portion of the planned pond levee with accessible path to the fishing facilities.

11. Wildlife Observation

Wildlife observation attracts approximately 11,000 visitor-trips annually and is a leading form of recreation throughout the year when refuge roads are open. The refuge visitor can usually observe deer, wild turkey, Canada geese, wood ducks and several species of songbirds in an early morning or afternoon trip through the refuge. Bird watching is a popular activity with several members of the Tennessee Ornithological Society making Hatchie NWR a frequent stop.

The refuge participated in the National Watchable Wildlife Program in 1993 by coordinating with the Tennessee Wildlife Viewing Guide Committee to produce a booklet identifying viewing locations in Tennessee and permitting the Tennessee Department of Transportation to install directional signs at two refuge entrances. The program involves several Federal and State agencies nationwide in promoting wildlife observation.



The State Highway Department installed Wildlife Viewing Area signs at the entrance to Powell Road. (R200-09-93, GHS)

17. Law Enforcement

The new Steel Shot requirement, placed on all small game and other migratory bird hunters using shotguns, was monitored for compliance by Refuge Officers and Tennessee Wildlife Resources Agency Officers patrolling the refuge. Compliance was excellent due to signing and news releases.

Stolen vehicles were abandoned on the refuge on January 14 and May 13, respectively. The Haywood County Sheriff's Department and Tennessee Highway Patrol investigated the incidents.

A Refuge Law Enforcement Assessment was completed in September. In addition to the two collateral officers on staff, one full-time or seasonal Law Enforcement Officer (1802) and one more collateral officer were recommended to maintain an adequate law enforcement program for current and future needs.

No marijuana cultivation was found on Hatchie Refuge during 1993. Three plants were retrieved from the refuge by County Sheriff and Refuge Officers in 1991.

Table VI. LE CASES PROCESSED IN FEDERAL SYSTEM 1993:

DATE:	VIOLATION:	DISPOSITION:
09/04	Possession of lead shot during small game season	\$50 Fine
09/04	Possession of lead shot during small game season	\$50 Fine
*09/07	Destruction of government property	\$200 Fine
	Unlawful Entry by Vehicle	\$50 Fine
	Possession of Firearm during closed season	\$100 Fine
09/26	Hunting small game during closed season	\$50 Fine
*11/03	Destruction of government property	\$200 Fine
	Unlawful Entry by Vehicle	\$50 Fine

* Violation occurred in 1992.

I. Equipment and Facilities

1. New Construction

The first phase of Project Fish facility construction began at Oneal Lake on October 29, 1992. Intermittent wet conditions during the winter period delayed construction, but the contractor, Graves and Graves Construction, began hauling and moving dirt and gravel for the proposed parking lot and access trail on February 1. Construction of the first of two fishing piers began by the end of March. The lake, already lowered for planned construction, had to be lowered further to allow access for the contractor's pile driver. The two proposed piers were completed by April 23. During the latter part of June the parking lot and connecting trail to the fishing piers were black-topped and painting of parking lines and erection of signs were accomplished. Following an on-site inspection by Regional Engineer Gene Metzger and Manger Nichols on July 27, additional leveling, planting of bermuda grass and other landscaping requirements were completed during August. At year's end the project was complete with one major drainage problem to be repaired.

2. Rehabilitation

Two major rehabilitation projects were planned and funded for implementation in 1993. These projects, the Friedman GTR levee and Bear Creek levee rehabilitation projects, were inspected for Section 404 permit requirements by Corps of Engineers and Tennessee Department of Environment and Conservation representatives in early March. At the recommendation of the Federal and State representatives, a permit application was filed with both agencies on May 19.

At the above agency's recommendation, all proposed projects, including those planned after 1993, were identified where impacts to wetlands might exist. Therefore, the permit application included fifteen potential projects. A strong consideration in combining all projects into one permit was the State's \$3,000 fee for processing all applications for Water Quality Certification. Surprisingly, this applies to all applicants, including State and Federal agencies.

The permitting agency representatives projected a 60-90 day waiting period for permit processing and agency and public review. The refuge began preparing for project construction by purchasing water control structures and culverts, borrowing two dirt pans from Tennessee NWR and repairing construction equipment. Unfortunately, the State water quality certification process took nine months, thus the two projects planned in 1993 will not be implemented until

1994, at the earliest. Fortunately the Friedman GTR levee remained intact during the 1993 winter flood period.

During the summer of 1993, the refuge maintenance staff rehabilitated an estimated 50 yards of the Friedman GTR levee not requiring a Section 404 permit. The levee was modified to divert water from the Friedman GTR to Oneal Lake as a water supply source for the lake during the fall or winter period when water is available. Oneal Lake was maintained at high pool during the 1993 winter period due to the new water supply.

The refuge maintenance staff commenced repairs and expansion to a pole storage shed at the Hillville Maintenance Area in mid-March. Several posts were replaced, the roof extended over the two above ground fuel storage tanks and oil storage building, and the roof and posts painted. The improvement increased the structure's storage capacity and enhanced its overall appearance and longevity.



Refuge pole storage shed after rehabilitation. (R200-06-93, GHS)

3. Major Maintenance

All 35 miles of refuge roads and dikes were maintained by grading, spot graveling and mowing during the year. Major maintenance was required in several portions of Powell Road, Windrow Road and Swan Lake Road during May where gravel had been swept from the road during winter flooding. Portions of Powell Road were spot graveled

during July when a dump truck was borrowed from Reelfoot NWR. Dirt was also hauled and spot spread on Borrow Pit Lake Road and McCool Lakes Road.

Parking areas at the refuge's nine oxbow lakes and the Powell and Windrow Road rights-of-way were cleared of dead or fallen trees during June.

Conversion of the refuge's original shop building to an improved wood shop was completed in January. The project began in December 1991. During 1992 the 24x30 foot metal building was wired, insulated, paneled and suspended ceiling and lights installed. Installation of new windows and wood trim was accomplished in 1993. The improved facility will be usable for maintenance activities for many years.

4. Equipment Utilization and Replacement

Much time and money were expended on equipment maintenance during 1993. Equipment purchased with BLHP funds in 1978-79 is now reaching the age where parts replacement and repairs are commonplace. The refuge vehicle fleet also required various repairs. Total cost for parts and non-staff labor was approximately \$12,000.

A new GMC mini-van and Chevrolet compact, extended cab, 4x4 pickup were received in 1993, to replace a 1985 Plymouth sedan and 1981 Ford full-size pickup. The Ford pickup was disposed of by General Services Administration sale in October.

A refrigerated trailer was picked up at the Memphis Defense Reutilization and Marketing Office by refuge staff in January and transported to St. Catherines Creek NWR for storage of acorns.

Four items of excess property were distributed by the General Services Administration and picked up by two State agencies and one individual during 1993. These included a 1967 Allis Chalmers wheeled tractor, a Clark 10,000 pound capacity fork lift, a 1968 International dump truck and a 1971 Dodge stake dump truck utilized by the refuge for several years. All items were non-operable due to engine problems.

Several vehicles, office and maintenance equipment and an International TD-20 Dozer were transferred to Reelfoot NWR Complex in 1993. This was due to the transfer of Chickasaw and Lower Hatchie NWR's to the Reelfoot Complex on October 1, 1992.

Two portable rest rooms with disability access for Project Fish visitor use and a 8x5 foot utility trailer to transport a portable welder were purchased in 1993.

The refuge took receipt of a portable Hobart welder and Polaris 4-wheeler from Reelfoot NWR and Mississippi Valley District Forester in June and December, respectively.

The refuge staff picked up several items of excess office furniture at the Regional Office on November 23 during office relocation.

6. Computer Systems

A 386 Swan computer, with 100 MB hard disk drive, Summagraphics digitizer, AutoCad V12-386 software, one Lorans geographic positioning unit, plotter, software for mapping, Omnitali forest inventory program and surge protector were transferred to Reelfoot NWR Complex in 1993.

A Dell Model 200, 286 computer, monitor, Epson printer and uninterruptible power source were transferred to Reelfoot Refuge for administrative responsibilities at Chickasaw and Lower Hatchie NWR's.

In July the refuge purchased ArkCad and ArkView software for the AutoCad program.

The refuge purchased a 486/66 MHz Swan computer, monitor, Panasonic 2023 printer and Dos 6 software in August.

J. OTHER ITEMS

1. Cooperative Programs

The U. S. Geological Survey continued operation of the acid rain monitoring station located east of the work center at Hillville. The station which has been operating since October 1984 continues to provide data for the National Atmospheric Deposition Program/National Trends Network (NADP/NTN). Refuge readings average an approximate pH of 4.3 to 4.7, ten times more acidic than normal rainwater which has a pH of 5.6.

A Special Use Permit was issued to Ford Construction Company during June to permit use of three refuge roads to transport rip-rap, gravel, and equipment to Interstate 40 bridges crossing refuge streams. During the next two years the bridges will be widened and erosion controlled around bridge piers. Refuge access to three borrow-pit lakes will be greatly improved by road improvements required.



I-40 Bridge Rehab (R200 10-93, GHS)

4. Credits

Sections A,B,C,D,E (except 2,3,4,6 and 7.),F,G,H (except 9.)I, and J (except 1.) were prepared by Glenn H. Stanley.

Sections E 7. and H 9. were prepared by Marvin L. Nichols.

Sections E 2,3,4 and 6 and J 1. were prepared by Linda Baxter.

The report was edited by Marvin L. Nichols and typed by Janice L. Hinsley.

L. INFORMATION PACKET
(inside back cover)

Birds



Hatchie

National

Wildlife

Refuge

Birds

How to use your checklist

Hatchie National Wildlife Refuge was established in 1964 to provide a feeding and resting area for migratory waterfowl. Today, the refuge encompasses 11,556 acres of predominantly lowland forest which attracts over 200 species of birds, either on a part-time or year-round basis. Waterfowl wading birds, raptors, and songbirds abound at various times of the year. They can be seen by hiking along levees, field or wooded roads.

This checklist was designed to be informative and simple to use. The list is arranged in the order established by the American Ornithological Union. Symbols which appear in this checklist represent the following:

seasonal appearance

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

seasonal abundance

a - abundant	a common species which is very numerous
c - common	certain to be seen in suitable habitat
u - uncommon	present but not certain to be seen
o - occasional	seen only a few times during a season
r - rare	seen at intervals of 2 to 5 years
* - nests on the refuge	

Species in bold print are neotropical migratory birds, which breed in North America and winter in Mexico, Central America, the Caribbean and South America. They appear to be declining due to habitat loss and related problems.

This checklist includes 216 species of birds and is based on observations by refuge personnel and visiting ornithologists. If you should find an unlisted species, please let us know at Refuge Headquarters. We will appreciate your help in updating our records.

	<u>SP</u>	<u>S</u>	<u>F</u>	<u>W</u>
Loons				
___ Common Loon	r		r	
Grbes				
___ Pied-billed Grebe*	c	u	c	c
Pelicans and their Allies				
___ Double-crested Cormorant	u		u	u
___ Anhinga		u	u	
Hérons, egrets and allies				
___ American Bittern	o		o	
___ Least Bittern	o	o	o	
___ Great Blue Heron	u	c	u	u
___ Great Egret	u	u	u	
___ Snowy Egret	u	u	u	
___ Little Blue Heron	u	c	u	
___ Cattle Egret	r	r	r	
___ Green-backed Heron*	c	c	c	
___ Black-crowned Night-Heron	o	r	o	
___ Yellow-crowned Night-Heron*	c	c	c	
Ibises, spoonbill, stork				
___ White Ibis		r	r	
___ Wood Stork	r		r	
Waterfowl				
___ Greater White-fronted Goose				r
___ Snow Goose	u		u	
___ Canada Goose*	u	c	u	c
___ Wood Duck*	c	a	a	c
___ Green-winged Teal	c		c	u
___ American Black Duck	c	r	c	c
___ Mallard*	c	o	c	c
___ Northern Pintail	c		c	c
___ Blue-winged Teal	c	o	c	u
___ Northern Shoveler	u	r	u	u
___ Gadwall	c		c	c
___ American Wigeon	c		c	c
___ Canvasback	u		u	u
___ Redhead	u		u	u
___ Ring-necked Duck	c		c	c

	<u>SP</u>	<u>S</u>	<u>F</u>	<u>W</u>
___ Lesser Scaup	c		c	c
___ Common Goldeneye	r		r	r
___ Bufflehead	u		u	u
___ Hooded Merganser*	c	a	c	c
___ Common Merganser	u		u	u
___ Red-breasted Merganser	u		u	u
___ Ruddy Duck	u		u	u
Vultures, hawks and allies				
___ Black Vulture*	u	c	u	u
___ Turkey Vulture*	c	c	c	u
___ Osprey	u	r	u	r
___ Mississippi Kite	o	o	o	
___ Bald Eagle				r
___ Northern Harrier	c		c	c
___ Sharp-shinned Hawk	r	r	u	u
___ Cooper's Hawk	r	r	r	r
___ Red-shouldered Hawk*	c	c	c	u
___ Broad-winged Hawk	c		c	c
___ Red-tailed Hawk*	c	c	c	c
___ Rough-legged Hawk				r
___ Golden Eagle				r
___ American Kestrel	u	u	u	c
Gallinaceous birds				
(Quail, turkey and allies)				
___ Wild Turkey*	u	u	u	u
___ Northern Bobwhite*	c	a	a	a
Rails, gallinules, coots and cranes				
___ Sora	u		u	
___ American Coot	c	u	c	u
Shorebirds				
___ Semipalmated Plover	o		o	
___ Killdeer*	c	c	c	c
___ Greater Yellowlegs	o	u	o	
___ Lesser Yellowlegs	u	u	u	
___ Solitary Sandpiper	c	o	c	
___ Spotted Sandpiper	u	u	u	
___ Upland Sandpiper	u	r	u	

	<u>SP</u>	<u>S</u>	<u>E</u>	<u>W</u>
___ Semipalmated Sandpiper	u		u	
___ Western Sandpiper	r		r	
___ Least Sandpiper	u	u	u	
___ Pectoral Sandpiper	u	u	u	
___ Common Snipe	u		u	u
___ American Woodcock	u	u	u	u
___ Ring-billed Gull	o		r	o
___ Common Tern	o	o	o	
___ Forster's Tern	o	o	o	
___ Black Tern*	o	o	o	

Pigeons, doves

___ Rock Dove	r	r	r	r
___ Mourning Dove*	c	c	a	c

Cuckoos

___ Yellow-billed Cuckoo*	c	c	c	
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Owls

___ Barn Owl	o	o	o	o
___ Eastern Screech-Owl*	u	u	u	u
___ Great Horned Owl*	u	u	u	u
___ Barred Owl*	c	c	c	c
___ Short-eared Owl				o

Nighthawks

___ Common Nighthawk	o	o	o	
___ Chuck-will's-widow*	c	c	r	
___ Whip-poor-will*	u	u	u	

Swifts, hummingbirds

___ Chimney Swift*	c	c	c	
___ Ruby-throated Hummingbird*	u	u	u	

Kingfishers

___ Belted Kingfisher*	c	c	c	r
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Woodpeckers

___ Red-headed Woodpecker*	c	c	c	c
___ Red-bellied Woodpecker*	c	c	c	c
___ Yellow-bellied Sapsucker	c		c	c
___ Downy Woodpecker*	c	c	c	c
___ Hairy Woodpecker*	u	u	u	u

SP S E W

___ Northern Flicker*	c	o	c	c
___ Pileated Woodpecker*	c	c	c	c

Flycatchers

___ Eastern Wood-Pewee*	c	c	c	
___ Yellow-bellied Flycatcher	r		r	
___ Acadian Flycatcher*	c	a	c	
___ Least Flycatcher	r		r	
___ Eastern Phoebe*	u	o	o	o
___ Great Crested Flycatcher*	c	c	c	
___ Eastern Kingbird*	c	c	c	

Larks

___ Horned Lark	o	o	o	o
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Martins and swallows

___ Purple Martin	u	u	c	
___ Tree Swallow	u	o	c	
___ Northern Rough-winged Swallow*	u	u	c	
___ Bank Swallow*	u	u	u	
___ Cliff Swallow*	u	u	u	
___ Barn Swallow*	c	a	c	

Jays and crows

___ Blue Jay*	c	c	c	c
___ American Crow*	c	a	a	a
___ Fish Crow	r	r		

Chickadees and titmice

___ Carolina Chickadee*	c	c	c	c
___ Tufted Titmouse*	c	c	c	c

Nuthatches

___ Red-breasted Nuthatch	u		u	u
___ White-breasted Nuthatch*	u	u	u	u

Creepers

___ Brown Creeper	u	r	u	u
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Wrens

___ Carolina Wren*	c	c	c	c
___ Bewick's Wren*	r	r	r	r
___ House Wren	u		u	r

	<u>SP</u>	<u>S</u>	<u>E</u>	<u>W</u>		<u>SP</u>	<u>S</u>	<u>E</u>	<u>W</u>
___ Winter Wren	c		c	c	___ Orange-crowned Warbler	u		u	
<i>Kinglets and gnatcatchers</i>					___ Nashville Warbler	c		c	
___ Golden-crowned Kinglet	c		c	u	___ Northern Parula*	c	c	c	
___ Ruby-crowned Kinglet	c		c	c	___ Yellow Warbler	c		c	
___ Blue-gray Gnatcatcher*	c	c	c		___ Chestnut-sided Warbler	c		c	
<i>Bluebirds, thrushes and robin</i>					___ Magnolia Warbler	c		c	
___ Eastern Bluebird*	u	u	u	u	___ Cape May Warbler	r		r	
___ Veery	u		u		___ Yellow-rumped Warbler	c		c	c
___ Gray-cheeked Thrush	c		c		___ Black-throated				
___ Swainson's Thrush	c		c		___ Green Warbler	c		c	
___ Hermit Thrush	c		c	c	___ Blackburnian Warbler	c		c	
___ Wood Thrush*	c	c	c		___ Yellow-throated Warbler*	c	c	c	
___ American Robin*	c	c	c	c	___ Pine Warbler	u		u	
<i>Thrashers</i>					___ Prairie Warbler*	c	c	c	
___ Gray Catbird*	u	u	u		___ Palm Warbler	c		c	
___ Northern Mockingbird*	c	c	c	a	___ Bay-breasted Warbler	c		c	
___ Brown Thrasher*	c	c	c	c	___ Blackpoll Warbler	c			
<i>Pipits</i>					___ Cerulean Warbler*	c	c	c	
___ American Pipit				u	___ Black-and-white Warbler*	u	o	u	
<i>Waxwings</i>					___ American Redstart*	c	a	c	
___ Cedar Waxwing	c		c	c	___ Prothonotary Warbler	c	a	c	
<i>Starling</i>					___ Worm-eating Warbler	u	r	u	
___ European Starling*	c	c	c	a	___ Swainson's Warbler	u	e	u	
<i>Shrike</i>					___ Ovenbird	c		c	
___ Loggerhead Shrike*	u	u	u	u	___ Northern Waterthrush	c		c	
<i>Vireos</i>					___ Louisiana Waterthrush*	c	c	r	
___ White-eyed Vireo*	c	a	c		___ Kentucky Warbler*	c	c	c	
___ Solitary Vireo	u		u		___ Common Yellowthroat*	c	c	c	
___ Yellow-throated Vireo*	c	c	c		___ Hooded Warbler*	c	c	c	
___ Warbling Vireo*	r	r			___ Wilson's Warbler	c		c	
___ Philadelphia Vireo	u		u		___ Canada Warbler	c		c	
___ Red-eyed Vireo*	c	c	c		___ Yellow-breasted Chat*	c	c	c	
<i>Warblers</i>					<i>Tanagers</i>				
___ Blue-winged Warbler	c		c		___ Summer Tanager*	c	c	c	
___ Golden-winged Warbler	c		c		___ Scarlet Tanager	c	r	c	
___ Tennessee Warbler		a		c					

SP S F W

New world finches

_____	Northern Cardinal*	c	a	c	c
_____	Rose-breasted Grosbeak	c		c	
_____	Blue Grosbeak*	u	u	u	
_____	Indigo Bunting*	c	a	c	
_____	Dickcissel*	c	c	r	

Sparrows

_____	Rufous-sided Towhee*	c	c	c	c
_____	Chipping Sparrow*	c	r	c	
_____	Field Sparrow*	c	c	c	c
_____	Vesper Sparrow	c		c	
_____	Lark Sparrow	r		r	
_____	Savannah Sparrow	c		c	c
_____	Grasshopper Sparrow	r	r	r	
_____	Le Conte's Sparrow	r		r	r
_____	Fox Sparrow	c		c	c
_____	Song Sparrow	c		c	c
_____	Lincoln's Sparrow	c		u	r
_____	Swamp Sparrow	c		c	c
_____	White-throated Sparrow	c		c	a
_____	White-crowned Sparrow	c		c	u
_____	Dark-eyed Junco	c		c	c

Blackbirds, grackles, cowbirds and orioles

_____	Bobolink	o			
_____	Red-winged Blackbird*	c	c	c	c
_____	Eastern Meadowlark*	c	c	c	c
_____	Rusty Blackbird	c		c	c
_____	Common Grackle*	c	c	c	c
_____	Brown-headed Cowbird*	c	c	c	c
_____	Orchard Oriole*	c	c	u	
_____	Northern Oriole*	c	u	c	

Old world finches

_____	Purple Finch	u		o	c
_____	Pine Siskin	r		r	o
_____	American Goldfinch*	c	u	c	c

Weaver finches

_____	House Sparrow*	c	c	c	c
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These additional species are of accidental or rare occurrence on the refuge and have been recorded only once or twice:

Horned Grebe	Willet
Tundra Swan	Marsh Wren
Northern Goshawk	Evening Grosbeak

Sighting Notes

Date: _____ Time: _____ to: _____

Weather: _____

No. of species: _____

Route or area: _____

Observers: _____

Remarks: _____

Ethics for birdwatching

Take care not to disturb nesting birds, exposing eggs and young to extreme temperatures and predation.

Disturb wintering wildlife as little as possible, particularly during critical feeding and resting periods. They need all of their energy reserves to withstand the stresses of harsh weather and migration.

Do not litter! Many birds die when they become entangled in fishing lines, 6-pack rings and other trash, or when they mistake garbage for food.





U.S. Fish and Wildlife Service
Hatchie National Wildlife Refuge
Complex
P.O. Box 107
Brownsville, Tennessee 38012
(901) 772-0501

U.S. FISH AND WILDLIFE SERVICE
HATCHIE NATIONAL WILDLIFE REFUGE
172 HIGHWAY 76 SOUTH
BROWNSVILLE, TENNESSEE 38012

To: _____



Hunting & Fishing
Regulations & Permit
1993-94











Hatchie National
Wildlife Refuge

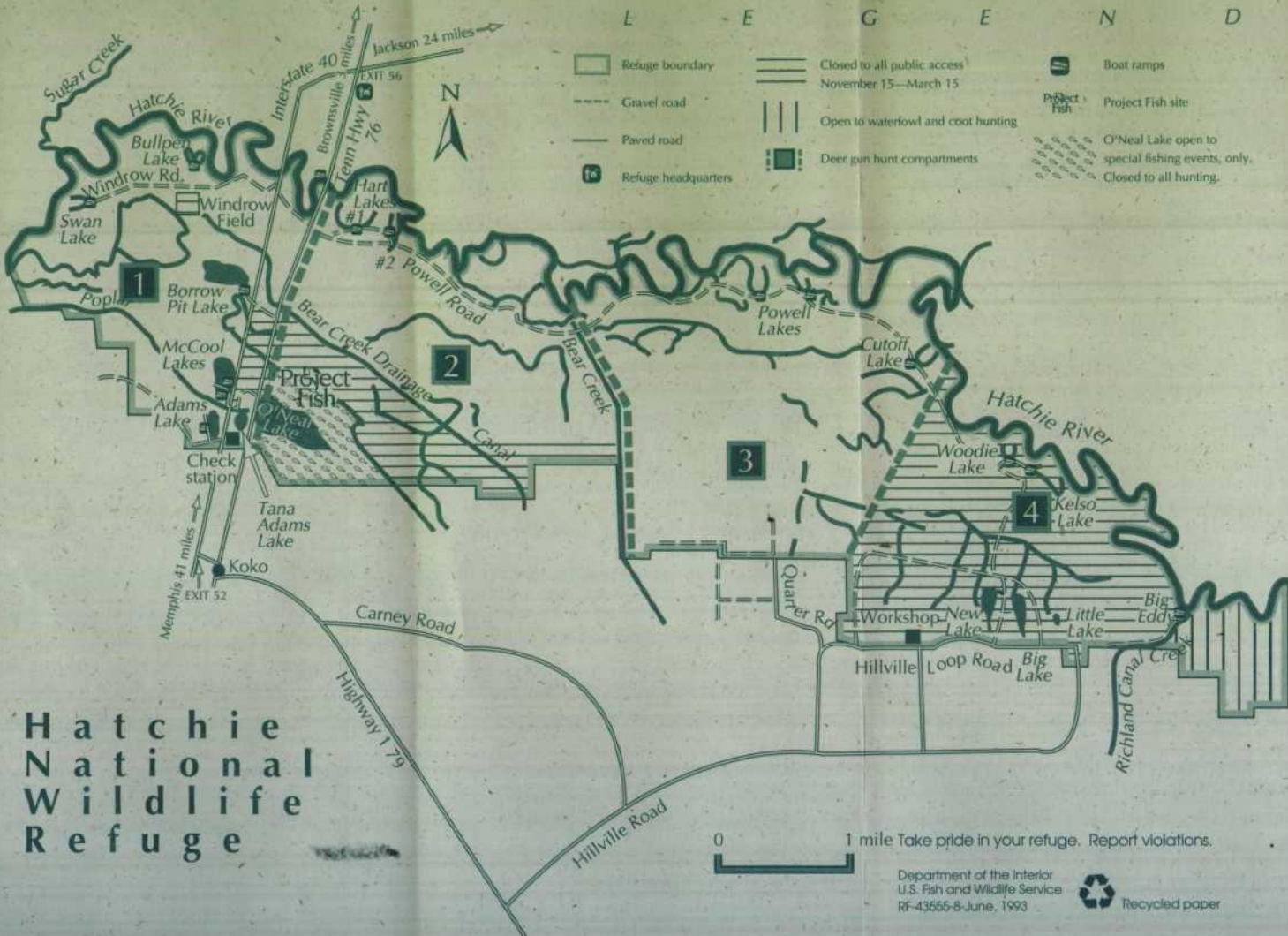
Hatchie National Wildlife Refuge
General Hunting and Fishing Permit 1993-94

I have read and understand these refuge
regulations.

Signed

E E G E N D

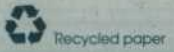
-  Refuge boundary
-  Gravel road
-  Paved road
-  Refuge headquarters
-  Closed to all public access
November 15—March 15
-  Open to waterfowl and coot hunting
-  Deer gun hunt compartments
-  Boat ramps
-  Project Fish site
-  O'Neal Lake open to special fishing events, only.
Closed to all hunting.



Hatchie National Wildlife Refuge

0 1 mile Take pride in your refuge. Report violations.

Department of the Interior
U.S. Fish and Wildlife Service
RF-43555-8-June, 1993



Hatchie National Wildlife Refuge

General Provisions

Hatchie National Wildlife Refuge is one of over 500 national wildlife refuges. The primary objective of a national wildlife refuge is to provide habitat for the conservation and protection of all species of wildlife. The harvest of surplus animals is one tool used to manage wildlife populations. Carefully managed hunts maintain wildlife populations at a level compatible with the environment, provide wholesome recreational opportunities and permit the use of a valuable renewable resource.

The regulations listed below supplement the general regulations which govern hunting and fishing on wildlife refuge areas as set forth in Title 50, Code of Federal Regulations. Hunting and fishing will be in accordance with applicable State regulations.

General Access Regulations

Access: Access for hunting, fishing and other public use is permitted on the entire 11,556 acres of Hatchie National Wildlife Refuge, except as may be regulated by other provisions, such as special closures for sanctuaries, or by signs on the area. Public access is allowed during daylight hours only, one hour before sunrise until one hour after sunset.

Vehicles: Only legally licensed vehicles are allowed on the refuge. ATCs and ATVs are prohibited, except by disabled individuals possessing a refuge special use permit.

Roads: Roads may be closed at any time due to adverse weather conditions or management needs. While on the refuge, vehicles must remain on established roads as designated on the map on the reverse of this leaflet.

Disabled Access: Refuge areas are open to disabled access. Please check with the refuge office for improved access areas.

Parking: Vehicles may be parked alongside open roads in a manner that will not interfere with the normal flow of traffic.

Closed areas: Designated areas will be closed to

hunting, fishing, and all public access from November 15 through March 15 to provide sanctuary for waterfowl. (See map for areas closed.)

Cultural Resources: All natural, historic and archaeological features are protected by Federal law. Persons disturbing or removing archaeological materials or disturbing any burial site will be prosecuted.

Camping and Fires: Prohibited.

Dogs: Dogs are prohibited except when used during small game and migratory bird hunts or during permitted field trials. Contact Refuge Manager for information on field trial permits. Dogs are required to wear a collar displaying the owner's name, address and telephone number.

General Hunting Regulations

Steel shot: All hunters using shotguns for small game and migratory game birds must use and possess shells containing steel shot only. Deer and turkey hunters may use lead.

Hunter Education: Hunters born after January 1, 1969, must possess proof that they have successfully completed a hunter education course. All hunters are encouraged to complete a hunter safety course.

Youth Supervision: Youths up to 16 years of age must be supervised by an adult at least 21 years of age. An adult may supervise only ONE youth under 16 years of age, except two may be supervised in a hunting blind during waterfowl hunts. The adult must be in sight and normal voice contact of the person supervised. Name of the adult supervisor must appear on the quota hunt application.

Species Hunted: Only species listed in this regulations leaflet as open to hunting may be taken.

Permits: Hunters must have a signed permit with them while participating in these activities. They must show the permit, valid state license and identification upon request of any refuge or state wildlife officer.

- 1. General Permit:** The signing of this leaflet on the designated line validates it as your general hunting and fishing permit. It is required for all refuge hunting and fishing except quota permit hunts (gun-deer and wild turkey).
- 2. Quota Permits:** The gun-deer hunts and the wild turkey hunts require quota permits. A ten dollar permit fee, for each drawn (check or money

order) is charged for all quota permits to recover the cost of administering these special hunts.

Application: Submit one stamped, self-addressed official U.S. postal card to the Refuge Manager at the address below. A party of no more than two hunters may apply together on the same postal card. No more than one card will be considered for each person or party. Applications will be hand drawn at the Brownsville town square. **Names and addresses for each applicant must be typed, or plainly printed.**

Application dates:

Gun Deer July 1-31

Wild Turkey February 1-28

Other: It is unlawful to drive a nail, spike, or other metal object into any tree or to hunt from any tree in which a nail, spike or other metal object has been driven. Tree stands left after the season closes will become property of the refuge.

Legal weapons: The refuge will follow the same requirements as outlined by the State, except for limitations in small game hunts.

Specific Hunting Regulations

Migratory Birds

WATERFOWL—Duck and coots only.

Area open: Hunting is allowed in the designated area only. (See map.)

Season: Tuesdays, Thursdays and Saturdays of the State season.

Hunting Hours: 1/2 hour before sunrise until 12 noon.

Bag: Same as State.

Blinds: Only portable blinds and blinds made of natural vegetation may be used. Portable blinds must be removed daily.

Decoys: Must be removed daily.

OTHER MIGRATORY BIRDS—Mourning Dove, Woodcock and Snipe.

These birds may be hunted in accordance with State regulations, season and bag limits. Refuge access and general hunting regulations apply.

BIG GAME

DEER / ARCHERY

- 1.** Permitted during the first 16 days of the State season.

2. Bag limit is same as State limit.
3. Deer taken should be checked at the nearest TWRA check station. Please specify that the deer was taken on the refuge.
4. Use or possession of a pod arrow, any pod device, or any chemical used in pod arrows is prohibited.

DEER / GUN

1. Quota permit required. See permit section for application details.
2. Hunts are scheduled on the third and fourth weekends (Saturday/Sunday) in October.
3. 300 permits plus 4 permits for wheelchair hunters and their aides are issued for each hunt.
4. Two deer of either sex may be taken. The first deer must be checked in prior to hunting the second deer.
5. Hunters must wear, on the upper portion of their body and head, a minimum of 500 square inches of fluorescent orange, visible front and back.
6. Deer must be checked at refuge check station located on Highway 76 (see map).
7. The refuge is not open to the State-wide Youth Deer Hunt.

WILD TURKEY

1. Quota permit required. See permit section for application details.
2. Gun hunting is permitted during two three-day hunts beginning on the second and fourth Fridays of April.
3. One bearded turkey may be taken. Birds taken will be counted in State-wide bag.
4. Turkeys taken should be checked at the nearest TWRA check station. Please specify that the turkey was taken on the refuge.

SMALL GAME

SQUIRREL, RABBIT AND QUAIL

Seasons: Same as State seasons, except all small game hunts are closed during the refuge deer seasons.

Bag: Same as State regulations for each species.

Weapons: Same as State regulations.

RACCOON AND OPOSSUM

Special 3-night seasons: Third Thursday through Saturday in September.

Hours: Dusk til midnight.

Bag: No limit. Game must be checked at refuge check station located at Hillville shop.

Regular season: Same as State.

Night access: The refuge is open at night for raccoon hunting only.

Closed: During deer hunts, including night before deer hunts.

BEAVER AND COYOTE

Season: During any other open refuge season. Permits and legal weapons apply as for the current season.

Bag: No limit

Fishing Regulations

Sport fishing is allowed on all waters within the refuge except O'Neal Lake, which will be opened during special events only.

The sport fishing season is open year-round except in designated areas (see map) which will be closed November 15 through March 15 to provide sanctuary for waterfowl.

Methods of fishing are limited to pole and line or rod and reel.

Only electric motors or hand power (paddles or oars) may be used to propel boats on refuge lakes. Gasoline motor use is prohibited.

Permits: Fishermen must have a signed permit with them while fishing. They must show the permit, valid state license and identification upon request of any refuge or state wildlife officer.

For more information

Further information may be obtained at the Refuge Office, located three miles south of Brownsville, Tennessee at the intersection of Interstate 40 and State Highway 76.

Hatchie National Wildlife Refuge

Brownsville, Tennessee 38012
Phone: (901) 772-0501

For further information, please contact:

Refuge Manager
Hatchie National Wildlife Refuge
P.O. Box 187
Brownsville, Tennessee 38012

Telephone 901/772-0501



The refuge headquarters is located on Highway 76 just south of I-40 at Exit 56, and is open from 7:30 AM until 4:00 PM, Monday through Friday (closed on all Federal holidays).



DEPARTMENT OF THE INTERIOR
U.S. Fish and Wildlife Service
RF-42525-1 - November 1986

HATCHIE

National Wildlife Refuge
Tennessee





The Refuge

Hatchie National Wildlife Refuge is one of over 400 refuges operated by the U.S. Fish and Wildlife Service to preserve our country's most complete array of wildlife ecosystems.

The Hatchie Refuge encompasses 11,556 acres along the Hatchie Scenic River, three miles south of Brownsville, Tennessee. The refuge, established in 1964, was acquired primarily to provide habitat - feeding and resting areas, for migrating and wintering waterfowl.



Habitat

When the first settlers arrived in the Mississippi River Delta over 22 million acres of swamp forest habitat stretched before them. Today, over 95% of this has been cleared for agriculture and only about one million acres of good quality forest remain. This habitat, the seasonally flooded lowland forest ecosystem dominated by water-tolerant oaks, makes Hatchie a special place for wildlife and people.



Over 9,400 acres of bottomland forests at the Hatchie National Wildlife Refuge still function as a natural forested wetland. They still slow ravaging flood waters, filter sediment and improve water quality, produce immense volumes of timber, provide a winter home for waterfowl and provide a place for the public to appreciate and enjoy a part of our great natural heritage.

Wildlife



- Over 200 species of birds, 50 species of mammals, and a myriad of reptiles, amphibians, fish and invertebrates can be found in the varied habitats of the Hatchie Refuge. The bottomland forests and the meandering sloughs provide breeding habitat for the numerous wood ducks and hooded mergansers and winter feeding areas for mallards, black ducks and others.

During the spring and summer the woods literally swarm with songbirds. Bald eagles are rare winter visitors, while red-shouldered hawks, barred owls and wild turkeys thrive in the area.

Some of the more numerous resident species include white-tailed deer, beaver and squirrels. River otters have disappeared from most parts of Tennessee, but the refuge is a stronghold for the species in this area.

Enjoy Your Visit



Wildlife Observation, Photography, and Hiking - permitted throughout the year during daylight hours.



Boating - permitted on all waters except Big Lake. No gasoline motors are allowed.



Sport Fishing - open year-round except in seasonally closed areas.



Hunting - includes deer (gun and archery), turkey, waterfowl and small game. Certain areas are closed seasonally. A separate leaflet is available for hunting and fishing regulations.



Firearms - allowed only during legal hunting seasons.

agement needs. While on the refuge, vehicles must remain on established roads as designated on the map on the reverse of this leaflet.

Parking: Vehicles may be parked alongside open roads in a manner that will not interfere with the normal flow of traffic.

Camping and Fires: Prohibited.

Pets: Pets must be confined or on a leash under control of the owner.

Closed Areas: Designated areas will be closed to hunting, fishing and all public access from November 15 through March 15 to provide sanctuary for waterfowl. (See map for areas closed.)

Access Regulations

Access: Access for hunting, fishing and other public use is permitted on the entire 11,556 acres of Hatchie National Wildlife Refuge, except as may be regulated by other provisions, such as special closures for sanctuaries, or by signs on the area. Public access is allowed during daylight hours only, one hour before sunrise until one hour after sunset.

Vehicles: Only legally licensed vehicles are allowed on the refuge. ATV's and ATC's are prohibited.

Roads: Roads may be closed at any time due to adverse weather conditions or man-

**Take Pride
in
Your Refuge!**
It's A Special Place
