

REVIEW AND APPROVALS

NORTHEAST ARKANSAS REFUGES

Wapanocca National Wildlife Refuge
Big Lake National Wildlife Refuge
Cache River National Wildlife Refuge
Bald Knob National Wildlife Refuge

Turrell, Arkansas

ANNUAL NARRATIVE REPORT

Calendar Year 1993

Dennis J. Widner 3/18/94
Project Leader Date

Sam O. Drake Jr 4-5-94
District Manager Date

Ronald W. Benson 4/7/94
Regional Office Approval Date

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K. FEEDBACK

C. LAND ACQUISITION1. FEE TITLE - FmHA TRANSFER

<u>Year Acquired</u>	<u>Tract No.</u>	<u>Acreage</u>	<u>Habitat</u>	<u>Administered by</u>
1989	Craighead Co. (10)	41.85	Natural woody regeneration	Big Lake NWR
1990	St Francis Co. (10)	480.0	Acorn/pecan nuts planted 1991-92	Wapanocca NWR
1991	Green/Lawrence Co. (10))	109.0	Nuttall acorns planted Oct.1993	Big Lake NWR
1991	St. Francis Co. (11)	29.3	Idle cropland	Wapanocca NWR
1992	Woodruff Co. (10)	240.0	Acorn/pecan nuts	Cache River NWR
Total 5 tracts 900.15 acres				

4. Farmers Home Administration Conservation Easements.

<u>Year Acquired</u>	<u>Tract No.</u>	<u>Acreage</u>	<u>Habitat</u>	<u>Administered by</u>
1989	(McGraw)White Co. (10)E	6.7	Wooded wetlands	Cache River NWR
1990	(French)Greene Co. (10)C	17.5	Idle cropland	Big Lake NWR
1991	(Stacy)Jackson Co. (10)C	110.2	Wooded wetlands	Cache River NWR
Total 3 Tracts 134.4 acres				

E. COMPLEX ADMINISTRATION

Administration for all refuges at Northeast Arkansas Refuges was accomplished at the complex office located at Wapanocca NWR. To preclude duplication, this Administrative section was prepared and covers administration for all refuges. Individual refuge narratives will reference this section and will not contain an Administrative section or Feedback section which is also located here.

1. Personnel



Wapanocca Staff

Chester
Glen

Dennis
Elizabeth



Big Lake Staff

Darwin Pat Bobby



Cache River Staff

Jerry Darwin Dennis
Michael Bruce

Personnel

- | | | |
|-----|--|---|
| 1. | Dennis J. Widner, WPN
(EOD 01-04-87) PFT | Project Leader, GS-0485-13 |
| 2. | Glen R. Miller, WPN
(EOD 10-21-90) PFT | Deputy Project Leader, GS-0485-12 |
| 3. | Dennis W. Sharp, CRR
(EOD 12-15-91) PFT | Refuge Manager, GS-0485-11 |
| 4. | Luke F. Eggering, BGL
(Resigned 04-30-93) | Refuge Manager, GS-0485-9 |
| 5. | Darrin B. Unruh, BGL
(EOD 10-17-93) PFT | Refuge Manager, GS-0485-9 |
| 6. | Bruce W. Ray, CRR
(EOD 05-20-90) PFT | Forester, GS-0460-11 |
| 7. | Bobby G. Moore, BGL
(EOD 05-02-63) PFT | Hydrologic Technician, GS-1316-8 |
| 8. | Jerry L. Griggs, CRR
(EOD 10-13-87) PFT | Range Technician, GS-0455-7 |
| 9. | Darwin L. Huggins, CRR
(EOD 07-01-90) PFT | Refuge Law Enforcement Officer,
GS-1802-7 |
| 10. | John M. Tidwell, WPN
(Retired 04-30-93) | Engineering Equipment Operator
WG-5716-8 |
| 11. | Chester C. McGee, WPN
(EOD 10-14-84) PFT | Engineering Equipment Operator
WG-5716-8 |
| 12. | Mike K. Wells, BGL
(Resigned 07-09-93) | Engineering Equip. Operator
WG-5716-10 |
| 13. | Patricia A. Griffith, BGL
(EOD 04-03-71) PFT | Office Assistant (Office
Automation) GS-0303-6 |
| 14. | Elizabeth I. Smith, WPN
(EOD 04-07-91) PFT | Secretary (Office
Automation) GS-0318-5 |
| 15. | Michael Johnson, CRR
(EOD 06-27-93) PFT | Refuge Manager
GS-0485-7 |
| 16. | Brooks, M. Hallum, CRR
(07-06-93 to 08-20-93) | Biological Science Technician
(Wildlife) GS-0404-5 |
| 17. | Vincent G. Plumbo, WPN | Volunteer |

WPN - Wapanocca; BGL - Big Lake; CRR - Cache River

The following personnel actions took place this year:

- 04-30-93 John Tidwell retired after 15 years at Wapanocca.
04-30-93 Luke Eggering resigned.
06-27-93 Michael Johnson was promoted from GS-5 Student Trainee (Wildlife) to GS-7 Refuge Manager stationed at Cache River NWR.
07-09-93 Mike K. Wells resigned.
10-17-93 Darrin Unruh was promoted to Refuge Manager GS-9 transferring from Tensas River NWR.



John Tidwell received a Certificate of Appreciation
and pen set upon retirement.

6-25-93 93-01-10 GRM

Northeast Arkansas Refuges Staffing Pattern

<u>FY</u>	<u>Full-time</u>	<u>Part-time</u>	<u>Temporary</u>	<u>FTE</u>
87	10	0	0	10.6
88	10	1	2	11.3
89	11	0	0	11.0
90	13	0	0	11.8
91	15	0	1	13.1
92	14	0	0	13.3
93	15	0	1	13.3

The biologist position (Cache River) remained unfilled.

Awards

Bobby Moore received a 30-year pin and certificate for his 30-year anniversary on 5-2-93.



Bobby Moore received a Certificate and pen for
30 years of government service.
6-25-93 93-01-11 GRM

3. Other Manpower Programs

Wapanocca

Wapanocca again participated in the Eastern Arkansas Private Industry Council's Summer Youth Program. It is a six week summer program designed to provide meaningful employment for economically disadvantaged youths of ages 14 through 21. LaShonda Jackson was assigned to the refuge from June 14 to July 23. She completed clerical and custodial duties around the office and did an excellent job.



LaShonda Jackson, PIC Summer Youth Program
July 1993 GRM

4. Volunteer ProgramWapanocca

<u>Volunteer</u>	<u>Maint.</u>	<u>Reforest.</u>	<u>Admin.</u>	<u>1993 Total</u>	<u>Accumulative All Years Totals</u>
Skeeter Hill	7			7	78*
Vince Plumbo	144			144	1112
Betty White			11	11	184
Allen McInteer	4			4	4
John Tidwell	3			3	3
Terry Ballard	<u>81</u>	<u>16</u>	<u>3</u>	<u>100</u>	100
Total	239	16	14	269	

*Since 1990; Mr. Hill had approximately 1,000 hours prior to 1990, but records have been lost.

Cache River

<u>Volunteer</u>	<u>Construction</u>	<u>Clerical</u>	<u>Other</u>	<u>Total</u>
Wyatt Doyle	108			108
Robin Huggins	—	<u>31</u>	<u>8</u>	<u>39</u>
Total	108	31	8	147

Big Lake

Seven volunteers contributed 96 hours to the farming program and 5 hours to the wood duck banding program.

5. Funding

<u>Fiscal Year</u>	<u>Total Funding (Thousands)</u>	<u>Base Funding (Thousands)</u>	<u>Supplemental Funding (Thousands)</u>
88	468.3	391.0	77.3
89	494.9	410.5	84.4
90	771.2	464.3	306.9
91	1041.6	483.5	558.1
92	917.2	494.6	422.6
93	809.1	599.3	209.8

Funding for Northeast Arkansas Refuges was \$809,100 which was allocated in the following categories:

<u>Description</u>	<u>Thousands</u>
<u>Base Funding</u>	
1261	418.0
1262	<u>181.3</u>
	599.3
<u>Supplemental Funding</u>	
1121 - Farm Bill (\$20,500)	
Staff Forester	20.0
Equipment & Projects - Green County	.5
1130 - UST's (\$25,000)	
Replace 2 Underground Fuel Tanks (Big Lake)	25.0
1230 - Special Migratory Bird (\$1,000)	
Goose Collar Observations	1.0
1261 - Special Operations (\$1,400)	
Law Enforcement, Firearms Requalifications (Moore)	2.0
Administrative Training	-.6
1261 - Co-op Program (\$12,600)	12.6
Volunteers (\$700)	.7
1262 - 4041 Maintenance (\$110,100)	
2-way Radio System	32.8
Replace 2 Underground Fuel Tanks (Big Lake)	22.0
Rehab/replace WCS - Dixie Farm Tract (Cache River)	15.0
Rehab Office Building - Dixie Farm Unit (Cache River)	30.0
Modification of FY 92 Project - Exterior Siding Rehab (Wapanocca)	10.3
8421 - Initial Allocation - Land Acquisition Assistance (\$10,000)	10.0
9120 - Equipment (\$25,000)	
Slip on Pumper	5.0
Equipment Trailer	14.0
Radio System	6.0
9120 - Misc. Fire (\$2,000)	
Fireline Construction & Maintenance	2.0
9120 - NUS (\$1,500)	
Maintenance of Fire Equipment	1.5

6. Safety

Personnel matters caused the cancellation of the February safety meeting. Because of conflicting work scheduling at Cache River NWR, the July - September monthly safety meetings were not held. The November and December meetings were also combined into one because of holiday and leave scheduling conflicts.

Films viewed include:

To Last A Lifetime (film)
Office Safety; Friday the 13th (film)
The Responsible Hunter (video)
Tractor Safety (film)
The Choice is Yours (film)
Your Body is Only Human (film)
Speaking From Experience (film)

Topics discussed included: First aid, stress, wildfire hazards, blood pressure problems, equipment safety, street gangs, and Job Hazard Analysis Manual. There were no reportable personal injury accidents this year, however, there was one vehicle accident. On April 29, Range Technician Jerry Griggs pulled out in front of an oncoming vehicle. Both vehicles received minor damage. The bumper was pulled off the government pickup. Weather conditions played a role in the accident as it was foggy at the time.

8. OtherTraining

<u>Course</u>	<u>Attendee</u>	<u>Location</u>	<u>Date</u>
Refuge Officer Basic School	Luke Eggering	Glynco, GA	01/31-02/13
SF-130,190 Fire Training	Dennis Sharp Darwin Huggins Jerry Griggs	St. Francis N.F., Mariana, AR	02/01-02
LE Refresher Training	Dennis Widner Darwin Huggins Bobby Moore	Quincy, FL	03/22-26
LE Refresher Training	Glen Miller Bobby Moore Jerry Griggs	Quincy, FL	04/05-09
Eastern AR PIC Summer Youth Training Pro.	Glen Miller	Forrest City, AR	04/16
Pesticide Applicator Training	Dennis Sharp	Jonesboro, AR	05/04-05
International Tracking System	Dennis Sharp	Memphis, TN	11/03

Workshops

Fire Management	Bruce Ray	Felsenthal NWR	01/15
Administrative Workshop	Pat Griffith Elizabeth Smith	Atlanta, GA	02/08-12
Total Quality Management (Recruitment Issues)	Glen Miller	Atlanta, GA	02/09-10
Mid-Career Planning Seminar	Dennis Widner Glen Miller	Stuttgart, AR	09/15

K. Feedback

Change, Ecosystem Management, Downsizing, budget deficits, Compatibility, Refuges 2003, Organic Act legislation. Where are we headed as an agency? Where are we headed as the Division of Refuges? These could be exciting and challenging times as we plot the course into the next century, but what I've observed at all levels of management in my colleagues is frustration. No sense of direction! I understand the preferred alternative of Refuges 2003 has been changed to Ecosystem Management. Everyone has their own concept of Ecosystem Management, but has the FWS adopted one clear cut definition to guide us? I haven't seen it, but we're quickly adopting "something - some philosophy" to reorganize and guide our management efforts. Is Ecosystem Management synonymous with preservation? There's striking similarities in the characteristics of Ecosystem Management as portrayed in Refuges 2003 and the preservationist management philosophy. Where are we headed?

Organic legislation - the Graham Bill. I wonder why wildlife oriented recreation is not included in purpose # 5 with environmental education. I think most FWS employees would agree organic legislation for refuges is good, but the purposes need to be broad enough to include the good refuge programs of the nation - not just Florida or J.N. Ding Darling NWR programs. I wonder how wildlife oriented recreation, including hunting, fishing, bird watching, etc. will shake out when compatibility determinations are completed if wildlife oriented recreation is not included in the refuge system purposes? Good point to ponder! I also wonder why migratory birds is purpose # 3 and international treaties is purpose # 4. If the purposes are in priority, I would believe these should be at the top of the list. I also wonder why in the Summary of Effects of Refuges 2003 Alternatives, I find waterfowl mentioned only once under the Ecosystem Management Alternative. Guess where? Of all places under Water Quality with a one line sentence which states, "Waterfowl concentrations cause localized problems". What major emphasis we're placing on a species with international treaty obligations and primary management responsibility for!

I've always been upbeat and proud of my profession. Oh, I gripe and complain some, like everybody else, but there has never been a management challenge too great or complicated for me to undertake or accomplish. But that's because I believed in what I was doing and had a clear sense of direction. Quite frankly, I can no longer find that clear direction, and when I consider the implications on professional wildlife and habitat management that the afore-discussed issues may have, I'm afraid I'd have to label myself as frustrated, along with my colleagues. I heard a project leader at the recent Project Leader's Conference, voice a quote and I'm afraid it may be true, "I've seen the enemy, and he is within!".

WAPANOCCA NATIONAL WILDLIFE REFUGE

ANNUAL NARRATIVE REPORT
CALENDAR YEAR 1993

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K. FEEDBACK

Refer to Complex Administration

INTRODUCTION

Wapanocca National Wildlife Refuge, established January 24, 1961, is located approximately 20 miles northwest of Memphis, Tennessee, in Crittenden County, Arkansas. The lands were acquired under the Migratory Bird Conservation Act (16 U.S.C. 715-715r), as amended, for use as an inviolate sanctuary, or for any other management purpose, for migratory birds (16 U.S.C. 715d). The refuge began its existence when 3,119 acres were leased from the Wapanocca Outing Club. As funds were made available from the sale of duck stamps, this land and various other tracts were purchased. On January 1, 1966, a substantial amount of land (1,695 acres) was added to the refuge and today Wapanocca totals 5,484.17 acres.

Prior to its establishment, the refuge was the site of one of the oldest and most prestigious hunting clubs. In the early 1800's two individuals from Memphis built cabins next to Wapanocca Lake and began waterfowl hunting. As the popularity of this sport increased, soliciting began for membership and members were brought in from as far away as Chicago, Illinois. In 1886, the Wapanocca Outing Club was established.

The club bought 6,500 acres for 50 cents an acre. The entire area, with the exception of Wapanocca Lake, was covered in forest. By 1895, 40 certificates of stock were issued while the limited number of remaining membership stock was sold individually until 1929 for prices up to \$15,000. The club was one of the first to apply self-imposed bag limits on ducks (25) and geese (5). The majority of the lake was also established as a waterfowl sanctuary. The amount of waterfowl numbered well into the 100,000's in the early 1900's.

However, in the late 1920's, the club began to cut the timber and also clean out small islands of grass and bushes from the lake. The alteration of the habitat was the beginning of a continued decline of waterfowl usage at Wapanocca. In 1936, the club sold about 3,000 acres to a cotton farmer who completed the clearing and began growing cotton. By 1941, the number of geese using the area had declined sharply, and by the mid-1950's the sport of goose hunting had already vanished.

Due to the decline of waterfowl hunting at Wapanocca, and the decrease in interest for the sport by the older members of the club, negotiations began with the Service in 1958 for the sale of all club holdings.

Today the refuge literally stands as a wildlife oasis in an agricultural sea. Approximately 90 percent of Crittenden County is agricultural land. An excellent diversity of habitat exists with the refuge divided equally between agricultural land, bottomland hardwood forest, and open water with flooded cypress/willow swamp. Because of its strategic location in the heart of the Mississippi Flyway and the diverse habitat, the refuge is a prime wintering area for migratory waterfowl.

A. HIGHLIGHTS

- Reforestation continues (Section F.3.)
- Mild temperatures = low waterfowl numbers (Section F.3.)
- Heron/egret rookery nests increased 56 percent (Section G.9.)
- First confirmation of resident nutria made (Section G.10.)
- Observation platform replacement bids too high (Section I.2.)
- Underground fuel storage tanks pass tightness test (Section I.8.)

B. CLIMATIC CONDITIONS

Lack of abundant rains kept the low-lake levels at that stage which prevented flooding of the hardwood timber during the wintering waterfowl period. However, mild temperatures kept the lake from freezing over, thus ducks remained until spring migration. The last freezing temperature was recorded on March 18 with a 30 degree reading.

Redbuds began blooming April 1.

Periodic rains in April and May caused problems for the farmers in getting crops planted. They finally received a dry spell from May 19-27 which allowed considerable farm tillage to be completed.

Rainfall was well below normal June through August which hurt crop yields. Persimmon fruit began falling in July before being fully formed.

The first fall killing frost occurred on October 28 with a recorded temperature of 34 degrees. This hurt some of the late planted soybeans which had not yet matured. A hard freeze followed on October 31 with a 28 degree reading.

Almost 7 inches of rain fell in November which filled most of the impoundments. This was not enough to raise the lake level to desired migration period elevations. By year's end the lake level was barely above the 209.30' msl which starts flooding surrounding hardwood timber.

*1993 WEATHER DATA - WAPANOCCA NWR

<u>Month</u>	<u>Precipitation</u>	<u>30-year** Average Precipitation</u>	<u>Max Min Temperature</u>		<u>Average Max Ave Temperature</u>	
January	3.52	3.37	68	22	48.5	34.0
February	2.18	3.87	72	15	50.2	32.3
March	2.98	5.07	79	19	57.6	42.9
April	6.76	5.65	78	33	67.6	47.7
May	6.30	5.26	89	47	77.5	60.0
June	3.31	4.05	95	49	88.7	69.4
July	1.22	3.03	99	70	95.3	74.9
August	2.30	3.32	99	63	92.0	70.6
September	3.35	3.54	95	46	85.4	60.5
October	4.43	3.40	85	28	71.4	50.4
November	6.93	4.99	77	18	57.4	38.9
December	<u>4.68</u>	<u>5.61</u>	67	22	52.5	37.4
Totals	47.96	51.15				

*This data was collected at the refuge weather station located at the headquarters.

**1962-1991

D. PLANNING

4. Compliance with Environmental and Cultural Resource Mandates

Section 404 permits were requested from the U.S. Army Corps of Engineers (COE) for the following projects:

- Clean out of Goose Pen Pond
- Old levee 1 borrow ditch and levee improvement
- Enlarging observation platform parking lot
- Clean out of lake access boat channel
- Culvert replacement of ditch #2 crossing

The first four requests were granted under the nationwide permit system. The latter request had not been responded to by year's end due to the additional work load put on the Memphis COE office resulting from the summer flooding problems along the Mississippi River above St. Louis.

E. ADMINISTRATION

Refer to Complex Administration

F. HABITAT MANAGEMENT

1. General

The diversity of habitat is near equally divided between cropland, wetland, and woodland acreage. These habitats are managed primarily for waterfowl, but other wildlife species also benefit.

2. Wetlands

Wapanocca Lake and the cypress-willow swamp are located in a basin-like depression, surrounded by man-made levees and natural ridges. A total of 600 acres of open water, 1,200 acres of cypress-willow swamp and 620 acres of bottomland hardwoods are collectively managed as one unit.

Water levels in Wapanocca Lake were two feet below the optimum level of 210.50' msl at the first of the year. On April 12, levels increased to the 209.3' msl reading, at which time water started flooding the bottomland hardwoods - long past the waterfowl migration. The low lake levels during the winter months probably was a partial cause for the low waterfowl numbers on the refuge.

Plans to flush the lake during early spring months never materialized, as water levels in Big Creek did not raise enough to back water into the lake.

Because of critically low summer water levels in 1992 due to evapotranspiration, water levels were held higher later this spring. By mid-June the water levels had dropped to target level. Rains in the late June raised water levels necessitating a draw down.

<u>Structure</u> <u>Opened</u>	<u>Level</u>	<u>Structure</u> <u>Closed</u>	<u>Level</u>
6/25	209.36	6/25	209.36
6/28	209.36	7/01	209.30

Approximately 230 acre-feet of water was released from Woody Pond into the lake in late July - early August to help alleviate low water levels in the lake. During this 7/29 - 8/13 period, lake levels rose from 208.76' to 208.80' msl., barely keeping up with the evapotranspiration rate. Lake levels reached a low of 208.26' msl on 9/20. No fish stress was noted. Precipitation gradually brought the elevation up to 209.36' msl on December 31, which was still over 1 foot below desired elevations that would adequately flood bottomland hardwood timber.

Water levels in Woody Pond were fair to begin the year but still almost 3 feet below the target of 214.50' msl for the winter months. Beaver blockages in structure #5 prevented raising levels during high water in Ditch 8. The planned summer draw-down to repair structure #5 did not occur due to lack of personnel to do the work. Structure #3 was opened July 29 to let water from Woody Pond into Wapanocca Lake to keep lake levels from dropping too low. It was closed August 13. The water level dropped 1.20 feet during this time but due to evapotranspiration Wapanocca Lake rose only .04 foot. Fall water levels slowly raised as rainfall was received, by the end of the year the level was 212.74' msl.

Stoplogs in the structure in Impoundment A-3 were removed March 8 to dry it out for the planting of milo. Due to the wet spring, the milo was not planted until mid-June, however, an excellent seed production was still obtained. Stoplogs were removed from the other structures on April 2 for draw-down to plant millet. Because of sediment build-up in some of the main ditches, impoundments C-4 and C-9 again did not dry up sufficiently to farm. Trees and brush are invading these areas. Stoplogs were again placed in the structures on October 18. Rains in mid-November put good water in most of the impoundments to make them attractive to waterfowl. Holes have eroded through the dikes at the structures of impoundments B-10 and E-1, draining water off these areas.

3. Forests

In a continuing effort to tie in wooded habitats on the refuge and eliminate minifragmentation of timber, a 2 1/2 acre parcel southeast of the observation platform was taken out of cropland and planted to trees. Because of wet conditions the area was not planted until May 28. Donated nuttall and pinoak acorns were planted. The summer drought took a toll on this late planting. Only a few trees could be found in early fall. The area was again disced and planted with nuttall acorns and native pecan on October 14.

Field P-11, 2 acres, was disced and planted November 10 after soybean harvest with donated acorns: pinoak (31 lbs.), nuttall (3 lbs.), water oak (3 lbs.) and white oak (2 lbs.).

Also 502 donated seedlings were planted in various locations around the refuge by volunteers in early spring and late fall:

<u>Species</u>	<u>April planting</u>	<u>November planting</u>	<u>total</u>
Nuttall/pinoak	87	158	245
Water oak	6	10	16
Willow oak	30	70	100
Shumard oak		2	2
Pecan		15	15
Hickory		2	2
Cypress		3	3
Osage orange		43	43
Persimmon		48	48
Muscadine grape		7	7
Redbud		2	2
Wild goose plum		8	8
Paw paw		<u>11</u>	<u>11</u>
Total	<u>123</u>	<u>379</u>	<u>502</u>

4. Croplands

Periodic rains in April and May caused problems for farmers getting crops planted. They finally received a dry period from May 19-27 which allowed considerable planting to be completed.

Rains and high humidity in latter part of June held up wheat harvest on the refuge thus the follow up planting of soybeans was late. Cooperative farmer Driver harvested 150 bushel of wheat for Wapanocca and 170 bushel for Big Lake NWR. Hot and dry weather during July and August stressed crops, especially the late planted soybeans in sandy fields. The corn crop was fair considering the weather but ears were small and far between in parts of some fields. The first killing frost on October 28 caught the late planted beans before full maturity thus there was a loss in yield.

Wet conditions also delayed the planting of milo in impoundment A-3. However it still yielded well and mallards fed heavily in it after it was flooded in November.

1993 Farming Program (1,566.3 acres)

<u>Crop</u>	<u>Pirani acres</u>		<u>Driver acres</u>		<u>Farley acres</u>		<u>Total acres</u>	
	<u>Coop</u>	<u>Refuge</u>	<u>Coop</u>	<u>Refuge</u>	<u>Coop</u>	<u>Refuge</u>	<u>Coop</u>	<u>Refuge</u>
Soybeans	209.9		479.9		159.8		849.6	
Wheat/ soybeans*			303.2				303.2	
Wheat			11.5				11.5	
Milo			36.2	42.7			36.2	42.7
Corn		31.1		79.4		23.0		135.5
Jap millet		32.0		71.0		24.3		127.3
Cowpeas				20.3				20.3
Crimson clover				35.2				35.2
Browntop millet				4.8				4.8
Total	209.9	65.1	830.8	253.4	159.8	47.3	1200.5	365.8

*Winter wheat harvested followed by soybeans.

9. Fire Management

A wildfire occurred on March 15. The fire originated between Highway 77 and the Burlington Northern RR tracts. The fire jumped the tracks igniting the top of a dead tree on the refuge. Embers then fell igniting the leaf litter. A motorist who also happened to be the Turrell Assistant Fire Chief reported the problem to the refuge office. Manager Miller extinguished the ground fire. The fire department was called to provide water to extinguish the smoldering trees. The refuge received a bill for \$250 which is the normal charge for out-of-town calls.

An arsonist set fire to sawgrass north of the observation platform walkway. It burned only about 1/4 acre before it went out on its own. Leaves of 10 medium sized cypress trees were scorched. The burned area was discovered on April 28.

While conducting a review of FmHA lands with Wildlife Management Biologist Scott Yaich and Regional Office Wildlife Management Biologist Supervisor Frank Bowers on August 16, Manager Miller noted smoke arising at the northern side of Round Pond refuge unit in St. Francis County. Upon arriving at the site, the fire had died out on its own and no one else could be seen in the vicinity. The neighbor to the north apparently burned off his wheat stubble and left only to have it creep onto the refuge land. The fire died out after consuming .2 acres of land that had been planted with acorns and pecan.

G. WILDLIFE

1. Wildlife Diversity

Wapanocca supports a good diversity of animal and bird (242) species due to its diverse habitat.

2. Endangered and/or Threatened Species

Peak bald eagle spring use seen was only 3 birds (2 adults and 1 immature). While they were occasionally seen in the vicinity of the old nest, no serious attention to it was observed. Two eagles were last seen February 24. The first fall eagle observation was made November 26 with one adult seen.

3. Waterfowl

Early year waterfowl numbers were low with a peak of Canada geese of only 4,000 in January but had tailed off to less than 1,000 by the end of the month. It is believed that the mild temperatures kept the birds in southern Illinois. A peak of slightly more than 10,000 ducks in January was all that were observed. Refuge impoundments held good water but the lake remained at an elevation below which would flood adjacent bottomland hardwood timber. The Arkansas Mid-winter Waterfowl Survey taken in January indicated ducks in Arkansas were 42 percent below the 1989-1992 average and Canada geese 77 percent below the average.

Mild fall temperatures again kept goose populations low. Canada geese peaked at 4,000 in December. Fall duck populations increased over those in 1992 however the lake was again too low to flood the bottomland timber.

A nineteen station Wood Duck Hen Call Survey route was established and the survey was run four times. The survey request was made by the Office of Migratory Bird Management in association with the Wood Duck Initiative.

Figure 1

Refuge Goose Use History

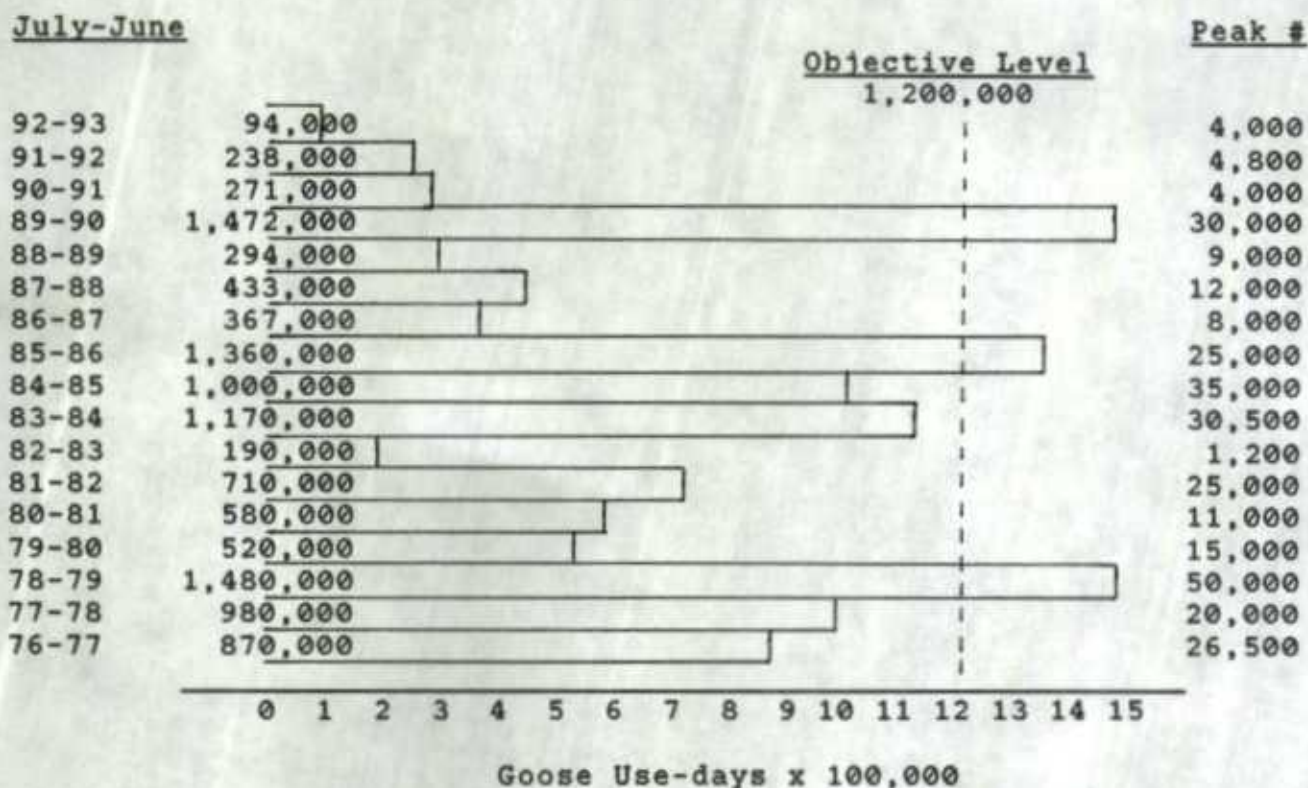
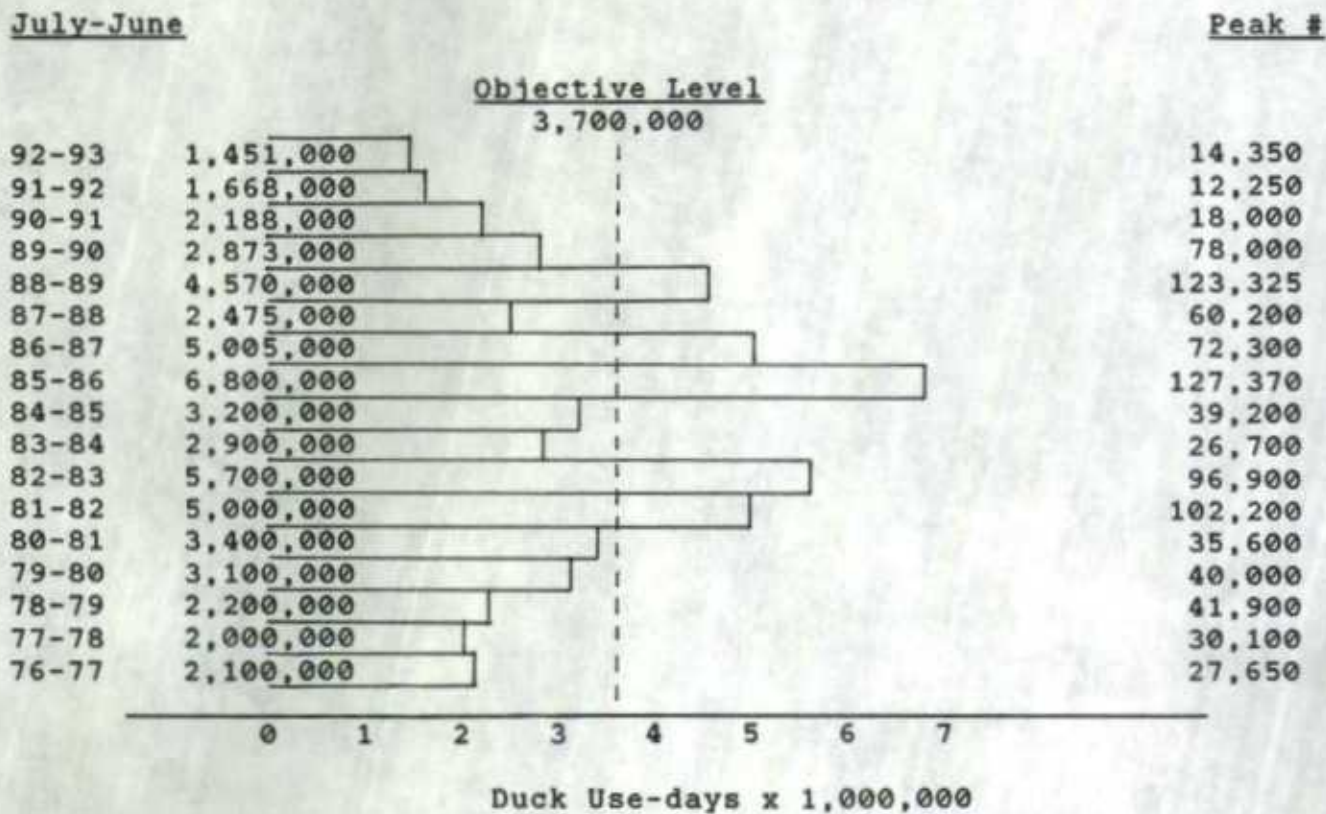


Figure 2

Refuge Duck Use History



The statewide aerial survey conducted in mid-December revealed the population of ducks down 75% from last year.

ANNUAL REPORT FORM
WOOD DUCK BOX PROGRAM INFORMATION
YEAR 1993

Total Boxes Up	<u>253</u>
Total Usable Boxes	<u>253</u>
Use by Wood Ducks of Usable Boxes	<u>?</u>
Number of Successful boxes (Wood Ducks)	<u>?</u>
Use by Other Ducks of Usable Boxes	<u>?</u>
Period Checked (Month)	<u></u>
Use by Other Wild- life of Usable boxes	<u>?</u>
*Total Wood Ducks Hatched	<u>1150</u>
Wood Duck Broods Produced	<u>115</u>
**Wood Ducks surviving to Flight Stage	<u>575</u>

Plans for Next Year (Indicate Number)

<u> </u> More boxes	<u> 0 </u>	Entrance Holes Created in Trees
<u> </u> Fewer boxes		
<u> X </u> No Change	<u> </u>	

Remarks: * Number of estimated successful boxes times 10

** 50 percent of total hatch

Due to the personnel shortage the wood duck boxes were not checked for success rate. Red-bellied woodpeckers were observed on two occasions coming out of boxes and wiping their beaks. Bird pecks on eggs have been a problem in the past.

Figure 3
Wood duck Box Program

<u>Year</u>	<u>Wood ducks Hatched</u>
1993	1,150
1992	1,140
1991	950
1990	1,300
1989	1,430
1988	890
1987	1,080

4. Marsh and Water Birds

The great blue heron/great egret rookery was censused in late June. A total of 161 nests were located in 74 trees as compared to 103 nests in 57 trees last year. This is a 56 percent increase in nests.

5. Shorebirds, Gulls, Terns, and Allied Species

No unusual sightings were made.

6. Raptors

No unusual sightings were made.

7. Other Migratory Birds

A total of 138 species of various other birds migrate through the refuge; of these, 37 species are warblers.

8. Game Mammals

White-tailed deer continue to be commonly seen.

The fox squirrel population was low again this year but harvest figures show them to be on the upswing.

Raccoon and their signs are commonly seen on the refuge.

10. Other Resident Wildlife

Otter were seen often this year.

The population of turkey remains low. Only two hens with no poults were observed on the refuge.



A nutria was found dead on the road on old Levee 1.
This is the first confirmation of this pest on the refuge.
 12/22/93 Slide file GRM

11. Fisheries Resources

The refuge issues one commercial fishing permit yearly. The permit is advertized for bidding with the winning bid good for 5 years. Bids were solicited in 1992 so it is good through 1996. Only two bids were received. Billy McClelland, Turrell, Arkansas, offered the winning bid of \$233 per year. He fished during March and October when the sportfishermen did not have access to the lake. He was concerned about losing nets to propellers. He removed the following rough fish:

<u>Species</u>	<u>Pounds Removed</u>
Buffalo	4,075
Carp	10
Drum	58
Bowfin	30
Gar	<u>15</u>
Total	4,188

A minimum net mesh size allowed on the lake is 4 1/2 inches. This is required to minimize the catch of sport fish. However there are some large catfish in the lake. He caught and released 295 pounds of catfish and 2 largemouth bass of 4 and 5 pounds.

15. Animal Control

Beaver populations were high creating numerous problems. Efforts to control nuisance beaver were made again this year. A total of 53 beaver was removed during the year.

16. Marking and Banding

The Canada goose banding quota was eliminated this year but instructions were to continue with a vigorous neck-collar observation program.

Because of the lack of Canada geese, the neck-collar observation goal of 850 was not reached. A total of 60 collars were observed during the winters of 92-93 and reported to the Wisconsin Cooperative Wildlife Research Unit. Twenty-nine hours were spent in pursuit of reading collars. Records from the previous 5 years show the following population makeup: 43.6% EPP; 55.9% MVP; .4% SJBP.

The wood duck banding goal of 240 was not met. However the individual quota for AHY-F was met and this due to banding 30 of them on the nest. The summer wood duck population appeared to be lower than normal and the remaining ducks did not respond well to the lake banding site. It took 8 shots with the rocket net to capture the rest of those banded.

1993 Wood duck pre-season banding results

	<u>Quota</u>	<u># Banded</u>
	30 AHY-M	1
	30 AHY-F	46
	90 HY-M	53
	90 HY-F	38
	<hr/>	<hr/>
Total	240	138

H. PUBLIC USE

1. General

Refuge visits were up this year with an estimated total of 19,285.

6. Interpretive Exhibits/Demonstrations

An excellent display located in the visitor contact station is provided for the public to interpret various phases of the refuge's environment. Exhibits include the lake environment, summer wildlife and winter waterfowl. An estimated 853 visits were made to this room. Various other educational exhibits, displays and informational write-ups are available for the public's education.

Two kiosk's provided an important source of information for the public when the refuge office was closed. One kiosk is located at the refuge headquarters and the other is located at the boat launching area.

Problems were encountered during the hunting season again this year in keeping a supply of hunting permits in the kiosk by the office. The container was continually being emptied of hunting permits only. The permits taken were nowhere near the proportion of hunters. We believe an anti-hunting individual/group may have been taking them to disrupt the hunt.

7. Other Interpretive Programs

A Special Use Permit was issued to the Pink Palace Museum to conduct night educational activities and tours on the refuge. They conducted 4 sessions involving 68 students.

Refuge personnel provided programs/tours to two student groups (West Memphis Christian School 7th grade and the Marion 5th grade classes) involving 106 students and 5 adults. Off-refuge presentations included:

Chickasaw Council Scout leaders

Memphis Chapter of Tennessee Trails Association, Memphis

8. Hunting

A Special Use Permit was issued to the Crittenden County Coon Hunters Association for conducting field trial hunts at night.

Squirrel hunting (October 1-November 15) was fair again this year. There were an estimated 500 hunter visits and only 1,200 squirrels taken. Totals were calculated from random hunter checks and vehicle counts.

Raccoon hunting was allowed November 1-15. The hunt was fair this year. Fewer hunters participated but more raccoon were harvested. It is estimated only 250 hunter visits were made and 500 raccoon taken. Totals calculated from random hunter checks and vehicle counts.

9. Fishing

Sport fishing opened March 15. The parking lot at the access area was full on weekends in late March and early April. Fish success was sporadic but crappie limits were obtained in March and early April.

Fishing for catfish was good most of the summer, one twenty-six pounder was reported to have been caught. Bass and bream fishing was again poor. The lake was closed to fishing September 30 with 9,400 fishing visits which was a 55 percent increase over last year.

11. Wildlife Observation

An estimated 8,790 visits for this activity were made on the refuge this year.

17. Law Enforcement

January 21, Refuge Officer Darwin Huggins attended a sentencing hearing for 2 individuals apprehended in separate incidents for vehicle break-ins on Wapanocca boat ramp parking lot. The subject, a convicted felon, apprehended on May 3, 1992, was sentenced to sixty days confinement and two years supervised probation. The second, apprehended May 10, 1992, received a \$1,000 fine and two years supervised probation.

Project Leader Dennis Widner attended an annual 40-hour training session in Tallahassee, Florida in March. Deputy Project Leader Glen Miller attended in early April. They also successfully completed their semi-annual firearms qualification in September.

Due to the number of vehicle thefts, vehicle break-ins, boat trailer thefts, and vandalism on the boat ramp parking lot in past years, periodic surveillances were initiated throughout the spring and summer months by refuge officers and special agents. No apprehensions were made, nor were there any reported incidents of these crimes. This is believed to be due to the apprehensions and convictions the previous summer.

1993 Violations - Wapanocca NWR

<u>OFFENSE</u>	<u>NUMBER</u>	<u>PROSECUTION</u>	<u>AMOUNT</u>	<u>DISPOSITION</u>
Trespass (night use)	5	Federal	\$ 0	5 pending
Unauthorized poss. of firearm	1	Federal	0	1 pending
Hunt without license	1	Federal	0	1 pending
Littering	1	Federal	\$ 60	closed
Fishing w/o license	<u>1</u>	State	\$102	closed
Total	9			

I. EQUIPMENT AND FACILITIES

2. Rehabilitation

The final inspection of the buildings siding/security system contract let in 1992 was made March 31. The security system had some problems that needed to be addressed. ADT Security Systems that set up the system finally fixed the problems in July. A part of their response to the problems may be the fact that the system monitoring was set up with the county sheriff and not through ADT. The sheriff agreed to monitor it for free.

In correcting water damage done prior to the roofing rehab work in the project leader's office, another leak was found. Fortunately it rained that day and the leak was found around a vent. It had been improperly sealed. Proper repairs were made.

The observation platform parking lot was widened and deepened to better facilitate buses and motor homes. The trail from the parking lot to the observation platform walkway was raised 2+feet to a level of 213.1' msl. This was done so the scheduled walkway replacement would not have to be ramped to accommodate the physically impaired. However the observation platform rehab bid came in at \$80,000 when only \$30,000 had been allotted. The contract was cancelled and the \$30,000 taken from the refuge to be used elsewhere.

Handicap faucets were installed on the public restroom sinks in the office building.



Upon replacing the water damaged ceiling in the manager's office, a design flaw was discovered. The ceiling joist was almost cut through to allow for the roof drain. The joist was sagging badly at that point. The joist was reinforced prior to putting up the new ceiling.

93-01-04 CM



The Round Pond unit (FmHA Fee) in St. Francis County was reposted. Someone had knocked down all signs on the west side. "Area Closed Beyond this Sign" signs were also installed to reduce confusion and trespass problems.

12-2-93 Slide File GRM



Goose Pen Pond had filled somewhat with silt and wood ducks have quit using this site. It once was a productive banding site. The pond was drained and silt buildup removed. Attempts will be made in 1994 to lure wood ducks back.
6-29-93 Slide File GRM

3. Major Maintenance

Trees encroaching on the east side of old levee 1 were dug out with the backhoe.

4. Equipment Utilization and Replacements

Two new Chevrolet S-10 maxicab pickups were received for Cache River NWR. One remains at Wapanocca for the time being and used by volunteers.

GSA sold the 1985 Dodge pickup to Mr. E. Pound.

Following repairs were completed by Mid-South Technical College, West Memphis, on the truck-tractor and trailer to make them road worthy:

1. Tuneup to get needed power
2. Air bag for seat
3. Seal in rear axle
4. New brakes on trailer

Parts totalled \$400.66. However, there was no cost for labor since they completed the work as training in the classrooms.

The following major repairs were made:

Motor grader - new tires
TD-15 dozer - new seals on right hydraulic arm
John Deere 2640 tractor - new hydraulic pump

5. Communications Systems

New federal and state band radios were installed in the 1992 Ford Ranger pickup.

The refuge went on mail postage metering in April.

8. Other

Southern Company, North Little Rock performed a tank tightness test on the 2,000 gallon underground fuel storage tanks. **THEY PASSED!!**

J. OTHER ITEMS2. Other Economic Uses

Special Use Permits: R.J. Pillow - Bee hives - \$100
 Billy McClelland - Commercial fishing - \$233
 Crittenden County Coon Hunters Association - coon hunters
 field trials - \$50

3. Items of Interest

A refuge revenue sharing check for was delivered to Crittenden County Judge Williams in April. This year's check was only for \$18,372 which reflects a 8 1/2 percent drop in actual entitlement from last year.

A check was also delivered to St. Francis County of \$778 for the Round Pond Unit.

Refuge Revenue Sharing Payments

<u>Fiscal Year</u>	<u>Amount</u>	<u>% of Total Entitlement</u>	<u>Entitlement</u>
92	\$18,372	81.1	22,650
91	20,151	89.6	22,490
90	31,575	93.5	33,770
89	26,277	78	33,770
88	23,993	71	33,770
87	19,899	59	33,770
86	20,271	60	33,770
85	25,345	64.4	39,355

4. Credits

Enforcement Officer Huggins - Section H. 17.

Deputy Project Leader - Miller - Remainder

Office Assistant Griffith - Assembled, edited and typed.

Project Leader Widner - Edited.

K. FEEDBACK

Refer to Complex Administration

Big Lake MWR

BIG LAKE NATIONAL WILDLIFE REFUGE

ANNUAL NARRATIVE REPORT
Calendar Year 1993

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K. FEEDBACK

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INTRODUCTION

Big Lake Refuge, located in Northern Arkansas at the northern end of Mississippi County, is one of the nations oldest inland refuges. It is approximately 10.5 miles long and 2.5 miles wide. President Woodrow Wilson signed an Executive Order on August 2, 1915, establishing the original 3,500 acre refuge and subsequent designations, purchases, etc. has increased its acreage to 11,038. Before "progress" began the bottomland hardwood habitat in this area was vast and dense. Today Big Lake bottoms are the only remnants of habitat remaining in Mississippi County and takes on the characteristics of an oasis of timber and swamp in agricultural developed surroundings.

Big Lake's life flow, the right hand chute of Little River, is thought to have been a result of the Mississippi River course change. The great river's evolution deposited a large sediment area just south of what today is known as the Big Lake bottoms. This action along with effects of the New Madrid earthquake of 1811-12 were the chief architectural forces of Big Lake characteristics today. Once man arrived and started developing the surrounding areas, the ecosystem of the swamp began to change. The changes were slow at first but as technology improved more rapid changes occurred until the habitat within the swamp was transferred from what was once known as a hunter/fisherman paradise to little more than a mud-hole.

An extensive network of ditches, in the Missouri bootheel drains approximately 2000 square miles of farmland directly through the refuge. During flood periods the inflows are so heavily silt laden that an accurate description of the water would be "too thick to drink and too thin to plow". Sediment fall out has continually filled the bottomland and swamp until there now exists a very shallow lake with an average depth of three feet. Continued siltation restricted any aquatic production at all, plus hampered timber growth and development. The refuge has been used primarily as a sump.

Big Lake's strategic location and historical value to migrating waterfowl plus its value as the last stronghold of outdoor recreational habitat in this area prompted some changes over the last couple of decades and those changes are still underway today. Through mutual agreements with drainage interests, the Corps of Engineers, the Service and local interest groups, a plan to improve the situation was implemented to divert some of the silty waters around Big Lake and still provide for adequate inflow to maintain and hopefully improve the area's ecosystem.

Since the implementation of the new regime of water management, water quality has improved, aquatic production has returned, waterfowl populations have become more stable, endangered and threatened species have returned to the area, and recreational interests have increased.

Additional water management practices are being explored which should enhance the refuge's contribution toward the above items even more. The refuge also supports a breeding population of wood ducks and hooded mergansers and more recently a respectable population of mallards. Approximately 3,000 woodies, 300 hooded mergansers and 1,000 mallards are produced annually. Annual visitation of numerous song, wading, and marsh birds also stir the interest of birding enthusiasts throughout the year.

A. HIGHLIGHTS

- Total rainfall close to 30-year average (B.)
- Heavy drift accumulations damage drift barrier (F.2.)
- A "most successful" eagle nesting - 3 fledglings survived (G.2.)
- New above-ground diesel and gasoline tanks installed (I.1)
- Mid-lake structure revamped - slowly (I.2.)

B. CLIMATIC CONDITIONS

Rainfall amounts deviated considerably from the normal during 1993. Heaviest amounts normally occur in late winter or early spring. There were five months (March, April, June, July, and December) that produced an excess of 4" of rainfall. The total rainfall for the year measures 49.28" at the headquarters located on the very south end of the refuge. This amount of rainfall is extremely close to the 30 year average of just less than fifty inches.

Temperatures during the year ranged near normal but after all was said and done, the 1993 high was 6 degrees warmer and the low was 3 degrees cooler than last year's readings. The heat index and wind chill factors during the year made conditions seem very near unbearable at times.

The only recorded snowfall of the year occurred during February when 7" fell on the 15th and a mixture of rain, sleet and snow occurred on February 25 and 26. Both sessions were rather short lived - thank goodness.

Spring of '93 produced the usual onslaught of thunderstorm and severe weather warnings but no serious poundings were delivered to the area this year.

Rainfall amounts are recorded at the refuge headquarters and temperature readings are received from the weather station in Blytheville, Arkansas. The following table of weather data is provided for a quick understanding of the weather during 1993 in the Big Lake area.

1993 Weather Data

<u>Month</u>	<u>Precipitation</u>	<u>Maximum Temperature*</u>	<u>Minimum Temperature*</u>
January	3.70	64	21
February	2.65	70	12
March	4.02	80	21
April	4.80	79	35
May	2.99	89	51
June	4.38	95	51
July	4.10	NR	NR
August	1.85	97	64
September	7.20	92	49
October	2.80	85	29
November	6.40	76	22
December	<u>4.39</u>	<u>65</u>	<u>20</u>

Totals 49.28 Extreme 97 + Extreme 12

*Degrees Fahrenheit

The above temperatures are very near average for this part of the country. Note the extreme deviation was 85 degrees for the year.

E. ADMINISTRATION

Refer to Complex Administration

F. HABITAT MANAGEMENT

1. General

The majority of Big Lake Refuge's 11,038 acres is classified as wetland habitat. The various habitat types are classed as follows: 5,250 swamp; 2,600 open water; 2,035 forest; 437 levees, dikes and administrative areas; 300 marsh; 250 moist soil; 125 farmland; and 41 acres of farmland seeded to acorns in 1990 and 1991.

Approximately 15 miles of meandering channels run the length of the refuge, but past siltation has made portions of these channels indistinguishable. These channels were once a part of the Little River, but today only a small portion of the old river channel exists just south of the refuge.

The refuge is frequently subjected to silt-laden flood waters due to continued drainage improvements in Missouri. The frequency of the floods coupled with the silt and drift that the floods bring is damaging to the refuge. Geologists from the University of Arkansas took core samples from the Big Lake bottom in May 1991. Preliminary data from radiocarbon dating showed that since 1938 silt up to one meter deep has been deposited into Big Lake. Such siltation rates have greatly increased the succession of the Big Lake system.

Over the past five years negotiations to change water management agreements with the Corps of Engineers have made progress to divert much of the silt laden waters around the refuge. These agreements may just be slowing the death of Big Lake, however.

As long as Big Lake is subjected to the floods from the vast Bootheel agricultural lands, the lake will continue to be filled with Missouri topsoil. Local fishermen complain of lower water levels and aquatic vegetation (lotus) where none was present 20 years ago. Refuge personnel are not lowering the water level; we are, however, unconsciously allowing the lake bottom to rise.

2. Wetlands

In Northern Arkansas and the Missouri Bootheel the Big Lake area is the last remnant of what was the vast Mississippi Delta forest. The fertile soils, which were once covered with bottomland hardwoods, are now row cropped to produce soybeans and cotton. The refuge takes on the characteristics of an oasis in an agricultural desert, and it is cherished by Arkansans because of its natural beauty. Except for the spoil levees and administrative areas, the rest of Big Lake NWR is classified as wetlands. The land contour ranges from 223 feet mean sea level (msl) in the deepest channels near the south end to 240' msl near the north end.

Big Lake

The 2,500 square mile watershed from the Missouri Bootheel provided adequate water supplies during the year. The water was delivered to the head of Big Lake by way of four major drainage ditches. As long as incoming flows were less than 238' msl, refuge personnel could manipulate its water control structures to create inflows of good quality water into the refuge or divert poor quality (muddy) water around the refuge. When water levels exceeded the 238' msl level, the refuge was mandated to operate the water control structures in the automatic mode.

In January 1992 the Corps of Engineers (COE) changed the settings on the Northend and Diversion Control structures in accordance with a new proposed water management agreement. The new settings allow more flood waters to be diverted around the refuge. Although the settings for this new agreement were made, the Service has not formally signed the Water Management Agreement because of problems with the new standing instructions and the COE's refusal to accept responsibility for the drift problem at the north end of the refuge.

The refuge was and will continue to be subjected to turbid flood waters from the Missouri watershed. With increased channeling and improved drainage above the refuge, the floods seem to occur at a faster rate and more often.

Drift accumulation during flood periods continued to be a problem at the north end drift barrier and in the north channel of the refuge. During and following each flood, drift removal operations were a must. Many man hours using boat and motor, dragline and/or explosives were required to remove drift to protect the integrity of the refuge's water management capabilities.



The heavy weight of drift has damaged the drift barrier on the north end of the refuge.

4/93 BGH

By late spring, heavy drift accumulations had taken its toll on the drift barrier. The drift barrier was damaged to the point that it did not sufficiently prevent drift from entering the refuge. One alternative is to design and build a stronger drift barrier.

Improved water clarity coupled with the silt deposits on the Big Lake bottom provides ideal habitat for aquatic macrophytes such as coontail, American lotus, American pondweed, and sago pondweed. The silt deposits on the floor of Big Lake creates a loose "slurry" of highly productive organic and inorganic material.

A negative aspect of the improved water quality is the spread of American lotus throughout Big Lake. Although lotus does provide cover for resident and migrating waterfowl, it crowds out more desirable vegetation such as American and sago pondweeds. It also reduces the public recreational activities by choking boat lanes and literally taking over entire bays and openings. Poor water quality in Ditch 1 during most of June and July prevented the intake of water into the refuge. Over this period water levels in the lake were constant which greatly improved water clarity. Approximately 75 percent of the main opening was inundated with lotus this past summer and fall.

A positive aspect of the clear water is the spread of sago pondweed, American pondweed and coontail. These plants are considered valuable waterfowl food plants. During October and November, 25,000-60,000 widgeons and gadwalls feasted on aquatics in the main opening of Big Lake.

Controlling or suppressing lotus while simultaneously encouraging other valuable aquatic macrophytes will prove to be a major challenge for wetland managers in years to come.

Mud-slough

Mud-slough is the only managed moist soil unit on the refuge. Beginning in late May the unit was dewatered by pumping for approximately 200 hours. Natural vegetation such as giant smartweed, wild millet, and various cyperus species produced an excellent feeding environment for waterfowl during the fall migration. Encroachment of woody vegetation is a continuing problem in the Mud-slough unit despite the use of mechanical and chemical control in the summer of 1992.

Mud-slough was filled almost overnight with our first flood in mid-November. The migrating waterfowl responded overwhelmingly to the available feed in the unit and as many as 6,000 ducks and 500 Canada geese were observed in the unit in late November and December.

3. Forests

The refuge's forest types have changed little since the construction projects of the late 1970's were completed. Natural succession has allowed several idle fields to revert to young pole-stage timber. These early successional stages are dominated by river birch, sweetgum, and willow. Although these species provide some cover for wildlife, their overall value is limited. The 35 acre reforested area on Baker Island showed very little acorn survival back in 1990, one year after acorns were planted. As the fall season progressed this year, a good stand of crimson-colored oaks were seen emerging above the dense growth of weeds.

In 1992, an inspection of tree core samples was conducted to determine growth rates of trees in the wilderness area. Several core samples in bald cypress and green ash timber indicated slower growth since the late 1970's. Since this slower growth period coincided with the completion of the Corps of Engineers Northend/Diversion Control Structure project, it is believed that these developments and structural operating procedures may have adversely impacted the timber in the wilderness area. Although this area is relatively high (235-238 ft. msl) there were virtually no living oak species present, which further suggests that the area has been stressed. Further causes and explanations of the timber deterioration are being considered.

No prescribed burns took place on the refuge this past year based on requirements of the fire management plan for Northeast Arkansas Refuges. Burning of levees to control woody vegetation, as has been done in the past, may be detrimental to the hardwood forest along the levee.

Approximately 90 acres on the French FmHA tract was planted with nttall acorns on October 8 by cooperative farmer Larry King. It was originally scheduled for seeding in late 1992 and again this spring, but wet conditions prevented any attempts. The land was disced by the farmer prior to seeding.

4. Croplands

A total of 121 acres were planted to the following crops:

<u>Field</u>	<u>Acres</u>	<u>Crop planted</u>	<u>Quality of Crop Produced</u>
Baker Island	12.5	winter wheat corn/milo	good, fair
Alston Field	18.7	corn/milo/ soybeans	fair
B.C. Field	40.1	milo/soybeans/corn	fair
Hill Farm	37.7	milo/soybeans/corn	fair
Oak Island	12.0	winter wheat	good

Baker and Oak Islands produced good stands of winter wheat that was heavily used by geese and deer throughout the winter. Deer and waterfowl utilized the corn/milo/soybean fields throughout the fall and winter.

10. Pest Control

Round-up, Rodeo, soil sterilant and just a good old fashion sling blade - and weed eater were utilized during the year to control vegetation in areas around the refuge headquarters, signs, parking areas and structures. Woody vegetation and weeds on the levee road were controlled by mowing.

Mice in the office are a continual problem. Refuge staff were successful at reducing mice numbers with glue traps and snap traps.

12. Wilderness and Special Areas

Approximately 5,000 acres of Big Lake Refuge was designated as a National Natural Landmark in the mid-1970's. This large tract contains seasonally flooded bottomlands, open water, and permanently flooded swamplands. Pure stands of baldcypress, which are the only significant stands of virgin timber remaining in the area, dominate the overstory species along with a mixture of white ash, tupelo, and some scattered oaks.

A portion of the refuge has also been designated as a Wilderness Area. The 2,100-acre tract lies almost entirely within the Natural Landmark area.

14. Farmers' Home Administration Conservation Easements

Big Lake has been assigned to manage two Fee Title FmHA tracts and one Conservation easement. The following is a breakdown of those tracts and their acreage:

<u>Tract</u>	<u># acres</u>	<u>Location</u>
French Tract	107.71	Greene/Lawrence County
French Easement	17.50	Green County
Craighead County Tract	41.85	Craighead County

No specific activities were conducted on FmHA easements this past year.

G. WILDLIFE

2. Endangered and/or Threatened Species

Two eagles were observed tending the nest in the main opening again this year, but their activities were not started until late February. The refuge was scheduled to open to fishing on March 1

and rushed efforts in posting the eagle sanctuary were accomplished just prior to the public's entry. The birds were almost daily observed throughout the following months to track their progress and to provide the necessary protection for their well being. Several cases of trespass were made by refuge personnel during the year.

The birds were observed going through all their nesting activities, such as incubation, feeding, wing exercises and eventually flying. The dramatic thing about the nesting attempt, aside from the fact that it was the first active nesting on Big Lake in 40+years, was that there were three fledglings in one nest. They all survived to flight stage and left the nest in mid-to-late July.

Another nest was observed to be constructed on the south end of the refuge, but no activity of use was ever observed. Who knows maybe next year!

Osprey kept their schedule and appeared to be actively involved in nesting activities in mid-March. Their peaceful co-existence with their neighboring eagles was a welcomed observation. They produced only one young during the year and it left the nest during August. There was one incident of bother by the using public during fishing season. This resulted in a letter of warning being sent to the two individuals that moved "too close" to the nesting birds.

Again, eagles and osprey were the main topic of conversation and concern - and finally pride - during the entire summer. Numerous requests were denied during the year for photographers to inch inside the sanctuary to obtain pictures. It is odd how some people awe in the presence of eagles and others view them as a nuisance and inconvenience.

3. Waterfowl

There were approximately 45,000 ducks and 1,500 coots on the refuge at the beginning of the year. About a third of those were mallards followed closely by gadwall and widgeon. Those numbers dwindled to a low of just over 3,000 ducks present in May and June, most of which were wood ducks with a few mallards and even fewer hooded mergansers. The last sighting of the blue-wing teal (this area's latest migrant) was in early May. The first southward migrants (also the blue-wing teal) were sighted in mid-September. Additional migrants were observed during late September, but it was not until the second week in October that a significant number of ducks (22,000) began to show up on the refuge.

Duck populations continued to climb to its peak for the year of nearly 86,000 birds during the fourth week of November. That number fell slightly to approximately 60,000 birds over the next few weeks and remained fairly stable throughout the remainder of the year. As of December 31 there were still 6,200 ducks using the refuge.

Canada goose numbers peaked at 800 during 1993, and their presence was last recorded in early March. They reappeared the second week in October. Blue and snow geese were periodically seen either resting on the main opening or in flight migrating southward from late November to mid-December. Their northward movements were recorded in early February to mid-March. The peak number recorded during those periods was 2,000.

The refuge hosted a respectable number of coots, and their peak occurred in November at 20,000. They were last recorded on the refuge in mid-March and the first arrivals occurred during the third week in September.

The wood duck continues to thrive on Big Lake, and this year's production was very close to past years. The population numbers fluctuate slightly during the summer due to local birds reaching flight stage and being included in the survey figures. The other factor influencing the population changes is the young-of-the-year moving away from the refuge once they have reached flight stage.

Mallards continue to produce a respectable number of young in the area and are regularly seen all summer. These sightings range from mating pairs early in the year to broods from late June to early August to large concentrations roosting on the main opening in August. As many as 1,000 to 1,500 birds have been recorded to roost on the refuge during that time frame.

Waterfowl Peak Populations 1993

<u>Month</u>	<u>Mallards</u>	<u>All Ducks</u>	<u>Canada Geese</u>	<u>Coots</u>
January	15,000	45,100	700	2,000
February	5,000	16,950	700	2,000
March	5,000	11,400	200	500
April	500	5,250	-	-
May	500	3,250	-	-
June	500	3,500	-	-
July	1,000	4,350	-	-
August	1,500	5,300	-	-
September	3,000	7,800	-	1,000
October	15,000	46,530	-	20,000
November	30,000	85,870	10	20,000
December	30,000	75,950	800	20,000

ANNUAL REPORT FORM
WOOD DUCK BOX PROGRAM INFORMATION
YEAR 1993

Total Boxes Up	<u>285</u>
Total Usable Boxes	<u>265</u>
Use by Wood Ducks of Usable Boxes	<u>250</u>
Number of Success- ful boxes (Wood Ducks)	<u>270</u>
Use by Other Ducks of Usable Boxes	<u>10</u>
Period Checked (Month)	<u> </u>
Use by Other Wild- life of Usable Boxes	<u>5</u>
*Total Wood Ducks Hatched	<u>4,500</u>
Wood Duck Broods Produced	<u>450</u>
**Wood Ducks Surviving to Flight Stage	<u>2,250</u>

Plans for Next Year (Indicate Number)

<u>0</u>	More boxes	<u>0</u>	Entrance Holes created in trees
<u>0</u>	Fewer Boxes		
<u>0</u>	No Change	(except to change out or repair unusable boxes now in place.)	

Remarks Total boxes up represented by single nest, double nest and four nest types. Total successful boxes include multiple use of various boxes. Survival rate estimated at 50%. See Big Lake inventory procedure # 7.2 for further explanation of production numbers.

The above figures are estimates and inspection of boxes are planned

for early 1993 prior to nesting, any differences detected will be reported as a correction to the above data.

4. Marsh and Water Birds

Great blue heron numbers remained stable during 1993. This species is present on the refuge year-round. Sightings in the summer months usually occur throughout the refuge in small numbers of one to five birds in any given area. During the winter however, they seem to flock together more and as many as 20-75 might be seen together. Peak numbers are thought to be in the range of 200-250 birds during the late summer months.

Double crested cormorants continued to utilize the refuge in growing numbers. At any rate, as many as 200 could be seen roosting on the refuge's main opening during the summer.

Little blue herons are daily sighted during summer months flying to and from the refuge in morning and evening movements. They are feeding on the refuge then returning to the roost and rookery near Burdette, Arkansas. As many as 300 can be seen on any given day during the summer.

American egrets (approximately 20) used the moist soils unit during the late summer once the drawdown was near completion.

Occasional sighting of bitterns and night herons were also made during the summer near and upon the moist soils unit at Mud-slough.

5. Shorebirds, Gulls, Terns, and Allied Species

Killdeer remain common in 1993 and their presence was recorded during the entire summer. Their nests were observed in the headquarters compound, and they were seen feeding their young. They again utilized all areas of the refuge including parking lots, roadways, shorelines, and wetlands. There are two "permanent residents" in the refuge parking lot. They are seen year-round in the same corner that they have occupied for 3 or 4 years. Last year they successfully raised three young in a "high traffic" area. Their numbers decreased dramatically during the winter.

Golden and black-bellied plover flocks were again observed during the spring as they made their way northward through the area. Again, the fall migration went almost unnoticed during 1993.

Greater and lesser yellow legs sightings were a bit higher and their presence was for a longer period during 1993. Those sightings were made in their usual haunts along marsh edges, shorelines and shallows of the Mud-slough moist soils unit.

Black terns and Franklin gulls could be observed in late summer and early fall in the main opening of the refuge. Their activities were always that of feeding on small fish schools late in the day. There were approximately 50 black terns and 10 Franklin gulls at their peak.

6. Raptors

Red-tailed hawks continue to be the most numerous of this category. Their numbers ranged from 10 breeding birds in late winter and early spring to a high of 100 during peak migration period in the fall. The number that over-winters here is usually around 6-10 birds and can be seen throughout the refuge during waterfowl surveys.

Marsh hawks are also thought to nest here, and their numbers remain constant at approximately 10 birds throughout the year. Most observations are recorded along the Ditch 81 levee road.

The barred owl's presence is more evident by its sounds than observation during the summer months. At almost any location on the refuge the barred owl's cry can be heard. They are regularly sighted during late winter along the Ditch 81 levee road, and on occasion as many as eight can be seen on a twelve-mile stretch. They are drawn to this area in search of prey, which can be scarce in late winter.

The Mississippi kite were here again in 1993 for about their seventh consecutive year in the same location. Several birds were present in the Hill farm unit area adjacent to the 81 levee road and could be seen on feeding flights daily during July and August. Between the two farm units (B.C. & Hill) the refuge now hosts approximately 35-40 birds, and that number is expected to increase slightly over the next few years.

8. Game Mammals

a. White-tailed Deer

The refuge deer herd, or at least part of it, uses both the refuge and the Arkansas Game and Fish Commission's public use hunting area. There seemed to be a shortage of mast production on the refuge again this year particularly in the white oak. The state's land, for some unknown reason, produced a quite better mast crop and subsequently attracted a greater than normal number of the total herd to that area. The refuge supplemented its natural food production with a meager farming operation performed almost exclusively by local

volunteers. The results of survey work conducted prior to the bow hunting season indicated that the herd was healthy. Their numbers supported the current management of the herd with no change recommended in the refuge's hunt. The combined totals of the refuge and the state management area herd is estimated at between 300-500 animals and remains fairly consistent with previous numbers.

There were 1,139 visits and 3,046 hours recorded during the year. These numbers are slightly down from last year. The ratio of regular and crossbow were about even. A total of 604 deer were seen during the hunt. A total of 23 animals were harvested by hunters. This is exactly the same number that was taken last year. Twelve of those harvested were males and eleven were females. Opening day was again the largest use day of the two month hunt. There was an influx of use just prior to the two closures of the hunt due to high water during the two month period that the hunt was scheduled.

b. Raccoon

Habitat for this species was excellent. Frequent sightings throughout the year and especially during late summer and early fall of both old and young-of-the-year animals indicated that the species is thriving well. Their presence on wood duck banding sites became quite a nuisance and on more than one occasion spoiled opportunities to shoot the net.

The annual ten day raccoon hunt during late October and early November did not produce a good harvest. Fifty-nine visitors spent 229 hours to bag only 55 animals. Raccoon sighting incidents changed very little after the hunt.

c. Fox Squirrel

The squirrel population was again low during 1993. The low mast production is thought to be the primary factor for the decline. The refuge squirrel hunt ran from September 4 to October 31, and coincided with Arkansas's state wide opening date. It took 110 visits, 313 hours to bag a total of 169 squirrels. This small game species numbers again seemed to regulate hunting pressure on itself. The higher the population, the more the hunter pursues; the fewer the number, the less he pursues this species.

10. Other Resident Wildlife

Beaver numbers are on the rise at Big Lake. There have been only moderate control measures over the past two years, but this year the floods during November and December afforded an opportunity to do some much needed control. There was only approximately 130 animals dispatched during the year. This should at least partially put their population in check. The muskrat has fared quite well over the same period, and with increased production in aquatic vegetation there is no reason to think that this trend should not continue.

Bobcats were seen more often during 1993 with at least two litters of three or more kittens reported, and ten observations of adult animals recorded.

The river otter still uses remote parts of the refuge and can be seen by quiet and diligent searches. Two observations were made by the refuge staff during the year, but our reports from deer hunters indicated that the otter is fairing well on the area.

The coyote has remained quite reclusive and almost totally nocturnal in this area. Early morning and late evening sightings of this animal were made during the year. The best indication that the animals are still here in fair numbers, are the signs left on the 81 levee and around the farm units. An occasional deer skeleton widely strewn, leaves little question as to what had been feeding on it. Neighboring cattle growers also experienced some calving loss, and have had coyotes feeding on dead adult cattle carcasses.

Skunks have succeeded in their resurgence in this area and can be seen virtually anytime or anywhere. Their sightings are normal on the 81 levee road and in all other parts of the refuge including the headquarters area. The refuge is not their only place of existence, they are sighted in virtually all parts of the surrounding countryside, and they are killed frequently on the highways.

11. Fisheries Resources

The fifteen-length-limit on largemouth bass continued in effect during 1993 and was received with mixed feelings from the using public. Approximately 50 percent of the anglers contacted during regular law enforcement efforts expressed a desire for a slot limit of some sort, and others were not convinced that a length limit was warranted. Their general feeling was that with a water system open on both ends, and subject to periodic floods, it afforded little or no effective opportunity to manage the lake's fisheries. The goals associated with this regulation include: 1) increasing the median size of the refuge largemouth bass population; 2) protecting a larger size brood fish to increase natural production; 3) increasing the number of quality sized bluegill; 4) improving overall fishing quality; and 5) improving the refuge fish management program by implementing state and federal fisheries management recommendations.

The most talked about and successful fishing opportunities at Big Lake during 1993 was the bream and shell cracker season. Hundreds of folks harvested thousands of these type of fish during a short lived period and were excited about next year's prospects.

Crappie fishing remains only moderately good upon the refuge and hopes of better things to come were expressed by the local fishermen during the year.

15. Animal Control

Public hunts were used whenever possible to control various species. The raccoon and archery deer hunts illustrate the need to maintain these populations below carry capacity. By having an annual biologically sound harvest we reduce competition for food and lower the likelihood of the spread of diseases in these species. These hunts also increase public use opportunities.

Beaver continue to interfere with water management practices and damage levee systems. The refuge attempts to control this species by taking an optimum number of animals each year. The best time to harvest beaver is during the winter and spring floods. Approximately 130 beaver were removed this year in November and December.

16. Marking and Banding

The refuge was assigned a banding quota for wood ducks again this year. Banding efforts were given a high priority during the wood duck pre-season banding. All the wood ducks banded this year were captured under a cannon net on the east levee of the Mud-slough moist unit. Banding operations require a lot of off-duty time to maintain a bait supply, keep the site clear of grass and weeds, and to just "be there" when the birds are there. There were 288 wood ducks and 35 mallards banded this year which was 46 birds over the quota. Wood duck age and sex numbers were as follows: HYM-92; AHYM-41; HYF-91, and AHYF-62.

H. PUBLIC USE

1. General

A variety of public use activities occurred on Big Lake this year. Fishing and hunting are the predominant attractions, but wildlife observation, boating, photography, and frogging also attract quite a few visitors.

There were several news releases issued during the year to announce opening and closing of fishing seasons and refuge hunts. Additional releases announced the successful nesting of the bald eagle pair, and gave a description of the bald eagle sanctuary.

Technician Moore presented 5 slide programs to Gosnell Jr. High School Career Orientation classes. He also gave a presentation to the local girl scout group in Manila.

8. Hunting

The refuge offered hunting opportunities for squirrel, raccoon, and archery deer hunters by having three structured refuge hunts. The hunt frameworks were geared to provide the maximum recreational

opportunities while promoting the optimum harvest for the game populations. Hunters were required to have a signed hunting pamphlet/permit in their possession while hunting, they are required to check-out at the end of each hunt.

a. Squirrel

The refuge small game hunt ran from September 4 to October 31. There were 313 activity hours recorded for 110 visits. A total of 169 squirrels (88 male, 81 female) were harvested. This is an increase of 46 percent from last year.

b. Raccoon

For the third year in a row the raccoon/possum hunt was structured for a 10-night hunt which began on October 22 and ended at sunrise on October 31. Hunters were required to check-in as well as check-out, making law enforcement operations somewhat easier. There were 55 raccoons harvested during 89 hunter visits. Approximately 229 activity hours were spent in pursuit of the ring-tailed bandit.

The refuge raccoon population is very high and the occurrence of a disease outbreak could occur without some type of control. The annual raccoon hunt provides some relief to the overall population and simultaneously provides recreational opportunities to the public.

Coon hunting on Big Lake is not for just anyone. With all of the sloughs, swamps, and mosquitoes, it takes a pretty "tough hunter" and a "good dog". Although the population of raccoons was high, the individual hunter's bag was generally small this year. This has been the case since the hunts have been held.

c. White-tailed Deer

The annual refuge archery season ran from November 1 through December 31. There were 3,046 activity hours during 1,139 visits to the refuge. The number of crossbow and regular bow hunters was nearly the same, with 558 crossbow visits and 595 regular bow visits. The visitation has increased over the last couple of years, but the harvest has remained about the same. This year 23 deer (12 buck, 11 doe) were harvested.

The data from the September 1992 Southeastern Cooperative Wildlife Disease Study Group (SCWDS) harvest suggested that the refuge deer herd is near nutritional carrying capacity and that there is a low likelihood of a disease outbreak. This data coupled with the fact that the fact that the present hunting season framework (including a two month archery season) has been in effect for several years, leads us to believe that the season length and structure provides the optimum harvest for the deer herd.

9. Fishing

a. Sport Fishing

The sport fishing season ran from March 1 through October 31 refuge-wide and a small portion (Sand-slough area) of the refuge was open year-round. The Sand-slough area is open year-round, but from November 1 to February 28, the area is limited to trolling motors or paddles only.

Fishing is the number one public use activity on the refuge. There was an estimated 22,000 fishing visits and 55,000 activity hours recorded for only 3,200 fishable acres.

Big Lake and Mallard Lake which is on the adjacent Big Lake Wildlife Management Area, are the only two significant fishable lakes open to the public in Mississippi County, Arkansas, and fishing pressure is usually heavy.



"It just doesn't get any better than this".

BJH

b. Commercial Fishing

Commercial fishermen were allowed access to the refuge under the same guidelines as those for sport fishermen. Commercial fishing permits were available for \$25.00 each. In addition to the state commercial fishing regulations, commercial fishermen must also abide by the special conditions attached to their special use permits.

The annual commercial harvest is calculated by compiling monthly commercial fishing reports which all refuge commercial fishermen must submit as part of the special conditions of their permit. The 1993 harvest was as follows:

COMMERCIAL FISH HARVEST

	<u>Buffalo</u>	<u>Carp</u>	<u>Catfish</u>	<u>Drum</u>
Weight	9,650	3,530	1,615	80

Total Weight 14,875 pounds

Commercial Fishing Permits Issued - 6

17. Law Enforcement

Refuge law enforcement personnel successfully completed an annual in-service training Quincy, Florida during the spring and semi-annual firearms qualifications in the fall. Big Lake Refuge Officer Bob Moore served as firearms instructor at the above training sessions.

Refuge Manager Darrin Unruh completed basic law enforcement training at FLETC in November. Darrin's completion of training was a welcomed asset to Big lake. In past years, there has been only one refuge officer to conduct law enforcement efforts in conjunction with his other assigned duties.

Law enforcement efforts on the refuge were generally accomplished randomly or in association with on-going assignments. Special efforts were made during the refuge squirrel, raccoon, and deer hunts with high visibility patrols and inspections. Occasional checks were made of creel limits, licenses, and safety equipment during the fishing season. With the successful nesting of bald eagles on the NWR, increased enforcement efforts were made to deter trespass into the sanctuary area. Several trespass cases were made during this period.

1993 Violations - Big Lake NWR

<u>OFFENSE</u>	<u>NUMBER</u>	<u>PROSECUTION</u>	<u>AMOUNT</u>	<u>DISPOSITION</u>
Trespass	14	Federal	\$815.00	1 pending
Fishing w/o license	3	Federal	220.00	1 pending
Fishing w/o license	1	State	113.25	closed
Illegal take of wildlife	4	Federal	2,210.00	1 pending
Unauthorized possession of firearm	2	Federal	110.00	1 pending
Failure to remove deerstand, daily	1	Federal	110.00	closed
Possession of undersized fish	4	Federal	440.00	closed
Possession of controlled substance	1	Federal	260.00	closed
Operating vehicle w/o valid license	1	Federal	60.00	closed

I. EQUIPMENT AND FACILITIES

1. New Construction

The refuge had two above-ground fuel tanks installed during the year. Mechanics Limited Inc., was awarded a contract to remove the gasoline and diesel from underground and back fill the area after environmentally testing the soils for leaks or other contaminants. The new tanks (1,000 gallons each) were installed on above-ground concrete slabs and are self-contained and double-walled to contain any spillage or leakage. The job was completed in mid-December, but requires the contractor to return and address a few minor flaws.

Attempts to move the portable building being used by the refuge as an oil house resulted in damage, mostly due to age deterioration. The building was ultimately unsalvageable and was destroyed by refuge personnel. The building was sitting over the two underground tanks and had to be moved to accomplish the contract stipulations.

2. Rehabilitation

The Corps of Engineers awarded a contract to a Missouri firm to rehab the mid-lake control structure. The contract should have taken two months maximum, but for one reason or another - mostly contractor related - the project (which was started in August) was not completed until late November. The structure received new larger screw stems, indicators, gear housings, and seals at the pipes. The gates were sand blasted and repainted. A small amount of work was performed on the cat-walk portion of the structure.

Refuge personnel continued with its annual maintenance of the NE/diversion and South 81 Control structures. The twelve miles of gravel road on 81 levee was graded a couple of times for its entire length. Several gradings were required for its first 2.5 miles. The levee slopes were mowed during the year. Chemical applications were made to control vegetation at the water control structures, parking areas and headquarters site. Mud-slough levee was mowed a couple of times during the year.

4. Equipment Utilization and Replacement

Because of safety regulations, the refuge's 3-wheel ATV was replaced with a new 4-wheel Honda ATV.

All three of the refuge's vehicles received replacement of their tires during the course of the year.

Several hours of maintenance was required during the year to keep the refuge's farm equipment and implements in working condition.

The refuge's terrain king mower was all but written off early in the year, but continued maintenance and repair to it and the 3020 John Deere allowed them to be effectively used on the levee slopes after all.

The 120G road grader received much attention during the year. Finally the problem of the batteries losing their charge was solved, or at least we hope it is!

One of the refuge's outboard motors received major repair during the year. Part of the repair was due to mechanical failure, but the costly part was due to damage caused while using it on the refuge during a sudden storm. This resulted in hitting a partially submerged log and damaging the lower unit and pivot pin housing.

J. OTHER ITEMS

3. Items of interest

The die-hard D-4 dozer suffered a hydraulic breakdown and failure during the year. Attempts to repair this machine proved unsuccessful for one reason or another. It was included on the list of sale items and ultimately sold to a person in Texas. They have not removed the machine at the writing of this report. A historically handy piece of equipment at Big Lake, the machine's loss will no doubt create logistical hassles to obtain machinery to perform the minor tasks that this old relic was utilized for.

The following Refuge Revenue Sharing checks were delivered:

Craighead County -	\$65.00
Greene County -	47.00
Lawrence County -	119.00
Mississippi County -	5,291.00

4. Credits

Refuge Manager Unruh wrote Sections A, F, H, and J.

Hydrologic Technician Moore wrote Sections B, G, and I.

Assembled, edited and typed by Office Assistant Griffith.

K. FEEDBACK

Refer to Complex Administration

Cache River NWR

CACHE RIVER NATIONAL WILDLIFE REFUGE

ANNUAL NARRATIVE REPORT
Calendar Year 1993

INTRODUCTION

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INTRODUCTION

The Cache River National Wildlife Refuge represents a significant contribution to the U.S. Fish and Wildlife Service's (FWS) effort to preserve and restore bottomland hardwood habitat in the Mississippi River Alluvial Floodplain (MRAF). These habitats are recognized as important areas for wintering waterfowl and other migratory and resident wildlife species. The refuge's primary objective is to acquire and preserve remaining bottomland hardwood wetlands and reforest cleared tracts within the Cache River basin.

The initial acquisition for Cache River National Wildlife Refuge began in 1986 with the purchase of 1,395 acres from The Nature Conservancy (TNC). The refuge has an ongoing acquisition program, and presently contains approximately 24,765 acres. These lands are located within the 133,000-acre floodplain of the middle and lower Cache River Basin in the Northeast Arkansas counties of Jackson, Woodruff, Prairie, and Monroe. The principle drainage of the Basin are the Cache River and its major tributary, the Bayou DeView River.

The Cache River Basin is characterized by meandering channels, shallow sloughs, oxbow lakes, cypress brakes, and scrub/shrub wetlands. The topography of the Basin is characterized by natural levees next to stream channels, and a series of shallow ridges and swales that occur throughout the floodplain. The Cache River Basin is one of the few remaining areas in the lower MRAF that has not been drastically altered by drainage and channelization projects.

The significance of the unaltered nature of the Cache River Basin is best viewed with respect to the changes that have occurred in the MRAF over the past 50 years. What was once virtually a continuous complex of bottomland hardwood wetlands, estimated at approximately 24 million acres, had been reduced to approximately 5 million acres by 1978. These changes have occurred in the Cache River Basin to a much lesser degree than other areas of the MRAF. None the less, losses have occurred in the basin and are projected to continue. For example, bottomland hardwood acreage in the four county Cache River Refuge area were estimated at 408,000 acres in 1957. This acreage had been reduced to 220,000 acres by 1978 as land continued to be cleared for agricultural purposes.

The bottomland hardwood wetlands of the MRAF are recognized as some of the most dynamic and productive habitats in North America. The loss of bottomland hardwood habitat has adversely affected many species of wildlife, particularly migratory waterfowl. Historically, this area of Northeast Arkansas has wintered the largest concentration of mallards in North America. The natural resource value and the continual threat of loss to this habitat type underscored the importance of the FWS creating the Cache River

National Wildlife Refuge. The refuge is approved to eventually include up to 55,000 acres, which will compliment approximately 22,000 acres of nearby bottomland hardwood habitat already in public ownership. The Arkansas Game and Fish Commission (AG&FC) owns and manages a total of 14,000 acres in it's Dagmar and Rex Hancock Wildlife Management Areas (WMA) and 8,000 acres are owned by the U.S. Army Corps of Engineers (COE). These lands, in conjunction with the refuge's land acquisition, will ensure that a significant portion of the remaining bottomland hardwoods in the Cache River Basin will be preserved through public ownership.

A. HIGHLIGHTS

- Land acquisition continues (Section C.1)
- Michael Johnson reports for duty as Refuge Manager (Trainee) (Complex Section E.1)
- The Mid-December Arkansas Waterfowl Survey recorded over 553,000 ducks and 123,000 geese in the Cache River Acquisition area (Section G.3)
- Water management capabilities are expanded on the Dixie Sanctuary with the addition of four water control structures (Section I.1)
- The refuge moves into a new office and temporary living quarters at the Dixie Unit (Sections I.1 and I.2)
- New low band repeater system is brought on line at Cache River and White River NWR's (Section I.5)

B. CLIMATIC CONDITIONS

Weather conditions were unusually dry again this year with the months of February, March, July, and September deviating more than an inch and a half from the thirty-year average. The total annual rainfall deficit was 8 inches below normal. Lack of rainfall in February and March allowed refuge farmers to begin farming operations without delays. However, above average rainfall in April and May caused delayed rice planting on some farmed areas of the refuge. Planting of additional refuge crops were on schedule, although some soybean replanting did occur because of low soil moisture and lack of seed germination. Ample rainfall occurred early in the growing season, however rainfall for July was almost nonexistent. Lack of moisture and extremely high temperatures during this month stressed most crops, especially those planted late in the season. Rainfall increased in October and November and created difficult harvest conditions. Completion of crop harvest by refuge farmers was later than usual and continued until flooding halted harvest efforts completely. Normal to above normal rainfall during January, October, November, and December provided excellent conditions for migrating waterfowl, and resulted in high waterfowl use of refuge lands.

Climatic Conditions for 1993

<u>Month</u>	<u>Precipitation</u>	<u>Precipitation</u>	<u>Temperature</u>			
			<u>30 year avq.</u>	<u>Max.</u>	<u>Mean</u>	<u>Min.</u>
January	4.1	4.4	67	47	25	33
February	2.1	4.7	73	50	15	31
March	2.8	5.1	82	59	21	42
April	7.2	5.4	81	66	38	49
May	5.5	5.0	87	77	48	60
June	3.0	3.3	95	88	60	71
July	1.4	3.7	100	96	71	75
August	4.3	3.4	101	93	65	72
September	2.0	3.5	94	82	49	61
October	3.4	2.9	86	72	28	48
November	5.1	4.0	78	57	24	38
<u>December</u>	<u>4.3</u>	<u>4.7</u>	<u>66</u>	<u>52</u>	<u>23</u>	<u>34</u>
Year	42.4	50.1				

River Gauge Readings for 1993

<u>Month</u>	<u>White River</u>			<u>Cache River</u>		
	<u>High</u>	<u>Low</u>	<u>Mean</u>	<u>High</u>	<u>Low</u>	<u>Mean</u>
January	27.9	26.0	27.2	10.3	7.6	9.4
February	27.5	25.3	26.6	9.1	6.1	7.7
March	26.3	25.3	25.9	9.5	6.2	8.2
April	27.3	25.4	26.0	10.0	8.3	9.3
May	27.5	24.7	26.6	9.7	4.2	7.7
June	24.4	19.8	21.6	7.1	3.8	5.7
July	19.8	17.8	18.9	8.5	4.5	6.8
August	18.9	13.0	15.6	8.4	6.0	7.3
September	18.8	11.2	13.0	9.5	6.8	7.4
October	20.8	19.2	20.1	10.0	4.6	8.1
November	26.2	19.1	22.1	11.0	3.7	7.7
December	27.4	26.3	27.1	10.9	6.1	9.5

The Cache River reaches flood stage when the gauge at Patterson, Arkansas is at 8 feet. The White River is considered at flood stage when the gauge at Clarendon, Arkansas reaches 26 feet.

C. LAND ACQUISITION1. Fee Title

Cache River NWR has grown to 24,765.01 acres through an ongoing acquisition program in Jackson, Woodruff, Monroe, and Prairie counties in Arkansas.

The refuge acreage is shown by cover class and county below:

Cache River NWR Total Acres

<u>County</u>	<u>Acres</u>	<u>Forest</u>	<u>Acorn Plantings</u>	<u>Farmland</u>
Woodruff	12,203.88	6,328.35	1,414.90	4,460.63
Prairie	4,574.29	2,989.05	238.00	1,347.24
Monroe	5,218.32	3,553.71	602.00	1,062.61
Jackson	2,768.52	1,908.97	0.00	859.55
Total	24,765.01	14,780.08	2,254.90	7,730.03

The Arkansas Chapter of TNC continues to be a major player in land acquisition at Cache River NWR. During the year the Service paid TNC for the Robbins properties. This was a total of 475.78 acres in Woodruff county. In addition to the lands obtained through TNC, the refuge purchased six additional tracts of land. The majority of the new land was in Monroe county where the refuge obtained 1,642.50 acres. In Woodruff county the refuge purchased 340.88 acres and in Jackson county 80.00 acres were purchased. This acreage plus the Robbins property (from TNC) increased the size of Cache River Refuge by 2,539.16 acres during 1993.

The average cost per acre for property bought during 1993 was \$663.31.

Establishing boundary lines on refuge properties has been a slow process during 1993, none the less, 19 miles of line were established and 1.5 miles of old lines were renewed. In addition to refuge personnel working on boundary lines a registered survey team completed approximately half of their 7 mile contract during 1993.

D. PLANNING

5. Research and Investigations

The refuge issued a special use permit to Dr. James Harris with the Arkansas Department of Transportation and Highways to conduct a freshwater mussel survey on portions of the Cache River. Dr. Harris was doing this work under contract with the AG&FC. This survey has been completed, and the final report will be out in January of 1994.

Refuge staff met and talked on various occasions with representatives of the COE Waterways Experiment Station concerning their ongoing bottomland hardwood wetland research on the Cache River. They have collected over three years of data on hydrology, sedimentation, nutrient cycling, vegetation, wildlife populations, and wildlife habitat relationships. Although this work is not occurring directly on refuge lands, study sites are generally adjacent to the refuge. Therefore, the results of this study may have direct implications on refuge lands along the Cache River. Presently these researchers are analyzing their data and preparing reports. They are also in the process of constructing GIS maps on past and present vegetation distributions. We are continuing to provide assistance to the study group in the form of information and tour assistance. The results of the research conducted are expected to provide valuable information on aspects of the Cache River ecosystem, and will certainly be useful for future resource management planning.

6. Other

The Soil Conservation Service (SCS) provided an elevation survey and site plan drawing for a proposed water control system project on the Dixie Unit. SCS provided the refuge with known elevations and drainage patterns of the area, which were needed to design and construct the first phase of the project.

Refuge staff provided assistance during three public scoping meetings on the Cache/Lower White River land exchange with Potlatch Timber Company. The purpose of the meetings were to gather public input on resource management and public use issues. Meetings were held in Helena, Clarendon, and Little Rock, Arkansas. The information collected during these meetings will be used to develop issues for inclusion in a Cache/Lower White River Comprehensive Resource Management Plan.

The refuge staff met with staff from White River NWR and Scott Yaich, Wildlife and Habitat Management Biologist, to discuss concepts and organization of the Cache/Lower White River Comprehensive Resource Management Plan. Information on current acreage, habitat types, threatened and endangered species, cultural resources, management capabilities, hydrology, and access were compiled by refuge staff for use in plan development. In addition, 1:40,000 topographical maps delineating current refuge lands were prepared. These maps will be incorporated into a GIS system being developed by the Center for Advanced Spatial Technologies and the Fish and Wildlife Cooperative Research Unit located at the University of Arkansas. When completed, this system will provide information on vegetative types, flooding increments, public ownership, and respective spatial arrangements for each throughout the Cache/Lower White River project area.

E. ADMINISTRATION

Refer to Complex Administration

F. HABITAT MANAGEMENT

1. General

The Cache River NWR is located within the 10 year floodplain of the Cache and Bayou DeView rivers. The dendritic nature of the rivers and normal flooding regimes associated with the floodplain, create a dynamic ecosystem with diverse habitat for a wide array of flora and fauna. In general, habitat management has been directed toward preserving existing bottomland hardwoods, reforestation, protecting natural wetlands, and restoring hydrology to farmed wetlands.

2. Wetlands

Refuge lands are located in the floodplain of the Cache and Bayou DeView Rivers, consequently wetlands comprise a high percentage of refuge acreage. Forested wetlands comprise the largest portion of the refuge and are priority for acquisition. These areas experience seasonal puddling and overflow flooding annually, on an intermittent basis from November through June. At present, management of these forested wetlands is limited to beaver control and the management of one greentree reservoir (GTR).

Beavers are prolific throughout the refuge. Although the diversity added by their presence and activities are recognized, efforts are made to reduce the negative impact they have on timber resources. In spring and early summer, beaver dams are breached with explosives to allow drainage of these forested wetlands. On large tracts this may require repeated efforts because of the large number of existing dams and the uncanny ability of beavers to quickly halt the flow of water. Several of the acquired tracts exhibit water damaged trees as a result of beaver activity. Priority is given to protecting undamaged stands and those damaged stands with a high percentage of living trees. Stands with a high percentage of dead trees receive little beaver control efforts due to a shortage of time and manpower.

The greentree reservoir on the George tract is regulated with a 6-foot fabricated slide gate. Water typically fills the 800 acre GTR when the Cache River rises to 10+ feet and/or the White River reaches 27+ feet, (which causes water from the White River to back up the Cache River as far north as the George tract). This area of the refuge is designated as a sanctuary from November 15 to February 28. The GTR was not flooded at the start of year and the river levels did not allow filling until January 14. The GTR remained full until the slidegate was raised on June 21. Approximately two weeks were required to drain the area, because of the large number of existing beaver dams on the area. This area has approximately 250 acres of cypress/tupelo breaks that remain flooded throughout the year. The slidegate was closed on October 18 to allow filling of the GTR. The rivers did not rise enough to flood the area until November 26.

The refuge is in the process of developing a system of water control structures to provide flooded habitat on a variety of farmed, moist soil, and reforested tracts. During 1993 there were 23 existing structures at 17 locations that were used to provide flooded habitat. Six structures were constructed at four different sites during the summer of 1993, and therefore did not provide flooded habitat until this fall. A description of these new structures and the management capabilities associated with each is contained in section I.1 New Construction. Approximately 2,270 acres of flooded habitat was provided by the 23 structures during the fall and winter of 1993. The impoundments associated with each structure were filled by either catching runoff or by back flowing floodwater through the structure.

Approximately 75 percent of the existing impoundments were full at the beginning of the year. The Plunkett and some of the higher elevation impoundments on the Dixie Unit were not filled until the week of January 11. Water was held until the first week of April, at which point initial attempts were made to drain the water from those impoundments that were to be farmed. High water from the Cache River prevented draining of the majority of impoundments until the last week of May and the first week of June.

A lack of rainfall and late maturing crops prevented flooding of areas during October. As the rains finally came in late October, we were able to begin catching some runoff in non-farmed areas. The farmed impoundments were going through a wet prolonged harvest, which prevented flooding of most farmed areas until the last two weeks of November. The Cache River reached 11.0 feet on November 28, which caused significant flooding throughout the refuge. This flood event filled all refuge impoundments. Some impounded areas regulated by levees and water control structures, such as the Dixie Sanctuary, experienced water levels higher than designed and/or natural spillways. In addition, flooding of the Cache River significantly increased the amount of flooded habitat on the Dixie Unit from what would have been provided by refuge impoundments alone. This additional flooded acreage persisted throughout the end of the year and then began to decrease as the Cache River fell.

Beavers caused numerous problems at water control structures on the refuge. In an attempt to prevent beavers from plugging pipes and structures, heavy gauge 4'x12' welded wire hog panels were cut to fit in front of most structures. A variety of configurations and methods of attachment were experimented with. The jury is still out, but hopefully our efforts will deter beavers from plugging pipes, or at least prevent damage to pipes during dam removal.

3. Forestry

The forest habitat master plan has not been written, and no timber inventory work was accomplished in 1993. Forestry work on the refuge has been limited to reforestation and beaver control.

Direct seeding of acorns with a "no-till" automatic planter is the method used for reforestation at Cache River. During 1993 only one new tract was direct seeded. The planted tract was a 136 acre field in Woodruff county. An old planting of 120 acres was determined a failure and was replanted.

The Nature Conservancy, through grant money they received, planted hardwood seedlings on 40 acres of the Robbins property prior to our purchase.

A major aspect of forestry is to protect the forest resource. Beavers that damage standing timber are a never ending problem. In the summer beaver dams are blown in order to release water standing on viable stands of timber. At Cache River there are 68 known beaver dams. Some of these dams are in ditches and create no problems for the refuge. However, the majority of the dams are in timbered areas and must be removed to protect the timber. Ten and a half cases of explosives were used, in an estimated 55 shots, during the 1993 campaign to release water standing on refuge timber.

4. Cropland

The refuge has approximately 7,730 acres of openland, of which 6,401 acres were managed under cooperative farming agreements in 1993. The non-farmed acreage is composed of sand fields, reverting cropland, or fields scheduled for reforestation. These areas add habitat diversity to the refuge and are utilized by a variety of wildlife species.

Eleven cooperative farmers participated in the refuge farming program, with agreements ranging in size from 90 to 3,100 acres. Cooperative farming agreements were prepared for each farmer specifying the crops to be grown, location, crop shares, pesticide use restrictions, and other special farming conditions. The refuge received one fourth of the crops grown. The refuge's share of the crop was left standing in areas most prone to flood. The types of crops grown, acreage, and share distribution are shown below:

Refuge Cooperative Farming

<u>Crops Produced</u>	<u>Acreage Farmed</u>		<u>Total Acreage</u>
	<u>Cooperator</u>	<u>Government</u>	
Soybeans	3,649.1	0.0	3,649.1
Milo	0.0	915.7	915.7
Rice	757.1	243.7	1,000.8
Corn	22.0	0.0	22.0
Wheat	273.3	91.1	364.4
Japanese Millet	0.0	354.0	354.0
Set-a-side	95.0	0.0	95.0
Total	4,701.5	1,604.5	6,401.0

Cooperative farming field work began the first of April, as field conditions permitted. Drying conditions during the first two weeks of April allowed seed-bed preparation, but then the rains came curtailing any planting. Frequent rains throughout the last of April and the first of May prevented the planting of the majority of rice and milo until the last two weeks of May. The milo at the Horseshoe tract could not be planted until the third week of June because of high water. Soybean planting occurred throughout June and into July. Some beans that were planted the last of June went over 20 days after emergence without any rainfall. These fields had very spotty stands and the farmer elected to replant over the top of the standing beans. Millet was planted from the first week of June through July 22.

Rainfall was above normal for April and May and below normal for June and July. The wet spring delayed planting and crop establishment. The crops were behind schedule and then suffered from a lack of adequate moisture during critical times. The rice crop was the least affected by the dry weather and produced a good yield. Early fall rains and a later than normal rice harvest, because of delayed spring planting, created tough wet harvest conditions in many of the rice fields. In addition a considerable amount of rice was blown down prior to harvest, adding to harvest difficulties. The wet conditions and downed rice delayed the final rice harvest until the week of November 15. The rice yield varied from about 65 to 170 bushels per acre with a average of approximately 120 bushels per acre. Yields were actually higher than reported, but wet conditions and downed rice prevented farmers from harvesting all of the crop.

Most milo yields were actually very good considering the delayed planting and dry growing season. Cooperative farmers did not grow any milo for their share of the crop this year. All milo grown was left in the field as the refuge's share. Therefore harvest yields are unknown, but a visual estimate based on last year's harvested yield was estimated to be approximately 4200 lbs per acre.

Soybean yields were generally below normal because of late planting and a dry growing season. Yields ranged from 10 to 30 bushels per acre with an average of approximately 18 bushels per acre. Most farmers were eligible for disaster payments on soybeans as a result of drought determination and declaration for most eastern Arkansas counties. Soybean harvest was late because of late planting and a slow maturing crop. Heavy rains and rising river levels made for a wet hurried harvest. Some beans were cut just in front of or

through rising flood waters. Approximately 100 acres of soybeans were eventually lost to the rising flood waters.

Millet stands planted for the refuge were generally good this year. The stands planted during June produced the best yields. Those planted in mid-July produce a shorter plant with smaller seed heads, and consequently produced a reduced yield.

Cooperative farmers were required to rebut rice levees and roll stubble after the rice harvest. Additionally, we required the farmer to maintain a flood on the refuge's share of rice during the month of November. Flooding of 50 acres of refuge rice on the Dixie Unit was delayed until the first week of January. We had a lot of flooded acreage on this area early in the season and felt that more benefit would be derived by waiting until flood waters receded before flooding the remaining 50 acres of rice.

Approved pesticides provided adequate control of most agricultural pests when used in combination with crop rotation and cultivation. Some Johnsongrass problems are developing in fields that do not readily flood and have been planted to milo on a regular basis. These fields will need to be rotated to crops other than milo in order to address the Johnsongrass problem.

5. Fire Management

During 1993 there were no controlled burns on the refuge but wildfire remained a constant threat to our direct seeded hardwood plantations. There were 13.5 miles of disked fire breaks maintained around planted fields on the refuge. This is a big help but the refuge still experiences wildfires. The refuge experienced 7 wildfires that burned approximately 67.6 acres. All of these wildfires were in old fields, fuel type 1, with the largest wildfire consuming 36 acres of a two-year-old hardwood plantation.

G. WILDLIFE

2. Endangered and/or Threatened Species

Four federally listed endangered species, the American alligator, Arctic peregrine falcon, bald eagle, and the fat pocketbook pearly mussel formerly occupied the Cache River Basin. Today the bald eagle is the only one of these four species known to occur on the refuge. The Mid-Winter Bald Eagle Survey was conducted on January 4 with 15 bald eagles (6 adults, 8 immatures, and 1 unknown) observed. Eagles were utilizing the Plunkett and Dixie Sanctuaries where major concentrations of ducks and geese were present.

A Pink Musket mussel was believed to be found at the mouth of Barnes Lake in June by the researcher conducting the freshwater mussel survey on the Cache River. The age and condition prevailed positive identification.

3. Waterfowl

Overall waterfowl populations on the refuge are directly tied to the availability of flooded habitat, particularly overflow flooding in the Cache and Lower White River Floodplains. At the start of the year, floodwater from the Cache and Lower White River covered only portions of the refuge. The Mid-Winter Waterfowl Survey was conducted on January 7, at which time only 10,000 ducks and 10,000 geese were observed on the refuge. Rising water levels the last three weeks of January, flooded large portions of the refuge for the first time of the winter. Large numbers of waterfowl responded to the availability of flooded habitat. An estimated 100,000 snow and blue geese, 10,000 white-fronted geese, and 2,000 Canada geese were observed utilizing the Dixie Sanctuary on January 27. On that same date, approximately 100,000 ducks comprised of 70 percent mallards, 20 percent pintails, and 10 percent green-winged teal were also observed using the Dixie Sanctuary.

Waterfowl began leaving the area by the second week of February as the flood waters had receded on most of the refuge. The snow and blue geese left the Dixie Sanctuary on February 12, however approximately 20,000 ducks remained until the end of the month. By the last week of March the only migratory waterfowl observed on the refuge were a few small flocks of blue-winged teal. All migratory waterfowl had moved through the area by April.

Wood ducks were present on portions of the refuge throughout the year. Pairs and small family groups were observed during the summer, but no large concentrations or roosts were located. Trapping and banding efforts were hampered by the scattered nature of the local wood duck population. The wood duck nest box program is ongoing with the addition of three boxes at the Hardwick tract and three boxes at the Bank of Brinkley tract during February. Utilization of the nest boxes was disappointing with only 1 out of 12 boxes utilized. Additional boxes will be added as wood duck use and manpower allow.

The first migrant blue-winged teal were observed on September 7. Small flocks of teal were observed for a two to three week period around permanently flooded refuge lakes and sloughs. The first

mallards were observed on October 18. Rains in late October provided some early water on the refuge. Small flocks of mallards and green-winged teal were observed feeding in fields of flooded milo on the Dixie Unit on November 3. Lack of rainfall caused the Cache River to steadily fall, reaching 3.7 feet on November 14. Duck use at this time was limited to a small number of sites where early water was caught and held or where refuge cooperative farmers had pumped up the refuge's portion of crops.

Heavy rains in mid-November brought a major rise on the Cache River with a gauge reading of 11.0 feet being recorded on November 28. The lower White River began to rise slowly and reached a crest of 27.4 feet (Clarendon) on December 9. The 1993 Arkansas Mid-December Waterfowl Survey was conducted from December 14 to 17 with over 553,000 ducks and 123,000 geese being recorded in the Cache River acquisition area. Although these numbers are impressive, surveyors believe this is an underestimate because of the difficulty associated with surveying flooded bottomland hardwood areas. Major concentrations of approximately 100,000 ducks were observed at both the Plunkett and Dixie Sanctuaries during the 1st and 2nd weeks in December. The snow and blue geese were first observed on the Dixie Sanctuary around December 3, which was approximately one month earlier than the previous two winters. Numbers peaked at approximately 75,000 during the week of December 13. Goose use on the Dixie Sanctuary declined drastically by the end of December.

5. Shorebirds, Gulls, Terns, and Allied Species

Shorebird use of refuge fields and drained impoundments was limited during the spring migration because of high water. Peak numbers were observed during the week of April 6. Lesser yellowlegs and solitary sandpipers were the most common species observed. Other species observed included: semipalmated sandpipers, common snipe, woodcock, and killdeer. An interesting sighting was made of 1,000 white pelicans that stayed at the Choctaw tract for approximately the last two weeks of March. Another interesting sighting of eight black-necked stilts at the Dixie Unit was made in August.

6. Raptors

Birds of prey are very common on the refuge. The red-tailed hawk and the marsh hawk are the two most commonly seen, and the barred owl and screech owl are the most commonly heard species. Other species seen on occasion by refuge personnel include the American kestrel, red-shouldered hawk, great-horned owl and the Mississippi kite.

8. Game Mammals

The bottomland hardwood habitat associated with the refuge is very productive and supports a diverse population of game mammals. White-tailed deer are very common throughout the refuge, with the largest population found in southern Woodruff and eastern Prairie counties. Deer are dispersed to high ground during periods of high water. The refuge reforestation program is providing some much needed travel corridors and non-flooded escape cover for the deer population.

Squirrels (gray and fox) are also abundant on the refuge with good populations found on all forested portions of the refuge. Other common game mammals include: raccoon, opossum, and rabbit (cottontail and swamp). Black bear have been sighted in the area near the refuge in recent years, but none were reported in 1993.

10. Other Resident Wildlife

The bottomland hardwoods and associated wetlands of the Cache River support a vast array of wildlife species. Common mammals include: beaver, muskrat, river otter, mink, coyote, skunk, armadillo, rice rat, white-footed mouse, and cotton mouse. Groundhog and nutria were observed adjacent to the refuge this year for the first time. These species are not generally found in this part of Arkansas.

Some 85 species of birds have been recorded by the COE, Waterway Experiment Station personnel on transects through the Black Swamp Wildlife Management Area, which adjoins the refuge. Bird species exhibited considerable seasonal variation on the surveyed transects with 68 species recorded during spring, but only 28 present during winter. Of those present during spring, 44 were considered to be resident breeders, while 24 were migrants that breed in more northerly latitudes.

11. Fisheries Resources

The waters of the Cache, White, and Bayou DeView Rivers and their associated oxbow lakes and sloughs provide abundant habitat for a variety of freshwater fish species. Annual flooding regime provide regular restocking of lakes and sloughs. The most common fish species include: crappie, bluegill, black and spotted bass, flathead, blue and channel catfish, carp, buffalo, and drum.

Over thirty different species of freshwater mussels have been found in the Cache River. Several species are commercially harvested. Mussel harvesting is not allowed on those portions of the river located on the refuge. These areas serve as sanctuaries that help repopulate other portions of the river where mussels have been heavily harvested.

15. Animal Control

Beavers are abundant on the refuge. Beaver abundance and persistent dam building activities are a continuing problem for the refuge. A considerable amount of time was expended controlling beaver populations and removing their dams in an attempt to protect bottomland hardwood stands. A total of 70 beavers were removed from the refuge during the year.

16. Marking and Banding

Wood duck banding efforts were less than successful during 1993. After little success in 1992 with swim and walk-in traps, considering the amount of time invested, an attempt was made this year to develop a cannon net site. Local AG&FC biologists were also interested in trapping this year, therefore equipment and manpower were pooled in an attempt to develop a cannon net site on Le LaBlanc WMA. The site was bushhogged, flooded, and prebaited during late June. By the first of August there were about 100 wood ducks regularly using the area, but they were reluctant to use the bait site. Unfortunately, no ducks were captured or banded. A tall stand of sudan grass growing around the trap site was believed to have contributed to the ducks reluctance to use the bait site. We plan to expand the mowed area at the trap site next year and begin our prebaiting efforts earlier.

H. PUBLIC USE

1. General

Public use at Cache River Refuge is primarily associated with hunting and fishing. Some bird watching does occur, but it is mainly limited to passers-by stopping to look at the ducks or geese from the highway.

8. Hunting

The refuge hunting program includes waterfowl, big game, and small game. Refuge hunt seasons are established to minimize conflict between various hunts and to coincide with hunts on adjacent state WMA's. This framework, along with permissible bag limits, help to ensure a sustained harvest and quality outdoor experience for the public.

a. Waterfowl (ducks)

Waterfowl hunting was available on the refuge during the state season, with morning hunting only. The season was split into three segments. The first segment was from November 25 to December 5, the second from December 18 to December 26, and the third from December 31 to January 9. No permanent blinds were permitted and all decoys had to be removed daily. Along with duck hunting, other species such as dove, snipe, woodcock, coot and blue/snow, whitefront, and Canada geese could be hunted when their respective seasons corresponded with the duck season. Steel shot "only" could be possessed and the use of retrievers was allowed.

b. Big Game

The refuge supports a healthy population of white-tailed deer and offers the public three methods of hunting; archery/crossbow, muzzleloader, and modern gun. Deer hunting is extremely popular on refuge lands with high hunter turnout from both resident and non-resident hunters.

The refuge is split into three units or hunting zones. The southern most area is Unit I, the middle region is Unit II, and the northern area of the refuge is Unit III. Each refuge hunting unit may include more than one state (AG&FC) hunting zone. Therefore, all deer hunting regulations are in accordance with the state hunting zones and refuge hunting units.

An additional factor affecting deer hunting is the designation of Flood Prone Zones (FPZ). FPZ's were created by the AG&FC as a method to protect deer that concentrate on isolated non-flooded areas during times of high water. FPZ B encompasses the majority of refuge unit III, and closes all deer hunting when the Cache River gauge at Patterson, AR reaches 10 feet. Deer hunting reopens on refuge unit III when the gauge reading at Patterson is reported to be 8.5 feet or less. Refuge lands located in FPZ C include all of Units I and II. Refuge Units I and II close to all deer hunting when the White River gauge at Clarendon, AR reaches 28 feet and will reopen when water levels fall to or below 27 feet. River gauge readings are reported daily by the National Weather Service in state newspapers and must be consulted by deer hunters prior to hunting refuge lands in FPZ's during times of high water.

Archery/Crossbow season opens on Units I and II, and the state zone seven portion of refuge unit III, on October 1 and closes February 28. The remaining portion of Unit III opens on October 1 and closes on January 31.

Muzzleloader deer season on Units I, II, and the zone seven portion of Unit III opened October 23 to either-sex and closed October 27. The remaining portion of refuge Unit III was closed to muzzleloader hunting.

The modern gun deer hunt on refuge units I, II, and the zone seven portion of Unit III opened November 13 and closed November 21. Modern gun season on remaining refuge lands in Unit III was November 27 and 28 only.

High waters closed portions of the archery/crossbow and modern gun deer seasons on refuge lands in FPZ B. The archery/crossbow season was closed for 8 days in October, 9 days in November, 11 days in December, 31 days in January, and 21 days in February. The modern gun season was closed the last two days of the season.

Although archery/crossbow deer seasons were closed a good portion of the season, overall the 1993 deer season was a success. Deer hunter turnout and hunter success were relatively high on refuge lands. Many hours of recreation were provided to the public with refuge management objectives and many hunter aspirations being met.

Populations of wild turkey exist on several areas of the refuge. However, turkeys are not as abundant on refuge lands as some other areas in the state. Turkey hunting is a favorite among many hunters, and some take the opportunity to hunt wild turkey on refuge property. Turkey hunting is only permitted on Unit I and II lands south of Interstate 40 during the statewide spring and fall seasons. Refuge lands in Unit III and Unit II north of Interstate 40 are closed to all turkey hunting.

c. Small Game

Small game hunting on the refuge is open for squirrel, rabbit, raccoon, and quail. Squirrel season is open on Units I, II, and III during January and February with the season opening on September 4 on Unit II and III and on October 2 in Unit I. Rabbit season for Unit I, II, and III was open during the months of January and February with a opening date of October 2 through the end of the year. The use of dogs is not allowed for squirrel or rabbit hunting on refuge lands.

Quail season for all refuge units was from January 1 to February 14 and December 1 through the December 31. Use of dogs was permitted.

Raccoon and opossum hunting seasons was open on all Refuge Units until January 13 and then again starting November 20. Season continued through the end of the year. Raccoon hunters may use dogs to hunt raccoon and/or opossum. However, trapping of raccoon, opossum, or any other furbearer is not allowed on the refuge.

9. Fishing

a. Sportfishing

Sportfishing is a popular activity on refuge waters with crappie, black bass, and catfish being the primary species sought. Sport fishing is permitted year-round on all refuge waters except for areas designated as waterfowl sanctuaries, which are closed from November 15 to February 28. Refuge sportfishing regulations are in accordance with all general state sportfish regulations.

b. Commercial Fishing

Commercial fishing is permitted on the refuge through a special use permit. There were seven special use permits for commercial fishing issued during 1993. The following restrictions applied to all commercial fishing permittees: January 1 to March 31 commercial fishing activities were permitted only in the main river channel, Barnes Lake, old river channel, and all borrow pits on the east side of the Cache River; April 1 to October 31 commercial fishing was permitted in all refuge waters; November 1 to December 31 commercial fishing was restricted to the main channel of the Cache River only. Additional commercial fishing restrictions applicable year-round to all permittees for 1993 included: No use of seines, wings, or leads, and employment of commercial trotlines only to the main channel of the Cache River.

17. Law Enforcement

Refuge Officer (RO) Darwin Huggins attended the annual 40-hour training session in Tallahassee, Florida during March. Refuge Officer Jerry Griggs attended the training in April. They successfully completed their semi-annual firearms qualification in September.

In April, RO Huggins received information that a local farmer was using the chemical Furadan as an avicide. RO Huggins contacted special agents and assisted them with the investigation. Officers found several dead animals and birds, including a great horned owl, which laboratory tests revealed died of Furadan poisoning. Upon conducting interviews and further investigation, it was suspected that this was not an isolated incident and this chemical was used widely in the area as an avicide. RO Huggins assisted Special Agent Wood with numerous interviews and the collection of records during the months of April and May. The investigation is ongoing.

Throughout the marijuana cultivation season, refuge officers assisted State Police and county sheriff's offices with marijuana eradication. Refuge officers participated as spotters from helicopters and aided with ground support. This assistance resulted in 505 marijuana plants eradicated on and off the refuge. On July 1, 1993, RO Huggins discovered a marijuana garden on the refuge that contained 15 plants. Inspection and surveillance of

the site was conducted by Service special agents and refuge officers on the following dates: July 5, 9, 16, 17, 18, 21, 22 and 23. On July 23, Jackie Mason was observed removing marijuana from the garden and was arrested after a short foot chase by refuge offices and special agents. The suspect was transported to the North Little Rock jail facility where he remained until he appeared before a U.S. Magistrate on July 26, 1993. The suspect was charged with manufacturing marijuana, a felony. On August 17, 1993, RO Huggins testified before a federal grand jury in Little Rock. Mason was indicted. On October 8, 1993, Mason pled guilty to the charge. He received the maximum term of imprisonment allowed under Federal sentencing guidelines, 8 months. Also, he received three years probation. For the first two year, Mason must work three hours of community service each week.

1993 Violations - Cache River NWR

<u>Offense</u>	<u>Number</u>	<u>Prosecution</u>	<u>Amount</u>	<u>Disposition</u>
Hunting in closed area	2	Federal	\$120.00	closed
Hunting in closed area	3	State	426.00	closed
Hunting in closed area, NAWMP	1	State	142.00	closed
Unauthorized ATV use	3	Federal	110.00	2 pending
Unauthorized ATV use	1	State	144.00	closed
Operate vehicle without a driver's license	1	Federal	0	pending
Littering	1	State	144.00	closed
Transport loaded firearm in vehicle	3	Federal	170.00	1 pending
Hunting without permit	10	Federal	300.00	5 pending
Hunting without permit	7	State	1039.75	closed
Hunting from public road	4	State	590.00	1 pending
Aiding, abetting, accompanying a violator	2	State	284.00	closed
Night hunting	2	State	814.00	closed
Hunting from a permanent stand	2	Federal	110.00	1 pending

Failure to attach name to deerstand	1	Federal	0	pending
Possession of another's game without written verification	1	State	242.00	closed
Purchasing wildlife	1	State	0	pending
Hunt with aid of bait	2	Federal	260.00	1 pending
Violation of antlerless deer regulation	1	State	147.25	closed
Hunter orange violation	1	State	71.25	closed
Wasting game	1	State	0	pending
Hunt without license	3	Federal	110.00	2 pending
Hunt without license	2	State	233.25	closed
Failure to record deer kill on license	1	Federal	0	pending
Failure to record deer kill on license	6	State	870.25	closed
Taking waterfowl after legal shooting hours	6	State	866.75	closed
Unplugged shotgun	4	Federal	430.00	1 pending
Unplugged shotgun	3	State	448.75	closed
Duck stamp violations	6	Federal	290.00	2 pending
Duck stamp violations	14	State	1902.75	1 pending
Overlimit of waterfowl	1	Federal	210.00	closed
Overlimit of waterfowl	3	State	1938.00	closed
Possession of lead shot	7	Federal	970.00	closed
Possession of lead shot	13	State	1938.00	closed
Possession of oversized shot	1	State	146.25	closed
Taking waterfowl from a motor vehicle	4	Federal	840.00	closed

Migratory bird tagging violation	2	Federal	0	pending
Leaving decoys on NWR	1	State	146.25	closed
Possession of alcohol while hunting	3	Federal	0	pending
Fishing without license	6	State	567.25	closed
Possession of unlicensed commercial tackle	2	State	398.25	closed
Trotline without cotton anchor	2	State	184.00	closed
Manufacturing a controlled substance	1	Federal	*	closed

* Subject was given 8 months incarceration, 3 years supervised probation. After release from prison, subject must complete 3 hours of community service each week for first 2 year of probation.

I. EQUIPMENT AND FACILITIES

1. New Construction

Three major construction projects took place during 1993. These included the construction of four water control structures on the Dixie Sanctuary, building an office addition and remodeling the house at the Dixie Unit, and erection of two new radio towers. Construction of the water control structures and new office addition will be discussed below. The other items, remodeling the existing house at Dixie Unit and radio towers will be discussed under Rehabilitation and Communication Equipment, respectively.

Opportunities to greatly increase the water management capabilities on the Dixie Sanctuary have been recognized ever since the tract was acquired in 1989. Six small flashboard riser structures had been installed prior to this year. The Unit had over four miles of levee and two large railroad tank car pipes, equipped with

flapgates on the Cache Bayou side of the levee, when acquired. This system was designed to keep water off the area and allow water that did accumulate to be pumped off with two existing stationary relief pumps.

The existing system worked fairly well to keep water off from planting time through harvest, but provided no means for holding floodwater during the winter months. Our objective was to build a system that would allow for both floodwater exclusion and retention, depending on the time of year and management objectives. Initial planning efforts were directed towards obtaining a reliable elevation survey of the area and determining maximum water level safeguards and design requirements. Local SCS engineers provided a elevation survey of the work area and helped determine maximum water level safeguards.

A plan describing the proposed work, project objectives, and schedule of activities was prepared and sent to the COE, Memphis District Office, for Section 404 nationwide permit review. A site visit was held with COE representatives, who thereafter followed up with written concurrence that the proposed work did meet the criteria for a nationwide permit under Section 404.

The initial phase of the work was to raise the elevation of an existing half mile of road by approximately four feet and install two water control structures. Dirt work began the first week of July. At first, dirt moving capability was limited to two dozers (TD 15 and HD 16), and a 6-yard dirt buggy pulled by a John Deere 4555 tractor. Approximately one week into the project we received a D-7 dozer from White River NWR for use on the construction project. The HD 16 was an old military surplus machine and after about two weeks work, with a couple of downtimes for repairs, it developed a cracked head and had to be parked. Dirt work on the levee was completed on the last day of July.

The finished levee is approximately 24 ft. wide with 4:1 slopes. The two water control structures were placed side by side in an existing ditch at about the midpoint of the levee. One structure is a 36" X 40' galvanized pipe with a 42" X 8' flashboard riser and the other is a 24" X 40' aluminized type II pipe equipped with 24" sluice gates on 6 foot frames at each end. The area around each pipe end was covered with rip rap and sealed with concrete. The road surface on top of the levee was covered with a five inch layer of SB-2 crushed stone. Levee slopes and other exposed dirt areas were seeded with grass.

This levee and control structures provide the capability to incrementally flood approximately 140 acres of cropland. Water can be provided by runoff, redirecting floodwater, or pumping. The area is currently used for rice production and can be rotated to other crops or utilized as a moist soil management area.



A one half mile levee built on an existing road dividing two impoundments. The levee and newly installed 24-inch screwgate and 42-inch flashboard riser allow flooding of 140 acre impoundment.

12-93 DS

The next phase of the project was to replace two existing pipes and structures that were damaged beyond repair. These pipes drained into the large ditch that leads from Roaring Bayou to Cache Bayou. The damaged pipes were removed and the site was graded for concrete work. A 10' X 8' X 11' X 8" concrete spill apron was poured with one half inch rebar on one foot centers at each end of the pipe. A 8' X 8' X 8" head wall with 8' X 4' X 11' X 8" wingwalls and with one half inch rebar on one foot centers was poured on top of each spill apron. A 36-inch sluice gate mounting flange was attached to a 36" X 40' aluminized type II pipe and set in the concrete head walls. A 36-inch sluice gate with 8 foot frame was attached to the end of each pipe. The frames were anchored to the headwalls with angle iron braces. The fill over the pipe was raised approximately 3 feet and widened to 15 feet. All fill and disturbed soil areas were seeded and strawed.

This structure provides the capability to incrementally flood approximately 100 acres of cropland. Water can be provided by backing floodwater through the structure, runoff, or by pumping. This area is currently used for rice production and can be rotated to other crops or utilized as a moist soil management area.



Addition of 36-inch pipe with screwgates on each end allow 100 acre impoundment to be flooded with runoff, backflow of floodwater, or pumping.

11-93 DS

The next phase of the project was to replace a 9 foot diameter railroad tank car pipe in the main levee next to Cache Bayou. We were able to borrow a John Deere 490B trackhoe from Wheeler NWR for this phase of the project. This machine was used to build coffer dams, dig out existing pipes, and handle the new pipes and structures. Once the old pipe was removed the area was prepared for footings by digging down to firm ground and backfilling with fill dirt. A 24'X 11'X 1' concrete spill apron was poured on both ends of the pipes.

The design for this site included replacing the existing 9 foot diameter pipe with two 6 foot diameter pipes. One of the new pipes would have sluice gates on each end, while the other would have a concrete fabricated stoplog structure on the upstream end of the pipe. The two 6 foot diameter aluminized type II pipes were set in

place with the sluice gate mounting flanges attached. The headwalls were poured with the pipes and sluice gate flanges in place. The headwalls were 19' X 14' X 1' on the upstream side and 19' X 12' X 1' on the downstream side. The wingwalls were headwall height for 5 feet and then tapered down to 6 feet with a overall length of 11 feet and width of 1 foot. A center wall was formed out 5 feet from the headwall on the upstream side of the pipes. A 3" X 3.5" slot was formed in the inside surface of the center wall and adjacent wingwall to accommodate stoplogs on the upstream side of one pipe. All spill aprons and walls contain one half inch rebar on one foot centers.

A 72-inch sluice gate with 12 foot frame was mounted on each end of one of the pipes. The gate frames were anchored to the top of the headwalls with angle iron braces. Gates came with hand crank handles to raise and lower the gates. This method proved to be extremely slow and laborious. We devised a gear drive system operated by a hydraulic motor mounted on the gate frame and powered by a tractor hydraulic system. The hydraulic motor is portable and can be easily switched to a mounting bracket on either gate frame. This system works very well and provides a more efficient way to open and close gates.



Second concrete pour on the Cache Bayou
side of the twin 72-inch structures
on the Dixie Unit.

9-93 DS

The fabricated concrete stoplog structure can be filled with 89"X 8"X 3" stoplogs equipped with rebar pull pins. Each slot has a adjustable 3 foot diameter pipe that can be locked in place over the top stoplog to prevent boards from floating up. An expanded steel work platform was set on a formed lip over the top of the stoplog structure. This platform provides a safe and accessible area to pull or add stoplogs to the structure. A 2"X 8"X 12' board was mounted on bolts protruding from the concrete wingwall on both ends of the pipes. Water level gauges will be mounted to boards, allowing us to more accurately monitor water levels on both the Cache Bayou and Dixie Unit sides of the structures.



Finished twin 72-inch structures in the main levee of the Dixie Unit. In this picture the structures are holding out a large flood, while holding a smaller flood in the sloughs and impoundments on the Unit.

The main levee on the farm goes over the top of these two 72-inch pipes. The levee was raised to the top of the downstream headwall and covered with a 4 foot layer of SB-2 crushed stone. A small highwater boat ramp was built on the downstream side of the levee and also covered with SB-2 crushed stone. All disturbed levee and ditch bank areas were seeded and strawed following construction.

These structures are located at the lowest elevation on the Dixie Unit, and therefore provide the major drainage point and the main inflow point for bringing floodwater onto the area. Discharge is directly into Cache Bayou, approximately three quarters of a mile above it's confluence with the Cache River. Water brought on to the area through the structures is used as a source of water for four existing impoundments and also floods over 100 acres of natural slough habitat. The stoplogs can be used to catch runoff when floodwater is not available and regulate water levels necessary to meet habitat management objectives.

The addition of the newly constructed structures will not only provide a source of fall and winter water, but also serve to prevent flooding during the cropping season and as an irrigation water recovery system. When flooding occurs during the cropping season, the structures would be closed to hold water out. Runoff that accumulates behind the structures at this time can be pumped out with an existing 36 inch stationary diesel relift pump.

The final phase of this project for the year was replacement of a 7 foot diameter railroad tank car pipe on the north end of the Dixie Unit. The existing pipe was used to drain the north end of the area and keep out floodwater with a flapgate on the Cache Bayou side of the levee. The old pipe was removed and levee was repaired at the construction location. An existing eighteen inch stationary diesel powered relift pump was removed prior to construction at the site. The relift pump will be moved to a new location where it will be used to pump water onto the area.

The location for the new pipe was moved approximately 25 yards south of the old pipe location and in line with the drainage ditch. A coffer dam was built in the drainage ditch allowing excavation for the footings and spill aprons. A 12'X 12'X 1' spill apron was poured on each end of the new pipe location. A 48" X 40' aluminized type II pipe with 48-inch sluice gate mounting flange attached was set in place, backfilled, and compacted. A 8'X 10'X 1' headwall and 10'X 11 X 1' wingwalls were poured with the pipe and mounting flange in place. All walls were reinforced with one half inch rebar on one foot centers. A 48-inch sluice gate with 10-foot frame was mounted on each end of the pipe. The gate frames were anchored to the concrete headwalls with angle iron braces. A 18"X 40' polymer coated pipe with 24"X 5' flashboard riser was installed perpendicular to the drainage ditch and parallel to the levee. This structure is used as a drain culvert.

under the road leading to the 48-inch structure and also prevents water from the adjoining impoundment from entering the drainage ditch. The levee area over the top of the pipe was raised to the original elevation, widened, seeded, and strawed.

Installation of the above 48-inch structure provides a mechanism to let water on and off the Dixie Unit. The structures will hold a flood on approximately 100 acres of natural swales and sloughs when closed. Approximately 75 percent of this flooded acreage is cropland in rotation between soybeans, milo, and millet.

The work described above represents a major accomplishment for the refuge. The work was completed over a three month period. A lot of long hours, hot weather, and strenuous work were associated with this accomplishment. Maintenance worker Chester McGee from Wapanocca NWR was detailed to the refuge during most of the construction period and provided valuable carpentry, concrete, and operator expertise. Project Leader Widner provided overall direction for the project and direct assistance with many phases of the work. The Cache River staff worked daily on all phases of the project, while juggling the other day to day refuge operations. All those involved with the work deserve recognition for their hard work, dedication, and team work.

Another new construction project completed this year was an addition of a 25'X 26' office and 12'X 16' mud room to the existing house at the Dixie Unit. Construction was done in conjunction with a complete rehabilitation of the existing house. The new construction and rehabilitation was contracted to a local contractor. The new office was a concrete slab construction attached to the gable end of the house with a lowered pitched roof line. The office addition has an open floorplan connecting to an enclosed carport. Approximately 1030 sq.ft. of office space is provided by the new addition and enclosed carport. The walls were paneled and the floors were covered with commercial carpet and vinyl. A new central heating and cooling unit was installed in the office area. Handicap accessibility was provided in the office, bathroom, parking area, and front entrance.



A 48-inch pipe with screwgates on each end was installed in the main levee on the north end of the Dixie Unit. This structure regulates water for winter flooding and holds water off the unit during the crop season.

11-93 DS

An 18'X 12' mud room was constructed on a concrete block foundation was added to the rear entrance of the existing house. The mud room has a pitched roof, which ties in perpendicularly with the house roof. This room will be the main staff entrance and serve as an unheated storage area for boots, rain gear, etc.



The house at the Dixie Unit showing the new office addition and mud room under construction. The newly erected 140-foot radio tower can also be seen.

11-93 DS

2. Rehabilitation

An existing 4-mile levee on the Cache Bayou side of the Dixie Unit was covered with brush, vines, and small trees making it impassible by any type of motorized vehicle. Maintenance of the levee began at the north end using a D-3 dozer, and included removal of vegetation from the levee top and repair of eroded sections along a three mile stretch. A tree trimming crew was then contracted to clear all overhanging trees and limbs in an area 7.5 ft. either side of the levee center, and 14 ft. above the top of the levee. The levee maintenance conducted has provided an opportunity to bushhog the levee top, as well as providing vehicular access as needed.

A three bedroom brick house was acquired with the acquisition of the Dixie Unit. The house had been used as a makeshift office for the past three years and has provided temporary living quarters on an occasional basis. The general condition of the house interior

limited its suitability for an office, and the living quarters left a lot to be desired as well. The house exterior was in need of general repairs and painting. Structurally, the house was sound leading to the decision to include rehabilitation of the house as a part of the new office addition contract.

Replacement of all existing electrical wiring, and the addition of additional electrical outlets was the first phase of this work. The existing wiring was poorly done and posed a fire hazard. New lighting was installed throughout the house and 110V smoke detectors were added in two locations. Ceilings were repaired throughout the house and given a textured surface. All sheetrock walls, except in the bathrooms were paneled. The bathrooms and doors were given a new coat of paint. Vinyl floor covering was installed in the kitchen, lunch room, bathrooms, and storage room. The rest of the floors were covered with short napped commercial carpet and pad. A small storage closet was created by removing the front door and enclosing the porch area.

On the exterior of the house all rotten or deteriorating woodwork was replaced prior to covering exposed woodwork with a combination of aluminum and vinyl trim. Cracks and holes in the exterior brick were repaired prior to the application of two coats of paint to the brickwork. The existing asphalt shingles were removed and the roof was covered with a new layer of architectural shingles.

The end result of this long drawn out process, that started in May and was not completed until December, is a new office, staff area, and temporary living quarters that are clean, comfortable, and functional. In November refuge staff made a trip to the Regional Office to pick up surplus office furniture that became available as a result of their relocation. The office furniture was in excellent condition and we were fortunate to acquire enough to fully furnish the new office. After a week long cleaning campaign, we were able to move into the new office, and become somewhat settled shortly after Christmas. For the first time, the refuge now has a functional office and comfortable temporary living quarters. Needless to say, the refuge staff is rather proud of this facility and we thank our Project Leader, who made it possible.



The new office, rehabilitated staff area and temporary living quarters at the Dixie Unit.

12-93 DS

The water control structures at the Plunkett Sanctuary had not worked properly since installation in fall of 1990. The 42-inch sluice gates did not fit the rails correctly and would occasionally come off the rails while the gate was being raised or lowered. One of the gates came completely off the rails and stem during December 1992. Representatives from Fresno Gate and Valve were contacted regarding the problem, and agreed to correct the problem if their company was at fault. After measuring the gate, rails, and stem guide, they determined that the rails and stem guide supplied with the gates were not the correct size. They agreed to replace the defective items, and returned about a month later to replace the rails and stem guides on both gates.

The road leading into the Howell tract was improved through a cooperative effort with the AG&FC and the Woodruff County Road Department. Marine Motor Fuel Tax monies were used to widen and improve the county road leading from Highway 17 to the refuge property line and adjoining Black Swamp WHA.



Road improvement on the Howell tract done in cooperation
with AG&FC and Woodruff County Road Department.

12-93 JG

The Woodruff County Judge agreed to do all of the construction work with AG&FC providing all the materials. New ditches were pulled, 30 corrugated pipes installed, and 5 inches of SB-2 crushed stone was placed on approximately 3 miles of road and a highwater boat ramp. The work produced a good year round maintained road that provides access to the refuge and Black Swamp WMA. Approximately 1 mile of road, three parking areas, and a highwater boat ramp were created on the refuge.

4. Equipment Utilization and Replacement

During the spring the refuge received a John Deere 350 wide-tracked dozer from White River NWR. This machine was used to remove beaver dams and do finish work on newly constructed levees. A D-7 dozer was brought from White River NWR during the summer to help with levee construction.

Surplus military equipment was periodically screened at the Air Force Base in Jacksonville, Arkansas. A Euclid 10,000 lb. all terrain forklift was secured from the Air Base. The machine is in good operating condition and has been very useful for unloading trucks and handling pipes and structures. Two radio communication buildings were also received from the Air Base. One of these buildings was placed at the new Highway 302 radio tower site to house a repeater and duplexer. The other building was moved to the Dixie Unit where it is used to store oil, grease, and power tools. A two wheel utility trailer was also received from the Air Base. We plan to replace the military hitch with a ball hitch and use the trailer to haul a diesel fuel tank.

A 15 ton Beaver Tag-a-Long trailer with tilt bed was purchased and delivered during the year. A heavy duty pentel hitch added to the Ford 6000 dump truck along with the necessary wiring for brakes and lights to handle the trailer. This trailer will be used to haul small dozers, backhoe, farm tractors, and miscellaneous materials.

A 500 gallon self-contained trailer mounted fire fighting unit was received in September. A new Chevy S-10 extended cab 4 X 4 truck was also received in September. Midland low and high band radios were installed in this truck and it was assigned to Refuge Manager Mike Johnson. The refuge also received a new Polaris 6-wheeler and Honda a 4 X 4 ATV during the fall.

5. Communications Equipment

The refuge is still in the process of upgrading our communication system. Because of the remoteness of our facilities and land tracts, good communication is essential, but difficult to acquire. Phone lines were rewired in the existing house, and new lines were installed throughout the new office addition. The installed wiring will handle three phone lines. Unfortunately, we only have two lines at the present time because of the prohibitive cost of acquiring a third line. We did receive a new Cannon fax machine and have it hooked to one of the existing phone lines. We have not been able to put cc:Mail on line because the local phone system can only provide a 1200 baud rate.

The phone company has informed us that they plan to upgrade all the phone lines in this area starting in September of 1994. The upgrade work will allow a reduction in phone rates for touch tone business lines, and faster baud rates will be available.

The refuge staff worked on various phases of construction on a new low band radio system for the Cache and White River NWR's. Two Rohn 140-foot free standing towers were erected on the refuge. One of the towers is located at the Dixie Unit adjacent to the office, while the other is located on Highway 302, approximately 5 miles southwest of Brinkley, Arkansas. We cleared and leveled the Highway 302 site and added a graveled drive and parking area. The towers were erected on anchor bolts set in a concrete mat. Refuge staff excavated the footings and underground mat area, tied rebar, and poured the concrete for the two 16'X 16'X 4' mats. Tower assembly, erection, and antennae attachment was completed by a contractor.



Free standing 140-foot radio tower
at the Dixie Unit

Some of the mobile radio units to this system were acquired and used during 1992 for car to car communication. The remaining components were installed by a contractor. These components included: installation of two low band and one high band mobile units in refuge vehicles, a Midland repeater station, Decibel duplexer, and Midland low band base station at the Dixie Unit, and a Midland low band repeater station and Decibel duplexer at the Highway 302 site. Duplicate components were installed in vehicles and facilities at the White River NWR. The system is up and running, but still needs some minor adjustments by the midland technicians to be fully functional. When fully operational this system will provide radio communications over a 120 mile stretch of Cache/Lower White River watershed.

6. Computer System

The refuge is still operating with the IBM AT computer acquired from Regional Office surplus property. The machine is adequate for basic word processing and databases, but lacks the necessary memory, speed, and hardware for graphics, mapping, and cc:Mail applications.

J. OTHER ITEMS

3. Items of interest

Annual revenue sharing checks were issued to the County Judges in the following amounts: Woodruff \$43,138.00, Prairie \$13,150.00, and Jackson \$10,706.00. Cache River's portion of Monroe County revenue sharing check was included with the revenue sharing check delivered by White River NWR.

4. Credits

Forester Ray wrote sections C.1, C.3, F.3, and F.9, Refuge Manager Johnson wrote sections B., H.8b&c, and H.9a&b and edited. Law Enforcement Officer Huggins wrote section H.17, and Refuge Manager Sharp wrote and edited the remaining sections of the report. Deputy Project Leader Miller and Office Assistant Griffith also edited.

K. FEEDBACK

Refer to Complex Administration

Bald Knob NWR

Bald Knob National Wildlife Refuge

ANNUAL NARRATIVE REPORT
Calendar Year 1993

Introduction

Bald Knob National Wildlife Refuge was established September 22, 1993 under the Fish and Wildlife Act of 1956 and the Emergency Wetlands Resources Act of 1986. Management goals are to: protect and enhance approximately 14,000 acres of agricultural wetlands and bottomland hardwood forests; provide wintering habitat for snow and Canada geese, mallards, pintails and blue-winged teal; provide year-round living and breeding habitat for wood ducks; and provide the following recreational opportunities - fishing, hunting, trapping, bird watching, nature photography, wildlife observation, and environmental education and interpretation.

The proposed refuge was identified by the Lower Mississippi Valley Joint Venture as a high priority acquisition to meet the habitat conservation goals of the North American Waterfowl Management Plan. The refuge is located in White County, one-half mile south of the city of Bald Knob and is bordered to the west and south by the Little Red River.

A purchase agreement was signed with John Hancock Mutual Life Insurance Company for purchase of 12,940.97 acres it owns within the refuge. It was a multi-year acquisition proposal with 4,073 acres being purchased in 1993. The farming lease to Three Boeckmann Farms expires December 31, 1994. Total proposed acreage of the refuge is 14,189 acres. The remaining 1,249 acres of inholdings is divided up among 17 owners.

The 1993 acquisition boundaries were posted and locks installed on gates to prevent trespass.

The refuge is not expected to receive funding or staffing in 1994.

K. Feedback

Change, Ecosystem Management, Downsizing, budget deficits, Compatibility, Refuges 2003, Organic Act legislation. Where are we headed as an agency? Where are we headed as the Division of Refuges? These could be exciting and challenging times as we plot the course into the next century, but what I've observed at all levels of management in my colleagues is frustration. No sense of direction! I understand the preferred alternative of Refuges 2003 has been changed to Ecosystem Management. Everyone has their own concept of Ecosystem Management, but has the FWS adopted one clear cut definition to guide us? I haven't seen it, but we're quickly adopting "something - some philosophy" to reorganize and guide our management efforts. Is Ecosystem Management synonymous with preservation? There's striking similarities in the characteristics of Ecosystem Management as portrayed in Refuges 2003 and the preservationist management philosophy. Where are we headed?

Organic legislation - the Graham Bill. I wonder why wildlife oriented recreation is not included in purpose # 5 with environmental education. I think most FWS employees would agree organic legislation for refuges is good, but the purposes need to be broad enough to include the good refuge programs of the nation - not just Florida or J.N. Ding Darling NWR programs. I wonder how wildlife oriented recreation, including hunting, fishing, bird watching, etc. will shake out when compatibility determinations are completed if wildlife oriented recreation is not included in the refuge system purposes? Good point to ponder! I also wonder why migratory birds is purpose # 3 and international treaties is purpose # 4. If the purposes are in priority, I would believe these should be at the top of the list. I also wonder why in the Summary of Effects of Refuges 2003 Alternatives, I find waterfowl mentioned only once under the Ecosystem Management Alternative. Guess where? Of all places under Water Quality with a one line sentence which states, "Waterfowl concentrations cause localized problems". What major emphasis we're placing on a species with international treaty obligations and primary management responsibility for!

I've always been upbeat and proud of my profession. Oh, I gripe and complain some, like everybody else, but there has never been a management challenge too great or complicated for me to undertake or accomplish. But that's because I believed in what I was doing and had a clear sense of direction. Quite frankly, I can no longer find that clear direction, and when I consider the implications on professional wildlife and habitat management that the afore-discussed issues may have, I'm afraid I'd have to label myself as frustrated, along with my colleagues. I heard a project leader at the recent Project Leader's Conference, voice a quote and I'm afraid it may be true, "I've seen the enemy, and he is within!".

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

NORTHEAST ARKANSAS REFUGES

CACHE RIVER NATIONAL WILDLIFE REFUGE

P.O. BOX 279, TURRELL, AR 72384: PHONE: 501/343-2595

GENERAL INTRODUCTION

Cache River National Wildlife Refuge, established in 1986, is one of over 400 national wildlife refuges administered by the U.S. Fish and Wildlife Service. The primary objective of the refuge is to provide habitat for migratory waterfowl and preserve some of the few remaining tracts of bottomland hardwoods in the middle and lower Cache River Basin. The refuge is comprised of numerous tracts of land along the Cache River and Bayou DeView in the counties of Jackson, Woodruff, Prairie, and Monroe.

Public hunting and fishing are allowed under carefully controlled conditions in order to maintain wildlife populations at levels compatible with the environment. This permits the wise use of a valuable natural resource and provides wholesome recreational opportunities for the public. Both hunting and fishing are in accordance with state and federal regulations as supplemented by the following special refuge regulations.

ACCESS AND VEHICLE USE

Cache River National Wildlife Refuge is in the acquisition phase and the attached map shows the actual current ownership. Isolated land tracts which have been purchased are scattered throughout the acquisition zone and have been posted with refuge boundary signs. Access to many of these refuge lands is currently through private lands and all refuge visitors should obtain permission from adjacent landowners prior to crossing private land to reach refuge lands.

Most refuge roads are open to the general public all year. Knads may be closed at any time hazardous or poor road conditions exist. A locked gate or other barrier means the road is closed to all vehicle travel but not to foot travel unless signed otherwise. All vehicles must stay on established roads and meet all applicable federal and state requirements regulating the use of a motor vehicle. The use of ATVs or horses on the refuge is prohibited.

GENERAL REFUGE REGULATIONS

Public use of the refuge is permitted throughout the year. Development of public use facilities has not occurred yet, but the public may visit the refuge to observe and photograph wildlife. Prohibited activities include camping, building fires, cutting or defacing trees and littering. Waterfowl sanctuaries, indicated on the map, are closed to all public use from November 15 through February 28. Firearms, archery equipment and crossbows are permitted only during refuge hunts.

SPORT FISHING AND FROGGING REGULATIONS

Sport fishing and frogging is permitted year-round in accordance with state regulations. Waterfowl sanctuaries are closed from November 15 to February 28. Trotlines must be secured with cotton line and reset when exposed due to receding water and removed when unattended. A special use permit is required to fish commercial tackle.

COMMERCIAL ACTIVITIES

Refuge regulations require anyone engaging in a commercial activity (fishing, hunting, turtling, shelling, etc...) to first obtain a refuge special use permit. Anyone planning to pursue a commercial activity on refuge land, lakes, streams or waters, or on adjacent waters where riparian rights may be vested with the refuge are advised to contact the refuge manager for information on permitted commercial activities and special use permits.

GENERAL HUNT REGULATIONS

Refuge permits are required for all hunts. Permits are nontransferable and must be carried at all times by anyone on refuge land in possession of hunting equipment.

MOBILITY-IMPAIRED HUNTERS may apply for a special permit allowing the use of ATVs on existing refuge roads. Issuance of the permit is restricted to persons who are permanently confined to a wheelchair, require the use of mechanical aids (crutches and walkers) to walk or have complete single leg amputations. For more information, please call the refuge at 501-343-2595.

Firearms must be unloaded when carried on land vehicles or boats under power. Muzzleloaders are considered loaded if the percussion cap is on the nipple or if there is powder in the flashpan of a flintlock. Target practice is prohibited.

Hunting from improved roads with maintained road ditches or from a tree in which a metal object has been driven to support a hunter is prohibited. The placing of or hunting over bait or salt is prohibited.

Waterfowl sanctuaries, indicated on the refuge map, are closed to all entrance and hunting from November 15 through February 28.

Trapping is prohibited. Beaver and coyote may be taken during any refuge hunt by the use of the firearm appropriate for that hunt.

Spotlighting is prohibited. Artificial lights may not be used to locate wildlife.

Bag limits for all species are the same as state limits. Deer limits are the same as surrounding state deer zones unless otherwise specified.

Hunter orange must be worn in accordance with Arkansas Game and Fish Commission regulations during deer hunts.

THE USE OR POSSESSION OF ALCOHOLIC BEVERAGES WHILE HUNTING IS PROHIBITED.

STEEL SHOT ONLY MAY BE POSSESSED AND USED FOR ALL SMALL GAME HUNTING BY HUNTERS USING SHOTGUNS.

Hunters under the age of 16 must be supervised by an adult not less than 21 years old and must remain in sight and normal voice contact with the adult. For small game hunts, the adult may supervise no more than two youths. For big game hunts, the adult may supervise only one youth. Anyone born after December 31, 1968 must successfully complete a Hunter Education course in order to hunt on the refuge and be in possession of a hunter education card.

OBTAINING PERMITS

When signed, this brochure will serve as a permit for all hunts.

REFUGE HUNTING UNIT BOUNDARIES

The refuge is divided into three hunting units. These are:

Unit I - refuge lands south of U.S. Hwy. 70.

Unit II - refuge lands between U.S. Hwy. 70 and State Hwy. 38.

Unit III - refuge lands north of State Hwy. 38.

Refuge hunting units may include more than one Arkansas Game and Fish Commission hunting zone. Therefore, hunting will be in accordance to whichever state hunting zone you are adjacent to.

SPECIFIC HUNT REGULATIONS

A refuge permit (general hunt brochure) is required for all hunts. Regulations differ from zones 4, 7 and 13 regulations as follows:

Waterfowl (Duck): All hunting units - state duck season. Morning hunting only. State bag limit applies. STEEL SHOT ONLY may be possessed or used. DECOYS and blinds must be removed daily. Building or hunting from permanent blinds prohibited. Dove, snipe, woodcock, coot and geese may be taken when seasons correspond with duck season. Retrievers allowed. A special use permit is required to commercially guide for waterfowl.

SMALL GAME

Squirrel: Unit I: October 2, 1993 - February 28, 1994. Unit II and Unit III: September 4, 1993 - February 28, 1994. State limit applies. Dogs prohibited. Spring squirrel season closed.

Rabbit: All hunting units: October 2, 1993 - February 28, 1994. State bag limit applies. Dogs prohibited.

Quail: All hunting units: December 1, 1993 - February 14, 1994. State limit applies. Dogs permitted.

FURBEARER

Raccoon and Opossum: All hunting units: Same as state hunting season and bag limit. Dogs permitted. Trapping and pleasure running of dogs throughout the year prohibited.

BIG GAME

Only portable stands may be used and the owner's name and address must be permanently affixed to the stand. All stands must be removed by the last day of the archery season. The use of dogs is prohibited.

Deer (Archery/Crossbow): Units I and II: October 1, 1993 - February 28, 1994. Unit III in zone 7: October 1, 1993 - February 28, 1994. Unit III in zone 4: October 1, 1993 - January 31, 1994.

Deer (Muzzle Loading): Units I and II: October 23-27, 1993. Unit III in zone 7: October 23-27, 1993. Unit III in zone 4: Closed.

Deer (Gun): Units I and II: November 13-21, 1993. Unit III in zone 7: November 13-21, 1993. Unit III in zone 4: November 13 - 14, 1993.

Deer limits are the same as surrounding state deer zones unless otherwise specified. Refuge lands are located in Flood Prone Regions B and C. The descriptions of Flood Prone Regions B and C are in the AG&FC hunting pamphlet. Refuge lands in Flood Prone Region B will close to all deer hunting when the Cache River gauge at Patterson reaches 10 feet, as reported by the National Weather Service in state newspapers and reopen when the same gauge reading in these newspapers falls to or below 8.5 feet. Refuge lands located in Flood Prone Region C will close to all deer hunting when the White River gauge at Clarendon reaches 28 feet, as reported by the National Weather Service in state newspapers and reopen when the same gauge reading in the newspapers falls to or below 27 feet.

Turkey (Fall 1993 Gun): All units closed.

Turkey (Fall, Archery/Crossbow): Unit I and Unit II lands south of I-40: Same as state season. Unit II lands north of I-40 and Unit III: Closed.

Turkey (Spring 1994 Gun): Unit I and Unit II lands south of Interstate 40: Same as state season. Unit II lands north of Interstate 40 and Unit III: Closed. State limit applies.

This permit must be completed to be valid. It must be carried by the hunter during the hunts.

1993/94 GENERAL HUNTING PERMIT
I have read and understand the refuge hunting regulations and realize that hunting on the refuge is a privilege and willingly agree to allow USFWS officers to inspect or search all equipment used during my hunt.
Signature (Permit not transferable)
XX

GUIDE TO REFUGE SIGNS



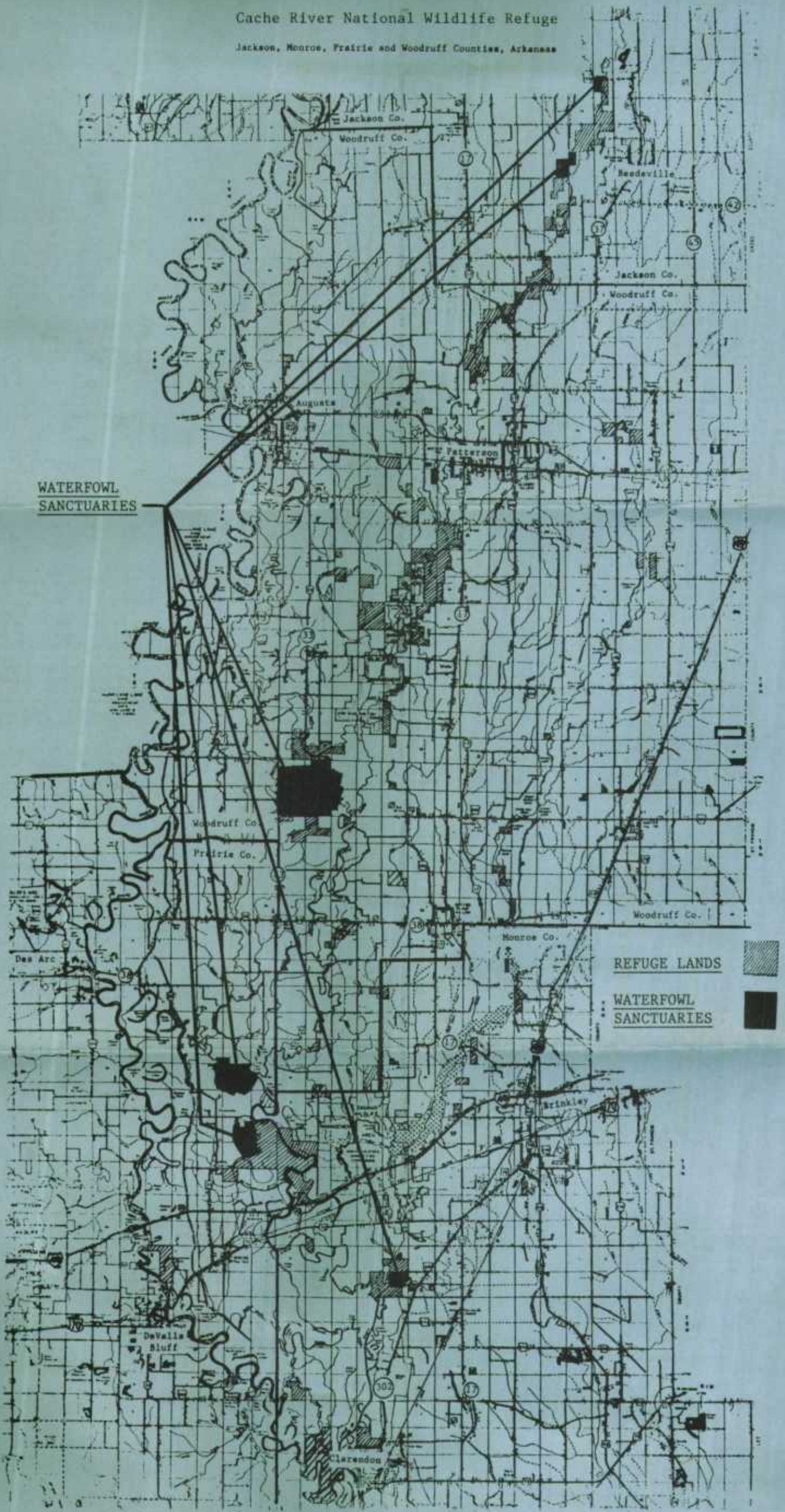
Refuge Boundary Sign. Public use permitted in accordance with refuge regulations.



Area closed to all public use. Some areas such as waterfowl sanctuaries are only seasonally closed. Seasonally closed areas have the specific closure dates printed on the face of the sign.

Cache River National Wildlife Refuge

Jackson, Monroe, Prairie and Woodruff Counties, Arkansas



WATERFOWL
SANCTUARIES

REFUGE LANDS

WATERFOWL
SANCTUARIES



Big Lake National Wildlife Refuge

Two miles east of Manila, AR on Highway 18
501-564-2429

General Introduction

Big Lake Refuge is one of over 475 national wildlife refuges. The primary objective of a national wildlife refuge is to provide habitat for the conservation and protection of all native 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 while some recreational opportunities and permit the use of a valuable renewable resource. The regulations listed below supplement refuge regulatory signs and the general regulations which govern hunting on wildlife refuge areas as set forth in Title 50, Code of Federal Regulations. Hunting will be in accordance with applicable State regulations.

General Hunt Regulations

1. The following areas are closed to possession of loaded firearms: refuge headquarters area, entire refuge area south of Highway 18, boat launch areas, and the entire levee and Levee Road.
2. Camping, fires and cutting or defacing trees are prohibited.
3. Parking on Ditch 81 Levee Road is allowed in such a manner as to not obstruct the free flow of traffic. Road may be closed during wet weather. ATV's and horses are prohibited.
4. Species not listed may not be hunted.
5. Boats are not permitted from November through February.
6. Trail markers are prohibited.
7. Hunters are required to check out daily at the self-check station located at refuge headquarters.
8. Each hunter under age 16 must be under the close supervision of an adult. Adults may supervise no more than two juveniles. A person must be at least 21 years old to supervise a youth.

9. Hunters are allowed on the refuge no earlier than one hour before legal shooting time to one hour after legal shooting time except during the raccoon/opossum hunt.
10. Steel shot only may be possessed or used during all hunts by hunters using shotguns.
11. No alcohol.

Specific Hunt Regulations

SQUIRREL

1. Open from beginning of the State's fall season through October 31.
2. Rabbit, coyote and beaver may also be taken incidental to squirrel hunting and subject to State seasons.
3. Squirrel dogs are permitted.
4. Shooting from boats under power is not permitted.

RACCOON AND OPOSSUM

1. Season begins at 12 noon on October 22, and runs for ten consecutive nights.
2. Dogs are required.
3. Hunters are required to check in and out nightly at the self-check station located at the refuge headquarters.

DEER (ARCHERY, INCLUDING CROSSBOWS)

1. November 1 through December 31.
2. Squirrel, rabbit, coyote and beaver may also be taken incidental to deer hunting and subject to State seasons.
3. Hunting from a tree in which a metal object has been driven to support a hunter is prohibited.
4. The hunt may be closed without advance notice if flood conditions make it necessary.
5. Only portable stands may be used and they must be removed each day.
6. Harvested deer must be checked out at the refuge self-check station and at an official state wildlife check station.

Take pride in your refuge. Report violations!



U.S. Fish and Wildlife Service
Big Lake National Wildlife Refuge
P.O. Box 67, Manila, AR 72442



Official business
Penalty for Private Use, \$300

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U.S. Department of the Interior
INT423

To:



Hunting Regulations & Permit

Big Lake National Wildlife Refuge

Permits








Permits are required for all hunts and must be in possession of the hunter regardless of age. When signed below, your signature acknowledges that you have read and understand the refuge regulations. Permits are nontransferable. Questions concerning refuge permits or regulations should be directed to the Refuge Office.

Big Lake national Wildlife Refuge General Hunt Permit

I have read and understand these refuge regulations.

Signed
(cut out if desired)

Big Lake National Wildlife Refuge

-  Area open to public hunting for squirrel, beaver, rabbit, raccoon, opossum and deer throughout refuge season.
-  Closed to hunting, discharge of firearms and possession of loaded firearms.
-  Boat Access
-  Water Control Structure
-  Refuge Headquarters
-  Refuge Boundary
-  Gravel Road



Refuge Headquarters and Hunter Self-Check Station

Timm's Point Observation Area

Blytheville 12 miles

Floodway Dam

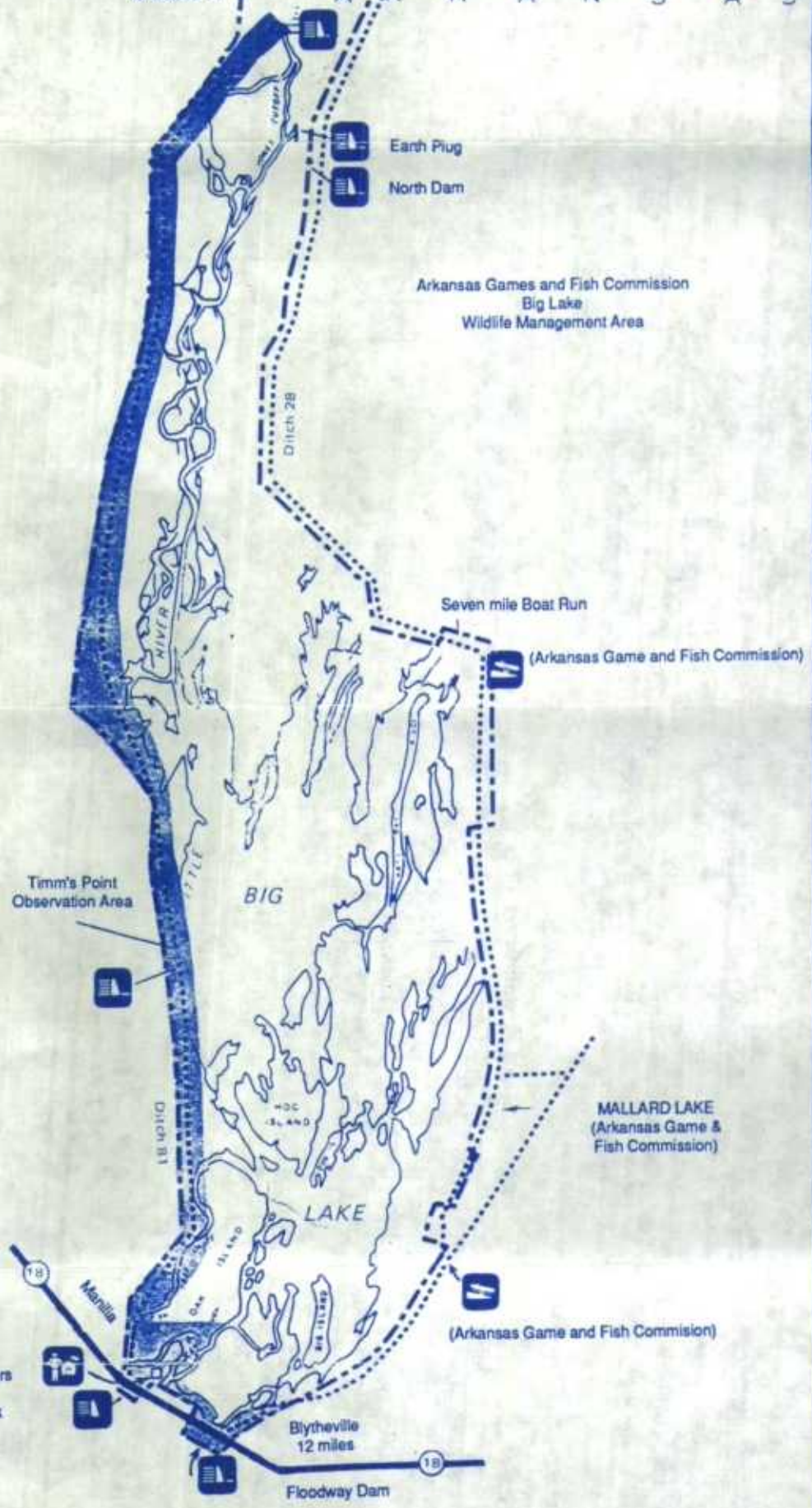
DUNKLIN MISSOURI
MISSISSIPPI ARKANSAS

Arkansas Games and Fish Commission
Big Lake
Wildlife Management Area

Seven mile Boat Run
(Arkansas Game and Fish Commission)

MALLARD LAKE
(Arkansas Game & Fish Commission)

(Arkansas Game and Fish Commission)



General Introduction

Big Lake Refuge is one of over 475 National Wildlife Refuges. A major objective of the National Wildlife Refuge System is to provide habitat for the conservation and protection of all species of wildlife and fish.

The regulations listed below supplement refuge regulatory signs and the general regulations which govern fishing on wildlife refuge areas as set forth in Title 50, code of Federal Regulations. Fishing and frogging will be in accordance with applicable State regulations subject to the following special conditions.

Permits

Permits are not required.

Special Regulations

1. Sport fishing is permitted in all refuge waters (5,500 acres) from March 1 through October 31, 24 hours a day. The area around Floodway Dam south of the Highway 18 bridge is open to bank fishing year-round, 24 hours a day.
2. Sport fishing with the use of non-motorized boats and boats with electric trolling motors is also allowed in the Sand Slough-Mud Slough area (designated on map by hatching and on the area by signing) from November 1 through February 28 during daylight hours only.
3. Parking on Ditch 81 Levee road is allowed in such a manner as to not obstruct the free flow of traffic.
4. Limb lines and toxic chemical containers for jug fishing are not permitted.
5. A length of cotton line of at least 24 inches must be attached to each end of a trotline and must extend from the point of attachment into the water. Trotlines must be attended daily or be removed.
6. Boats may be launched only in designated areas. ATVs and airboats are prohibited.
7. The following areas are closed to fishing and frogging: refuge headquarters area, all water control structures and support materials on Ditch 81 and the Floodway Dam.
8. An eagle sanctuary is seasonally established to protect a nest, designated on map by cross hatching and on area by signing when in effect.
9. Possessing largemouth bass less than the established minimum length is prohibited.
10. Frog hunting is permitted from the start of the State season through October 31. The use of bow and arrow for taking bullfrogs is prohibited.
11. Possession of killing devices is permitted only during applicable hunting seasons.

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U.S. Department of the Interior
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To:

U.S. Fish and Wildlife Service
Big Lake National Wildlife Refuge
P.O. Box 67, Manila, AR 72442

Official business
Penalty for Private Use, \$300



Fishing Regulations

Big Lake National Wildlife Refuge

**Attention: Fifteen inch
Minimum Length Limit
On Largemouth Bass**

Big Lake National Wildlife Refuge

Box 67
Manila, Arkansas 72442
(501)564-2429

Take pride in our nation's fishery resources.

M I S S O U R I

DUNKLIN CO.
MISSISSIPPI CO.

A R K A N S A S

LEGEND



Refuge headquarters

Gravel road

Refuge boundary



Boat access



Water control structure



See special regulation number 2.



See special regulation number 8.



0 5 10 MILES



Department of the Interior
U.S. Fish and Wildlife Service
RF-43515-July, 1992

Ditch B1 Water Control Structure

Floodway Dam

Seasonal eagle sanctuary

Mid-Lake Water Control Structure

Timm's Point Observation Area

Seven-mile Boat Run

Arkansas Game and Fish Commission

Arkansas Game and Fish Commission
MALLARD LAKE

Arkansas Game and Fish Commission

BIG LAKE
WILDLIFE MANAGEMENT
AREA

Arkansas Game
and
Fish Commission's

North End Water Control Structure

Earth Plug
North Dam

Little River

CUN ISLAND

DOG ISLAND

OAK ISLAND

DE ISLAND

MANILA ISLAND

MANILA ISLAND

MANILA ISLAND

MANILA ISLAND

MANILA ISLAND

MANILA ISLAND

MANILA ISLAND

MANILA ISLAND

Blytheville
12 miles

Manila
2 miles

WAPANOCCA NATIONAL WILDLIFE REFUGE
P.O. BOX 279
TURRELL, ARKANSAS 72384

HUNTING REGULATIONS

GENERAL PROVISIONS

Wapanocca Refuge is one of over 400 national wildlife refuges. The primary objective of the refuge is to provide habitat for the conservation and protection of migratory waterfowl and other wildlife species. 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 on wildlife refuge areas as set forth in Title 50, Code of Federal Regulations. Hunting will be in accordance with applicable State regulations.

GENERAL HUNT REGULATIONS

1. The entire refuge is open to hunting except Wapanocca Lake and within 100 yards of all refuge buildings and structures.
2. Boats, camping, fires, cutting trees and littering are prohibited. Horses are allowed only during the raccoon hunt.
3. Each hunter under age 16 must be under the close supervision of an adult. Adults may supervise no more than two juveniles. A person must be at least 21 years old to supervise a youth.
4. Access by vehicles on refuge roads may be restricted during periods of wet weather.
5. Steel shot only may be possessed used by hunters using shotguns during all refuge hunts.
6. ATVs Prohibited
7. Parking on levees is prohibited except in designated areas.

8. Trapping is not permitted.

PERMITS

Permits are required for both hunts and must be in possession of the hunter regardless of age. When signed below, this brochure serves as your permit for the small game and raccoon hunts. Permits are nontransferable.

SMALL GAME HUNT

1. Season - October 1 through November 15.
2. Squirrels and rabbits may be taken.
3. Dogs are allowed.

RACCOON HUNT

1. Season - November 1 through November 15.
2. Raccoons and opossums may be taken.
3. Dogs are required, but preferably no more than two per hunter.

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

WAPANOCCA NATIONAL WILDLIFE REFUGE
GENERAL HUNT PERMIT

I have read and understand these refuge regulations.

Signed _____

For further information please call (501) 343-2595,
Monday - Friday, 8:00 AM - 4:30 PM.

Take Pride in Your Refuge
Report Violations!

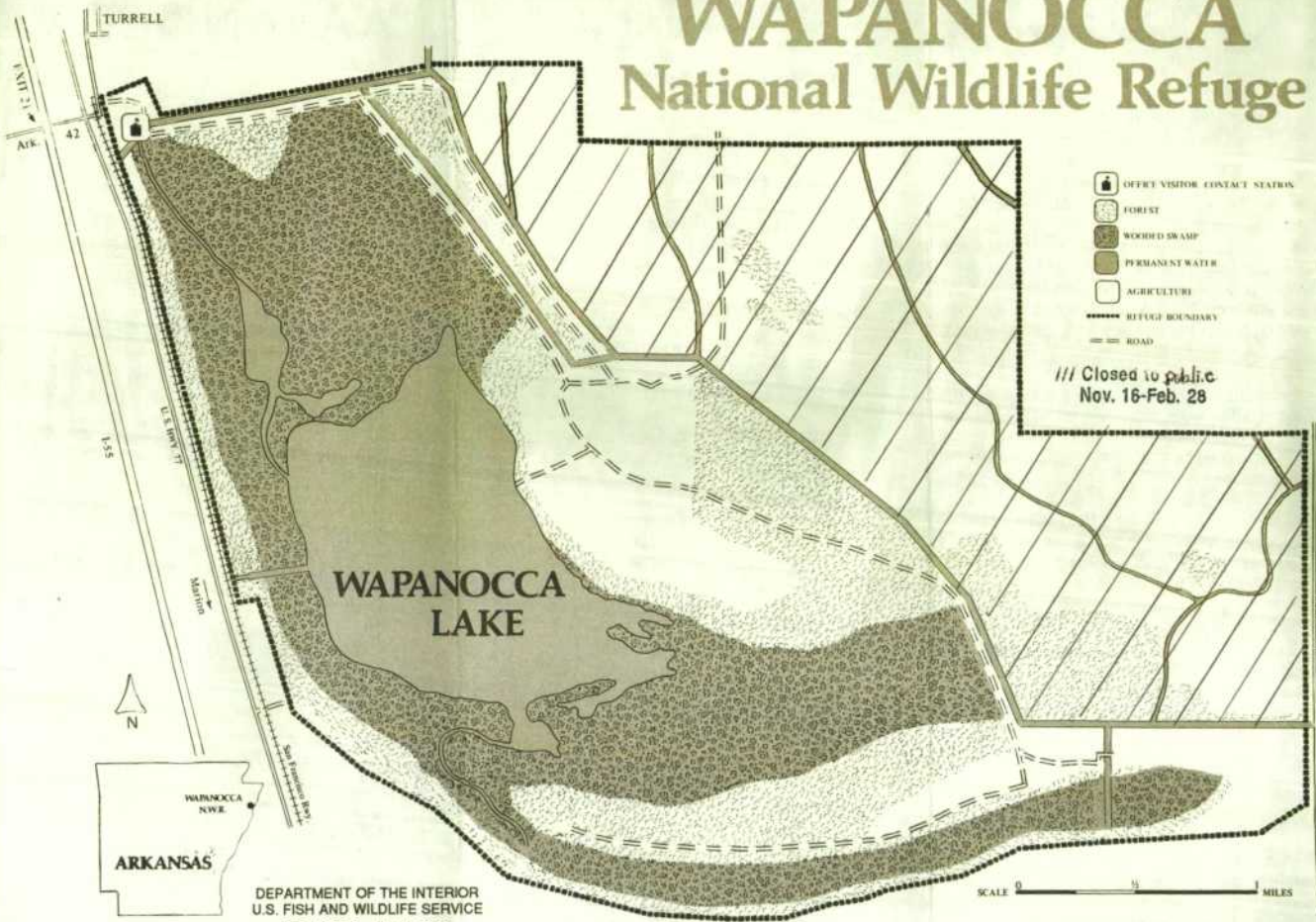
WAPANOCCA
NATIONAL
WILDLIFE
REFUGE



HUNTING
REGULATIONS
and PERMIT

WAPANOCCA

National Wildlife Refuge



-  GIFT VISITOR CONTACT STATION
-  FOREST
-  WOODED SWAMP
-  PERMANENT WATER
-  AGRICULTURE
-  REFUGE BOUNDARY
-  ROAD

/// Closed to public
Nov. 16-Feb. 28

WAPANOCCA LAKE



DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
RF-43650-6 - March 1990

SCALE 0 1/2 1 MILES

Wapanocca National Wildlife Refuge

General Provisions

Wapanocca National Wildlife Refuge is one of over 475 national wildlife refuges. The primary objective of the refuge is to provide habitat for the conservation and protection of migratory waterfowl and other wildlife species. Sport fishing is permitted at a level compatible with waterfowl resources, provides recreational opportunities, and permits the use of a valuable renewable resource.

Wapanocca National Wildlife Refuge, four miles west of the Mississippi River in Crittenden County, Arkansas, is a wildlife island in an agricultural sea. The 5,485-acre refuge is about equally divided into three habitat types: cypress-willow swamp, bottomland hardwood, and agricultural land. A freshwater impoundment contains the 600-acre Wapanocca Lake with 600 acres of bottomland hardwoods and approximately 1,200 acres in cypress-willow swamp. The majority of the 1,800 acres of timber is seasonally flooded. A boat launching ramp is located on the west side of the lake just off State Highway 77.

The regulations listed below supplement the general regulations which govern fishing on

wildlife refuge areas as set forth in Title 50, Code of Federal Regulations. Fishing will be in accordance with applicable State regulations and the following special conditions.

Special regulations

1. Sport fishing is permitted on the refuge from March 15 through September 30 during daylight hours only.
 2. Boats may be launched only at the Public Fishing Access area and into Woody Pond
 3. The use of live carp, shad, buffalo and goldfish for bait is prohibited. Yo-yos, jugs, drops, trotlines and all commercial fishing tackle are prohibited.
 4. Big Creek and Ditch B are closed to fishing.
 5. No fishing is permitted within 100 yards of any refuge buildings.
 6. Bank fishermen must park in designated areas (see map.)
 7. Retaining largemouth bass less than twelve inches in length is prohibited.
 8. No fishing from observation platform.
- For further information, please call (501)343-2595, Monday - Friday, 8:00 am - 4:30 pm. Take pride in your refuge. Report violations.

Department of the Interior
U.S. Fish and Wildlife Service
RF-43650-7-July, 1991



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U.S. Fish and Wildlife Service
Wapanocca National Wildlife Refuge
Box 279
Turrell, Arkansas 72384



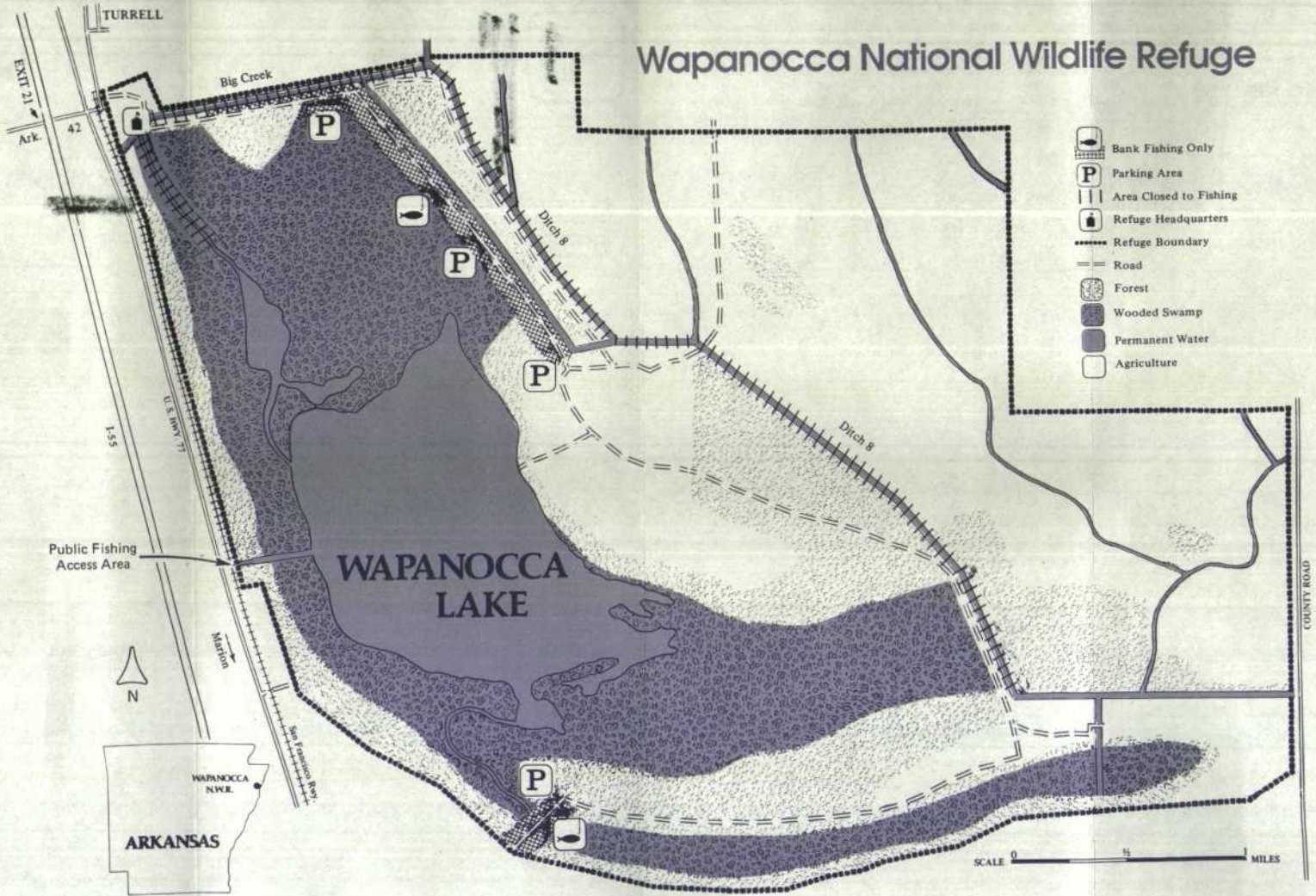
To:

Fishing Regulations

Wapanocca National Wildlife Refuge



Wapanocca National Wildlife Refuge



WAPANOCCA NATIONAL WILDLIFE REFUGE

ARKANSAS



SPECIAL REGULATIONS

1. Pictnicking and camping are not permitted.
2. Limited small game hunting is allowed: current hunting regulations may be obtained from the Refuge Manager.
3. No firearms allowed except during authorized hunts
4. Sport fishing in accordance with Federal and State regulations is permitted from March 15 through September 30, during daylight hours.
5. Parking on levees is prohibited except in designated areas. All other areas parking is allowed in such a manner as to not obstruct the free flow of traffic.
6. Littering is prohibited.

7. ATVs and horses prohibited

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for the American Indian reservation communities and for people who live in island territories under U.S. administration.



DEPARTMENT OF THE INTERIOR
U.S. Fish and Wildlife Service

RF-43650-1-July 1991



HISTORY

Wapanocca National Wildlife Refuge, four miles west of the Mississippi River in Crittenden County, Arkansas, is a wildlife island in an agricultural sea. At the turn of the century, large flocks of migrating ducks found vast flooded pin oak flats in the Arkansas Delta. Later this excellent waterfowl habitat was drained, the timber harvested, and the land planted to corn. Still, large flocks of ducks and geese utilized this area, feeding on residue corn in the ever enlarging agricultural areas. Then farming practices changed and corn was replaced with cotton. As the habitat continued to dwindle and corn was replaced with other crops, the number of ducks and geese returning to this area each winter declined.

In the late 1800's Wapanocca Lake and the surrounding area were purchased by a group of businessmen from Memphis, Tennessee, and the Wapanocca Hunting Club was formed. The lake and about 3,000 acres remained in their club until 1961 when it was acquired by the U. S. Fish and Wildlife Service with funds from the sale of duck stamps.

Today the refuge consists of 5,485 acres and is one of the last areas in the Arkansas Delta where one can see large concentrations of ducks and geese.



The old Wapanocca hunting lodge was once located at the site of the present refuge headquarters.



Wood duck habitat is improved by the addition of nesting boxes.

HABITAT

The refuge is about equally divided into three habitat types: An 1800-acre freshwater impoundment, 1800 acres of bottomland hardwoods, and 1800 acres of agricultural land.

The freshwater impoundment contains the 600-acre Wapanocca Lake surrounded by cypress-willow swamp. A part of the 1800 acres of bottomland hardwoods is seasonally flooded. The agricultural land is farmed cooperatively by local farmers. The refuge's share of the crops include corn, millet, wheat, and other supplemental foods which are left in the field for waterfowl use.

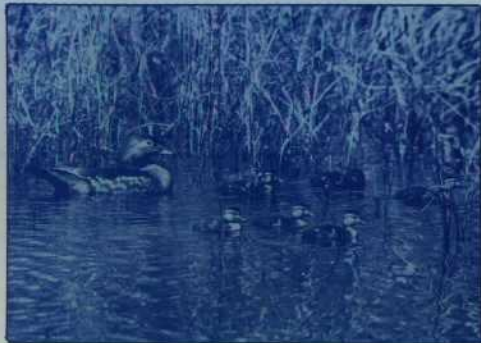
Nineteen field impoundments have been constructed on the refuge. These field impoundments are seasonally flooded and provide 190 acres of agricultural and natural foods which are extremely attractive to waterfowl.

This combination of woodlands, farmlands, swamplands, and lake habitat provides a great diversity of habitat which is utilized by a variety of both resident and migratory wildlife species.

WILDLIFE

Mallards account for approximately 60 percent of the ducks using the refuge. Ducks representing almost every other species common to the Mississippi Flyway comprise the remaining 40 percent. Wood ducks are year-round residents, nesting and rearing their young in the swamp. Nesting boxes, simulating the wood duck's natural nesting cavities in hollow trees, account for most of the 1000 or more young woodies that are produced on the refuge each year.

Resident game includes fox squirrels, rabbits, bobwhites, and wild turkeys. Deer are sometimes seen. Endangered bald eagles are present during the winter and several species of hawks and owls are abundant during the fall through spring period. Mourning doves are abundant and the refuge serves as a breeding and wintering area for them. Mink, muskrat, beaver and opossum are common, and coyotes and bobcats are present in moderate numbers. Raccoons are abundant and river otters are present, but seldom seen. Songbirds are present year-round, but are most abundant during the spring and fall. Several species of wading birds are frequent visitors throughout the summer, and shorebirds are seen during migration periods.



Wood ducks are year-round residents at Wapanocca.



Fishing is a popular pastime at the refuge.

RECREATION

Visitors are welcome at Wapanocca Refuge throughout the year to view, photograph, and otherwise utilize the varied wildlife resource opportunities. An auto trail and boat trail are provided to allow visitors access to inner portions of the refuge. An observation platform is located on the east side of the lake for wildlife observation and photography.

Sport fishing and squirrel, rabbit, and raccoon hunting are a part of the refuge recreation program in cooperation with the Arkansas Game and Fish Commission.

The refuge can be reached by following Interstate 55 north from Memphis, Tennessee, to the Turrell exit. Headquarters is located by taking State Highway 42 east to one-fourth mile south of Turrell, Arkansas.

Visitors are encouraged to check at the refuge office for information on regulations, road conditions and for other assistance. Written requests should be addressed to: Wapanocca National Wildlife Refuge, P.O. Box 279, Turrell, Arkansas 72384.



U.S. Fish and Wildlife Service
Big Lake National Wildlife Refuge
P.O. Box 67
Monro, AR 72442

Official business
Penalty for Private Use, \$300



Southeast Region Refuges

To:

Three horizontal lines for an address.



Big
Lake
National
Wildlife
Refuge

One of almost
five hundred refuges
in the United States.

A R K A N S A S



Big

Lake

National

Wildlife

Refuge

The Northeast Arkansas and Southeast Missouri area is extremely rich in archeological history. This area was covered with a spruce forest prior to the Ice Age, but this gave way to an oak/hickory environment which was inhabited by Paleo Indians and many now extinct animals including the mastodon, llama, tapir, horse, camel, and sloth.

History

The earliest documented human occupation of the Big Lake area was in the 700's by the horticultural-based "Woodland" Indians. During the 9th and 10th centuries a more advanced society occupied the area. Archeological findings revealed that this society built fenced villages and rectangular log houses. They also developed new farming techniques and implemented a sophisticated political system. The Big Lake area was occupied by Indian farmsteads up until the 14th century and then remained unoccupied until the early 19th century.

The New Madrid earthquake of 1811-12 changed the Big Lake area from a free-flowing river system to its present lake/swamp environment. In the late 1800's, loggers rapidly cleared the timber from the area due to a demand for hardwood railroad ties. The rich bottomland soil was quickly identified by industrious farmers and the area was converted to cotton-producing farmland.

Citizens alarmed by the rapid loss of habitat and game, encouraged President Woodrow Wilson to make Big Lake a preserve, which he did by Executive Order in 1915. The refuge has expanded from the original 3,500 acres to its present 11,038 acres. Today, the area

takes on the characteristic of a wildlife oasis in the center of a vast agricultural empire.

Habitat and Water Management

The Little River Drainage District in southern Missouri is the primary water source for Big Lake Refuge. The watershed consists of approximately 2,500 square miles of agricultural land which is all funneled into the refuge by way of several large drainage ditches. Since the Flood Control Act of 1935, Big Lake had been used as a sump for flood waters. Silt and trash associated with the floods led to the deterioration of the Big Lake System. To alleviate this problem the Corps of Engineers constructed a by-pass ditch (Ditch 81) to divert some of the floodwaters around the refuge. Since the completion of the project, there has been a noticeable improvement in water quality and an increase in natural aquatic vegetation.

Big Lake consists primarily of wooded swamps and open water. Big Lake is shallow with an average depth of 3 feet. The swamp areas are characterized by stands of black willow, buffonbush, and towering bald cypress trees. Tree species on higher ground include cottonwood, green ash, hackberry, red maple, sycamore, river birch, and a variety of oaks. Open water areas are populated with a variety of aquatic plants. Aquatic plants such as Sago pondweed and American pondweed are a valuable waterfowl food source.

Approximately 150 acres of farmland are planted annually to supplement the natural waterfowl vegetation. Corn, milo, soybeans and cowpeas provide food for resident species such as deer, raccoon, squirrel, and migratory birds. Winter wheat is planted and used as browse by Canada geese during November-February.

Since the Big Lake system is so unique, approximately 5,000 acres of the refuge has been set aside as a National Natural Landmark. Approximately 2,100 acres of the Natural Area has been included in the Wilderness Preservation System. The Big Lake Wilderness Area is one of 11 areas in Arkansas and is the only wilderness area in eastern Arkansas.

species of birds have
erved by refuge
and visiting
gists since 1915.

the refuge bird
are available at the
rters and portions of
are open to birding
d. Many species of
birds frequent the area including various
shorebirds, and raptors.

Refuge provides
r many species of
waterfowl including
gadwalls, wigeon,
aged teal, wood
gnecks and
ack. The peak
ns generally occur
er - January with an

population of 70,000 ducks. A recent
natural aquatic vegetation has resulted in
nt increase in diving ducks, especially
sback.

geese utilize the
ring the fall and
d can be observed in
Island field at the
t of the refuge.

ately 2,500 wood
produced annually
tree cavities and in
est boxes scattered throughout the refuge.
mergansers also utilize tree cavities and
s.

nd Bald Eagles have recently begun nesting
uge. Osprey have nested successfully since
a pair of bald eagles successfully hatched
ng in 1993.

Lake Refuge contains a significant amount
ds. It is not surprising that the most numerous
wildlife species are beavers, muskrat, and



raccoon. White-tailed
deer are frequently
observed feeding along
the Ditch 81 levee road
and in the small farm
fields. Sightings of
squirrels and rabbits are
common, and bobcats
are seen on rare
occasions.

Waters of the refuge abound with fish, aquatic
reptiles, aquatic insects and crustaceans. Largemouth
bass, crappie, sunfish, catfish, buffalo, and carp are
the most common fish species. The red-eared turtle is
commonly seen sunning on logs around the lake, but
the Alligator Snapping turtle spends most of its life on
the lake floor and is rarely seen. A variety of snakes
inhabit the waters and swamps of the refuge. The
eastern cottonmouth is the only common poisonous
snake found in the area.

Hunting

Controlled hunting of deer, squirrel, and raccoon is
allowed on the refuge. Hunting on Big Lake is a
management tool which provides wildlife population
data produces many hours of public recreation.
Permits are required for all hunts, and are available at
the refuge headquarters.

Fishing

Big Lake provides quality fishing opportunities for bass,
catfish, crappie and sunfish. The refuge fishing
regulations are available at the refuge headquarters.
Frog hunting is also permitted from the start of the
State season through October 31.

Wildlife Observation/Photography

Big Lake Refuge provides many opportunities to see,
photograph, and just simply enjoy its wildlife resources.
The best time to observe wildlife is early in the morning
or at dusk. Migratory waterfowl numbers peak during
the fall and winter months, but wood ducks, hooded
mergansers and a few mallards are year-round
residents. Eagles and osprey generally nest from early
February through April, and the eagles can be

observed feeding their young in May and June
and ospreys in June and July.

Recreational Opportunities

The Big Lake Refuge Headquarters is located on
State Highway 18, 15 miles west of Blytheville,
Arkansas. The refuge is generally open to the
public March 1 - October 31, and portions of the
refuge are generally open year-round.
Occasionally portions of the refuge or the entire
refuge may be closed due to floods and persons
planning to visit the area should contact the
Refuge Headquarters prior to their visit.

Office hours: 7:00 AM to 3:30 PM
Monday through Friday

For Additional Information

Contact: Refuge Manager
Big Lake National Wildlife Refuge
P.O. Box 67
Manila, Arkansas 72442

Or Call: (501) 564-2429.



Department of the Interior
U.S. Fish and Wildlife Service
January 1994

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	SP	S	F	W
<i>Jays and Crows</i>				
___ Blue Jay*	a	a	a	a
___ American Crow	u	u	u	u
___ Fish Crow	o	o	o	
<i>Chickadees and Titmice</i>				
___ Carolina Chickadee*	c	c	c	c
___ Tufted Titmouse*	c	c	c	c
<i>Nuthatches</i>				
___ Red-breasted Nuthatch	u		u	r
___ White-breasted Nuthatch	o	o	o	o
<i>Creepers</i>				
___ Brown Creeper	u		u	u
<i>Wrens</i>				
___ Carolina Wren*	c	c	c	c
___ Bewick's Wren	r	r	r	r
___ House Wren	r		r	r
___ Winter Wren	r		o	o
<i>Kinglets and Gnatcatchers</i>				
___ Golden-crowned Kinglet	c		c	u
___ Ruby-crowned Kinglet	c		c	c
___ Blue-gray Gnatcatcher*	c	c	u	
<i>Bluebirds, Thrushes and Robin</i>				
___ Veery	r		r	
___ Eastern Kingbird*	u	u	u	u
___ Gray-cheeked Thrush	u		u	
___ Swainson's Thrush	c		c	
___ Hermit Thrush	u		u	u
___ Wood Thrush*	c	c	c	
___ American Robin*	a	c	a	a
<i>Thrashers</i>				
___ Gray Catbird*	c	u	c	
___ Northern Mockingbird*	c	c	c	c
___ Brown Thrasher*	c	c	c	c
<i>Pipits</i>				
___ American Pipit	u		u	
<i>Waxwings</i>				
___ Cedar Waxwing	c		o	u
<i>Starling</i>				
___ Starling*	c	c	c	c
<i>Shrike</i>				
___ Loggerhead Shrike*	u	u	u	u
<i>Vireos</i>				
___ White-eyed Vireo*	c	c	c	
___ Yellow-throated Vireo*	c	u	u	

	SP	S	F	W
___ Warbling Vireo	o	o	o	
___ Philadelphia Vireo	u		u	
___ Red-eyed Vireo*	c	c	c	
<i>Warblers</i>				
___ Blue-winged Warbler	r		r	
___ Golden-winged Warbler	r		r	
___ Tennessee Warbler	a		c	
___ Orange-crowned Warbler	r		r	
___ Nashville Warbler	c		c	
___ Northern Parula*	c	c	c	
___ Yellow Warbler	c		u	
___ Chestnut-sided Warbler	c		c	
___ Magnolia Warbler	c		c	
___ Cape May Warbler	u		u	
___ Black-throated Blue Warbler	u		u	
___ Yellow-rumped Warbler	c		c	c
___ Black-throated Green Warbler	c		c	
___ Blackburnian Warbler	o		o	
___ Yellow-throated Warbler*	c	c	c	
___ Pine Warbler	o	o	o	o
___ Prairie Warbler*	u	r	u	
___ Palm Warbler	c		r	
___ Bay-breasted Warbler	c		c	
___ Blackpoll Warbler	c		r	
___ Cerulean Warbler*	c	c	c	
___ Black-and-white Warbler	o	o	o	
___ American Redstart*	c	c	c	
___ Prothonotary Warbler*	c	c	c	
___ Worm-eating Warbler	o		o	
___ Swainson's Warbler*	u	u	u	
___ Ovenbird	c		c	
___ Northern Waterthrush	c		c	
___ Louisiana Waterthrush	c	u	r	
___ Kentucky Warbler*	c	c	c	
___ Connecticut Warbler	v		v	
___ Mourning Warbler	u		r	
___ Common Yellowthroat*	c	c	c	r
___ Hooded Warbler*	c	c	c	
___ Wilson's Warbler	u		u	
___ Canada Warbler	u		u	
___ Yellow-breasted Chat*	c	c	c	
<i>Tanagers</i>				
___ Summer Tanager*	c	c	c	

	SP	S	F	W
___ Scarlet Tanager	u		u	
<i>New World Finches</i>				
___ Northern Cardinal*	c	c	c	
___ Rose-breasted Grosbeak	c		c	
___ Blue Grosbeak			r	
___ Indigo Bunting*			c	c
___ Painted Bunting			r	
___ Dickcissel*	c	c	u	
<i>Sparrows</i>				
___ Rufous-sided Towhee*	c	u	c	
___ Chipping Sparrow	u		u	
___ Field Sparrow*	c	c	c	
___ Vesper Sparrow	u		u	
___ Lark Sparrow	r			
___ Savannah Sparrow	u		u	
___ Grasshopper Sparrow*	u	u	u	
___ Henslow's Sparrow	h		h	
___ Le Conte's Sparrow	r		r	
___ Fox Sparrow	u		u	
___ Song Sparrow	c		c	
___ Lincoln's Sparrow	c		c	
___ Swamp Sparrow	c		c	
___ White-throated Sparrow	c		c	
___ White-crowned Sparrow	u		u	
___ Dark-eyed Junco	c		c	
___ Lapland Longspur				
<i>Blackbirds, Grackles, Cowbirds and Orioles</i>				
___ Bobolink	u		r	
___ Red-winged Blackbird*	a	a	a	
___ Eastern Meadowlark*	c	c	c	
___ Yellow-headed Blackbird	r			
___ Rusty Blackbird				
___ Brewer's Blackbird				
___ Common Grackle*	a	a	a	
___ Brown-headed Cowbird*	a	c	a	
___ Orchard Oriole*	c	c	u	
___ Northern Oriole*	c	c	u	
<i>Old World Finches</i>				
___ Purple Finch	u		u	
___ Pine Siskin				



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Birds

Wapanocca National Wildlife Refuge is located in Crittenden County in the delta of northeastern Arkansas. Established in 1961, Wapanocca is one of over 400 refuges in the National Wildlife Refuge system. Wapanocca has a rich wildlife heritage and is the former site of one of the most prestigious hunting clubs in the country. Today, Wapanocca's primary purpose is to provide habitat for thousands of migrating and wintering waterfowl, establishing an important link in the chain of refuges along the Mississippi Flyway.

Wapanocca's 5,500 acres lie just 5 miles west of the Mississippi River. The heart of the refuge is 600 acre Wapanocca Lake, a shallow old oxbow of the once meandering Mississippi River. Surrounding the lake is 1,200 acres of cypress and willow swamp. Together, the lake and swamp offer excellent feeding and resting habitat for waterfowl and diving birds. The other two-thirds of the refuge is equally divided between remnants of the once extensive bottomland hardwood forests and the croplands of the refuge's farm unit.

A visit to Wapanocca offers an excellent opportunity to view wildlife for the casual observer of nature and the experienced birder alike. Along the Nature Drive visitors can observe a wide variety of birds and other wildlife in different kinds of habitat - hardwood forest, cypress swamp, farmland, and open water. The observation Area at the edge of the lake is a favorite spot among visitors, especially during winter months when an abundance of waterfowl are using the refuge. A waterfowl sanctuary closed to the public during the period November 16 - February 28, is located Northeast of Ditch 8.

Refuge headquarters is located 1 mile east of Interstate 55 along state highway 42, 1/4 mile south of Turrell.

How to use your checklist

The bird checklist was designed to be informative and simple to use. The list is arranged in the order established by the American Ornithological Union. This list was developed with the assistance of Tennessee Valley Audubon members R. B. "Willie" Williams and the late Mark Brown. 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
*	Nests on refuge

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

	SP	S	F	W
Loons				
___ Common Loon	o		o	o
Grebes				
___ Pied-billed Grebe	c		c	c
___ Horned Grebe	o		o	o
Pelicans and their Allies				
___ American White Pelican	o		o	
___ Double-crested Cormorant	o		o	o
___ Anhinga	r		r	
Hérons, Egrets and Allies				
___ American Bittern	r		r	
___ Least Bittern	r	r	r	
___ Great Blue Heron	u	u	u	u
___ Great Egret	u	u	u	
___ Snowy Egret	o	o	o	
___ Little Blue Heron	u	u	u	
___ Cattle Egret	u	u	u	
___ Green-backed Heron	u	u	u	
___ Black-crowned Night-Heron	u	u	u	
___ Yellow-crowned Night-Heron	u	u	u	
Ibises, Spoonbill, Stork				
___ Glossy Ibis			r	
___ Wood Stork			r	
Waterfowl				
___ Greater White-fronted Goose	o		o	o

	SP	S	F	W
Sw Goose	u		u	o
Canada Goose*	c	o	c	a
Wood Duck*	c	c	c	c
Black Duck	c		c	c
Green-winged Teal	c	u	c	c
Willet	a	o	a	a
Northern Pintail	c		c	c
Blue-winged Teal	c	u	c	u
Northern Shoveler	c		u	c
Wadwall	c		c	c
American Wigeon	o		c	c
Canvasback	u		u	u
Golden Plover	u		u	u
Ring-necked Duck	c		c	c
Water Scaup	r		r	r
Lesser Scaup	o		o	o
Blue Jay	r		r	
Common Goldeneye	o		o	u
Golden Plover	c		c	c
Red-headed Merganser*	c	o	c	c
Common Merganser	r		r	r
Red-breasted Merganser	r		r	r
Wood Duck	c		c	c
Accipiters, Hawks and Allies				
Black Vulture	u	u	u	o
Key Vulture	u	u	u	o
Osprey	o		o	
Mississippi Kite	o	o		
Bald Eagle	o			o
Sharp-shinned Hawk	r		r	r
Screeper's Hawk	r	r	r	r
Red-shouldered Hawk	o	o	o	o
Red-winged Hawk	u	u	u	
Sharp-tailed Hawk	c	u	c	c
Sharp-legged Hawk				r
Bald Eagle	r			r
Sharp-shinned Hawk	u		u	u
American Kestrel	u	r	u	u
Merlin Falcon			r	
Columbig birds (Quail, Turkey and Allies)				
Wild Turkey*	u	u	u	u
Northern Bobwhite*	u	u	u	u

Rails, Gallinules, Coots and Cranes

	SP	S	F	W
King Rail	u	u	u	
Virginia Rail	r		r	
Sora	r		r	
Purple Gallinule	r	r	r	
Common Gallinule	u	u	u	
American Coot	c	r	c	c

Shorebirds

	SP	S	F	W
Black-bellied Plover	r		r	
Lesser Golden-Plover	f		u	
Semipalmated Plover	u		u	
Killdeer*	c	c	c	u
American Golden Plover	u		u	
Greater Yellowlegs	u		u	
Lesser Yellowlegs	u		u	
Solitary Sandpiper	u		u	
Willet	r		r	
Spotted Sandpiper	u		u	
Upland Sandpiper	u		r	
Sanderling	r		u	
Semipalmated Sandpiper	u		u	
Western Sandpiper	f		c	r
Least Sandpiper	c		c	u
Pectoral Sandpiper	u		u	
Dunlin	r		u	r
Short-billed Dowitcher	c		c	
Long-billed Dowitcher	o		o	
Common Snipe	c		c	u
American Woodcock	u	r	u	u
Franklin's Gull			r	
Ring-billed Gull	o		o	o
Herring Gull	o		o	o
Caspian Tern	r		u	
Common Tern	o	o	o	
Forster's Tern	o		o	
Least Tern	o	o	o	
Black Tern	r	o	u	

Pigeons, Doves

Rock Dove	u	u	u	u
Mourning Dove*	c	c	c	c

Cuckoos

Black-billed Cuckoo	r		r	
Yellow-billed Cuckoo*	c	c	c	

Owls

	SP	S	F	W
Barn Owl	o	o	o	o
Eastern Screech-Owl*	c	c	c	c
Great Horned Owl*	u	u	u	u
Barred Owl*	c	c	c	c
Short-eared Owl	r		r	r

Nightjars

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

Swifts, Hummingbirds

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

Kingfishers

Belted Kingfisher*	c	c	c	u
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Woodpeckers

Red-headed Woodpecker*	c	c	c	c
Red-bellied Woodpecker*	c	c	c	u
Yellow-bellied Sapsucker	c		c	c
Downy Woodpecker*	c	c	c	c
Hairy Woodpecker*	u	u	u	u
Northern Flicker*	c	c	c	c
Pileated Woodpecker*	f	f	f	f

Flycatchers

Olive-sided Flycatcher	r		r	
Eastern Wood-Pewee*	c	c	c	
Acadian Flycatcher*	c	c	u	
Least Flycatcher	r		r	
Eastern Phoebe	c	r	c	r
Great Crested Flycatcher*	c	c	c	
Eastern Kingbird*	c	c	u	

Larks

Horned Lark*	c	c	c	c
--------------	---	---	---	---

Martins and Swallows

Purple Martin*	c	c	c	
Tree Swallow	c		c	
Northern Rough-winged Swallow	c	u	c	
Bank Swallow	u		u	
Cliff Swallow	r		r	
Barn Swallow*	c	c	c	