Review and Approvals

Cross Creeks National Wildlife Refuge
Dover, Tennessee

Annual Narrative Report

Calendar Year 1996

Walter Meuschitt — 08-22-03
Refuge Manager — Date

Richard P Ingram — 9/4/03
Refuge Supervisor — Date

Bill Olmer — 9/5/03
Regional Office Approval — Date

INTRODUCTION

Cross Creeks National Wildlife Refuge is located in the northwest corner of middle Tennessee, Stewart County, and stretches for 12.5 miles along the Cumberland River. The refuge was established in 1962 as a result of mitigation proceedings with the U.S. Army Corps of Engineers due to the flooding of Kentucky Woodlands National Wildlife refuge and creation of the Lake Barkley Reservoir.

The refuge consists of rich bottomlands along the Cumberland River, rolling hills and rocky, limestone bluffs. Deciduous woodlands characterize the surrounding hillsides, while the bottomlands primarily consists of open water impoundments and cultivated fields. This combination is attractive to migratory waterfowl, wading birds, shorebirds, and neo-tropical migratory birds. The shallow water impoundments provide optimum habitat for dabbling ducks and the myriad of water dependent species. Two deeper bodies of water, Elk and South Cross Creeks Reservoirs, provide habitat for diving ducks and rich fishery resources. The refuge is a haven for the Southern James Bay population of Canada geese. The average peaks for wintering waterfowl populations are in excess of 80,000 ducks and 25,000 geese.

Since the refuge is located within the Cumberland River Watershed, Cross Creeks National Wildlife Refuge belongs to the Lower Tennessee-Cumberland Ecosystem and lies within the Interior Low Plateau Physiographic Province. The refuge provides habitat for more than 240 species of birds, 250 species of mammals, fish, reptiles, amphibians, and over 650 species of plants.

A network of dikes and water control structures make it possible to manage water levels for optimum habitat for the many species of wildlife. The ability to flood and dewater these areas supports the refuge farming program and allows for the production of a wide variety of moist soil plants. The 8,862 acre refuge lies within the Cumberland River flood plain; therefore, it is not uncommon to experience several flood events in a given year. This results in damage to dikes and roads, erosion of top soil, and delays in critical management operations and programs.

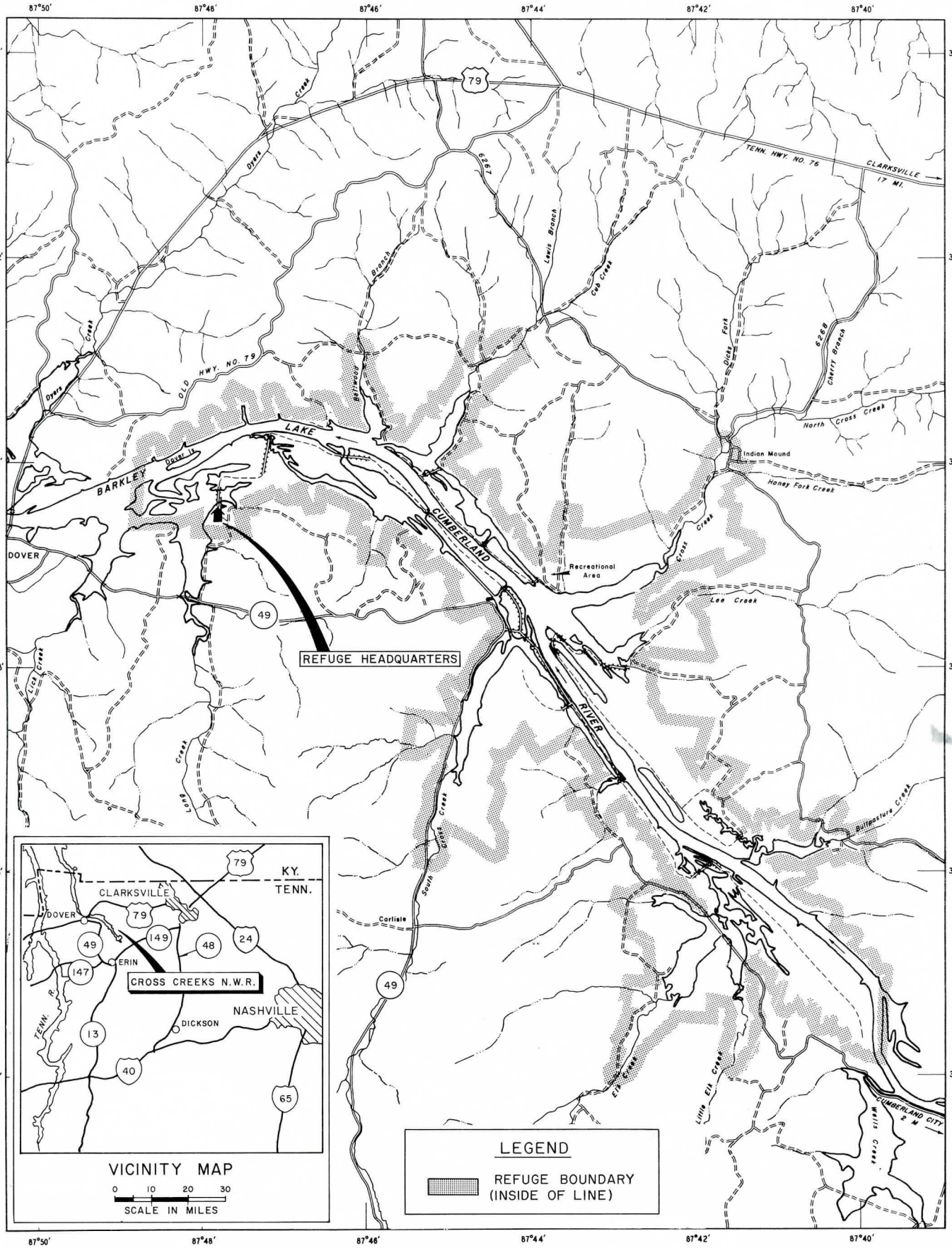
Visitor facilities consist of a visitor center, auto tour route, hiking trail, and numerous boat ramps. The visitor center is open Monday through Friday, 7:00 a.m. to 3:30 p.m. Other facilities are opened March 15 through October 31.

CROSS CREEKS NATIONAL WILDLIFE REFUGE

STEWART COUNTY, TENNESSEE

UNITED STATES
DEPARTMENT OF THE INTERIOR

UNITED STATES
FISH AND WILDLIFE SERVICE



COMPILED IN THE DIVISION OF REALTY
FROM SURVEYS BY U.S.G.S., C.E.
AND T.V.A.

ATLANTA, GEORGIA AUGUST, 1963
REVISED: 7/81

Scale 0 2000 4000 8000 12000 16000 FEET
0 1/2 2 3 MILES

TRUE NORTH
MAGNETIC N. 3°25′
MEAN DECLINATION 1963

4R TENN 605 403

Table of Contents

A. Highlights 1

B. Climatic Conditions 1

C. Land Acquisition

1. Fee Title ..... Nothing to Report
2. Easements ..... Nothing to Report
3. Other ..... Nothing to Report

D. Planning

1. Master Plan ..... Nothing to Report
2. Management Plan ..... Nothing to Report
3. Public Participation ..... Nothing to Report
4. Compliance with Environmental & Cultural Resource 3
5. Research and Investigations 3
6. Other ..... Nothing to Report

E. Administration

1. Personnel 4
2. Youth Programs ..... Nothing to Report
3. Other Manpower Programs ..... Nothing to Report
4. Volunteer Program 5
5. Funding 5
6. Safety 7
7. Technical Assistance ..... Nothing to Report
8. Other ..... Nothing to Report

F. Habitat Management

1. General 7
2. Wetlands 8
3. Forests ..... Nothing to Report
4. Croplands 8
5. Grasslands ..... Nothing to Report
6. Other Habitats ..... Nothing to Report

7.	Grazing	Nothing to Report
8.	Haying	Nothing to Report
9.	Fire Management	Nothing to Report
10.	Pest Control	10
11.	Water Rights	Nothing to Report
12.	Wilderness and Special Areas	Nothing to Report
13.	WPA Easement Monitoring	Nothing to Report
14.	Farmers Home Administration Conservation Easements	Nothing to Report
15.	Private Lands	Nothing to Report
16.	Other Easements	Nothing to Report

G. Wildlife

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

H. Public Use

1.	General	17
2.	Outdoor Classrooms - Students	19
3.	Outdoor Classrooms - Teachers	Nothing to Report
4.	Interpretive Foot Trails	22
5.	Interpretive Tour Routes	22
6.	Interpretive Exhibits/Demonstrations	22
7.	Other Interpretive Programs	22
8.	Hunting	23
9.	Fishing	Nothing to Report
10.	Trapping	Nothing to Report

11. Wildlife Observation 23
12. Other Wildlife Oriented Recreation 23
13. Camping ..... Nothing to Report
14. Picnicking ..... Nothing to Report
15. Off-Road Vehicles ..... Nothing to Report
16. Other Non-Wildlife Oriented Recreation ..... Nothing to Report
17. Law Enforcement 23
18. Cooperating Associations ..... Nothing to Report
19. Concessions ..... Nothing to Report

I. Equipment and Facilities

1. New Construction ..... Nothing to Report
2. Rehabilitation 24
3. Major Maintenance 25
4. Equipment Utilization and Replacement 26
5. Communications Systems 28
6. Computer Systems 28
7. Energy Conservation ..... Nothing to Report
8. Other 28

J. Other Items

1. Cooperative Programs ..... Nothing to Report
2. Other Economic Uses ..... Nothing to Report
3. Items of Interest ..... Nothing to Report
4. Credits 29

K. Feedback ..... Nothing to Report

L. Information Packet ..... Inside Back Cover

A. HIGHLIGHTS

Riverbank stabilization of the Cumberland River within the refuge boundary is making progress. This year survey teams, design engineers, and various U.S. Army Corps of Engineers contractors visited the project site.

B. CLIMATIC CONDITIONS

Precipitation for 1996 totaled 55.24 inches of rain and 3.5 inches of snow. The refuge received 9.04 inches more rain and 4.5 inches less snow, compared to the previous year. Snowfall occurred on ten days this year, but only on two of these days did the refuge receive more than trace accumulations. On February 16, two inches of snow fell. On November 10, one and a half inches of snow accumulated on the ground. The coldest day of the year occurred on February 4, when the temperature dipped to -3° F. The hottest daytime high was on July 20, when the temperature climbed to 93° F. The coldest month of the year was January with fifteen night time lows below 32° F. The two warmest months of the year were July and August with six and ten daytime highs at or above 90° F, respectively.

During 1996 Cross Creeks NWR experienced two minor flood events. On March 5, the Cumberland River/Barkley Lake began to rise at the rate of about two feet per day. By March 10, the Cumberland River had reached 360' msl, two feet above summer pool level. Two days later the water level began to recede. The Cumberland River/Barkley Lake stayed well below the roads and water control structures until May 13. During this second flood event the Cumberland River rose slowly. The river crested on May 22 at 365' msl. For the remainder of the year the Cumberland River/Barkley Lake stayed well within its banks

The weather pattern experienced this year was atypical. For the months of March, April and May the refuge received a total of 16.5 inches of rain. Although this rainfall did not cause any major flooding problems, the frequency with which it fell severely hampered farming activities (see Section F.4.). During the third week of June the weather pattern changed dramatically. The refuge did not receive any significant rainfall from June 13 to July 19. However, just as the land was dry enough for refuge staff to begin annual maintenance and impoundment restoration work, the rain began falling again. Between July 20 and the 31st the refuge received 5.5 inches of rain. August was a good drying out month with less than two inches of precipitation. September was going to be the month the refuge staff was finally going to get some habitat restoration work accomplished, but the refuge averaged over 1.5 inches of rain per week. October is typically the driest month of the year. In 1996 October was the seventh wettest month. To make a long story short, the 1996 rainfall pattern was such that most maintenance work was limited to roads and roadsides.

Since Cross Creeks National Wildlife Refuge (NWR) does not have a weather station, the data presented in the climatological data summary table was generated from the Fort Donelson National Battlefield NOAA weather station records. The weather station is located approximately three miles northwest of the refuge office.

Cross Creeks NWR
Climatological Summary for 1996

Month	Maximum High Temp.	Average High Temp.	Maximum Low Temp.	Average Low Temp.	Monthly Precip. (inches)
January	68	45.5	9	25.0	1.20
February	79	49.2	-3	26.3	4.14
March	73	52.7	11	31. 5	6.02
April	81	67.0	28	43.5	3.07
May	89	78.5	41	60.8	6.87
June	93	83.1	54	64.8	5.68
July	94	85.5	56	67.0	5.99
August	91	85.7	60	66.8	1.85
September	87	77.8	45	60.0	7.76
October	80	69.4	33	47.2	4.20
November	70	50.5	22	35.0	6.17
December	70	50.5	8	32.5	1.66
				Total Precip.	55.24

D. PLANNING

4. Compliance with Environmental and Cultural Resources Mandate

RM Wigginton met with representatives from R. Christopher Goodwin & Associates, Inc., New Orleans, Louisiana on August 30. The purpose of this meeting was to discuss the scope of work proposed by the U.S. Army Corps of Engineers (USACE) for protecting archeological sites within the USACE Cross Creeks National Wildlife Refuge Riverbank Protection Project. An earlier archeological survey conducted by DuVall & Associates, Inc. found nine sites along both banks of the Cumberland River that were potentially eligible for listing on the National Register of Historic Places and may be adversely affected by the proposed bank stabilization project. The USACE funded archeological survey report (DuVall, 1996, *An Archaeological Reconnaissance of Approximately 24 Miles of Shoreline Within the Cross Creeks National Wildlife Refuge, Stewart County, Tennessee*) identified the following sites as being potentially eligible and/or requiring additional investigation to make that determination: 40Sw32, 40Sw81, 40Sw228, 40Sw308, 40Sw319, 40Sw321, 40Sw333, 40Sw3398, and 40Sw340.

R. Christopher Goodwin and Associates, Inc. bid to conduct the National Register testing and further assessing on the above listed archeological sites. In late October Regional Director Noreen Clough signed the Archaeological Resources Protection Act Permit authorizing work to begin. However with flooding a possibility at almost any time beginning in November until May no work was conducted in 1996.

5. Research and Investigations

WIS Welker researched and presented to RM Wigginton a listing of Land Species of High Concern With Habitat Needs for the Interior Low Plateau Physiographic Area showing estimated percentage of habitat available and habitat needs for species of land birds known to be present on Cross Creeks National Wildlife Refuge. This was preliminary work for use in the Bird Conservation Plan formulated by the Southeast Partners in Flight Working Group to help guide future habitat management for the benefit of neotropical birds either utilizing or known to have used the refuge.

E. ADMINISTRATION

Personnel: 5, 2, 3, 4, 1

1. Personnel

1. Jim W. Wigginton, Refuge Manager, GS-0485-11, EOD 12/14/92, PFT
2. Walter H. Neasbitt, Refuge Operations Specialist, GS-0485-09, EOD 07/28/91, PFT
3. Sarah M. Welker, Refuge Ranger, GS-0025-07, EOD 03/17/85, PFT
4. Pamela B. Rule, Office Assistant, GS-0303-05, EOD 11/27/94, PFT
5. James D. Welker, Maintenance Mechanic, WG-4749-10, EOD 07/30/78, PFT

Five Year Comparison of Personnel

Year	Permanent Full-Time	Permanent Part-Time	Temporary	Total
Fiscal Year 1996	5	0	0	5
Fiscal Year 1995	5	0	0	5
Fiscal Year 1994	5	0	0	5
Fiscal Year 1993	6	0	0	6
Fiscal Year 1992	6	0	1	7

January 25, ARM Neasbitt and OA Rule attended a GSA Procurement Workshop in Nashville, TN.

May 6 - 10, OA Rule attended the Administrative Workshop in Memphis, TN.

June 17 - 21, ARM Neasbitt attended the Administrative Workshop in Jackson, MS.

4. Volunteer Program

A total of 141 volunteers, ranging in age from pre-teen to senior adult, contributed 1455 hours to various projects on the refuge. These included Canada goose neck collar observation, litter patrol, Junior Duck Stamp contest assistance, bird identification, environmental education program/exhibits assistance, wood duck banding and trail and general maintenance. Seventy members in one group worked together to hold a major clean-up of the Elk Reservoir area. Sixty volunteers assisted with Stewart County Earth Camp. One young man, who had attended Earth Camp, eagerly assisted in litter patrol for the refuge later in the summer. In April and May, a church group from Clarksville, TN worked on the refuge nature trail, placing bark and constructing a foot bridge, all in less than three days. The group, made up of mostly teens, brought all of their own equipment for the task.

5. Funding

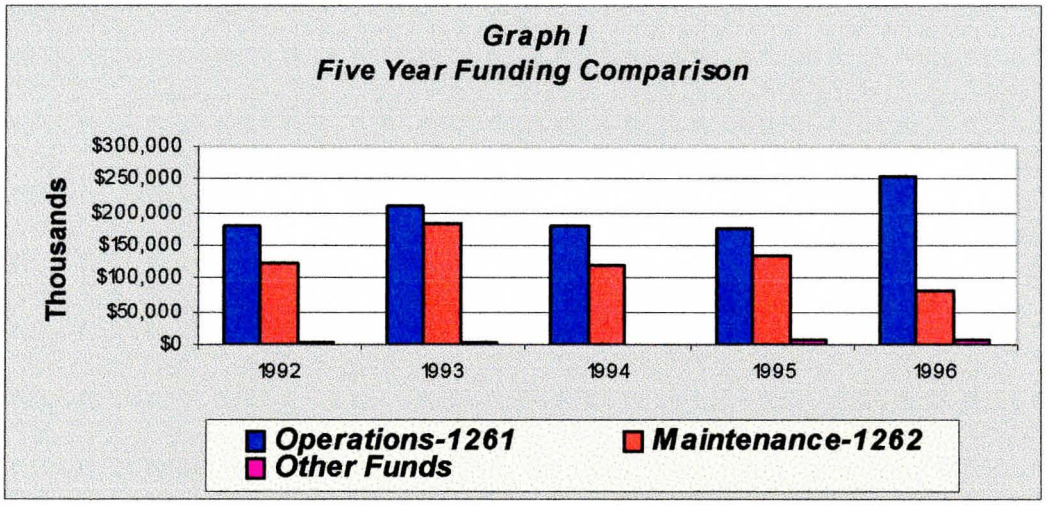
Funding allocations were received in mid April. This year the base operations and base maintenance allocations were consolidated into the initial base operations allocation. This year initial operations allocation (1261) increased from 161.9K in FY 95 to 229.0K for FY96. However without any additional initial operations or maintenance (1262) allocations funding was $500 less than the previous year. Maintenance Management System funds were increased by 27.5%. The funds were tied to hooking the refuges potable water system to city water, replacing front-end loader backhoe, and performing needed maintenance on bridge/water control structures.

An additional $4,500 was received in Drug Enforcement (1221) funds for law enforcement training activities and operations (1261) for goose collar observations and volunteer support. Fire Management funds (9110) were used for maintenance of equipment.

FY- 96 FUNDING ALLOCATION

Description	Fund Type - Sub-activity	Amount
Initial Allocation	Operations - 1261	229.0
Manage Volunteers/Salary Costs	Operations - 1261	11.0
Volunteer Program Support	Operations - 1261	0.8
Earth Camp Support	Operations - 1261	3.0
Goose Collar Observations	Operations - 1261	1.7
Proposed Dump Clean up	Operations - 1261	10.0
	Sub Total	255.5
Law Enforcement Instructor	Drug Enforcement - 1221	2.0
	Sub Total	2.0
Hook up to city water	Maint. Management Sys. - 1262	12.0
Bridges Maintenance	Maint. Management Sys. - 1262	24.2
Replace 79 Front-End Loader W/Backhoe	Maint. Management Sys. - 1262	48.0
	Sub Total	84.2
Fire Normal Unit Strength	NUS - 9110	0.5
Fire Maintenance (Equipment)	Maintenance - 9110	1.5
	Sub Total	2.0
	TOTAL	**343.7**

A five year comparison of funding levels is shown in **Graph I**



6. Safety

Monthly safety meetings were held, as well as tailgate sessions and informal discussions throughout the year. Video presentations were usually shown in support of the meetings.

During October, MM Welker visited the doctor several times complaining of sever headaches joint and muscle pain, and severe neck pain. Welker was concerned that he may be coming down with Rocky Mountain spotted fever or Lyme disease because of numerous tick bites he had been exposed to. Welker was treated with antibiotics and no definitive diagnosis on what was causing his headache or other pain was made.

On the night of November 23rd, ARM Neasbitt sprained and /or bruised his right ankle during Law Enforcement patrol in Pool 11. Neasbitt was inspecting a water control structure, and as he walked back to his vehicle lost his balance on the gravel road. X-rays revealed that his ankle was badly sprained and required wearing an ankle brace for six weeks.

F. HABITAT MANAGEMENT

1. General

May 13 - 17, ARM Neasbitt attended the Approach to Ecosystem Conservation class in Atlanta, GA.

2. Wetlands

This year the refuge continued to make some progress with its effort to rehabilitate Pool 6 moist soils and improve its drainage. Two years ago beaver dam debris, button bush, willow trees and other debris had been pushed out of the lowest Pool 6 elevations and placed in a windrow along the southern margins of the impoundment, between moist soils and farm fields. As time allowed, refuge staff began to spread the dirt and decaying wood back down towards the center of Pool 6. The slope from the adjoining farm field was decreased to facilitate Japanese millet planting. Work in the lowest portion of Pool 6 had to be postponed till next year because the soil never dried out enough to support the heavy equipment.

In the mid to late 1980's the refuge constructed a dike around the walk-in duck trap located in Lower Pool 4. A five foot flash board riser had been installed on the west side of the dike. It was intended by the refuge to pump water into the dike during July to September to facilitate preseason wood duck banding. Due to the lack of maintenance the dike had become over grown with trees. The soil along the inside and outside of the dike almost never dried out enough to support equipment needed to mow down the 15 - 20 foot tall trees, nor was the top of the dike wide enough to safely maneuver a rotary cutter and tractor.

As the dike had grown up in trees, the water control structure was in disrepair, and apparently never having functioned as intended the decision was made to begin pushing down the dike around the walk-in trap. In September, the D7 was used, as time allowed, to attempt to begin filling in barrow pits along the outside perimeter of the dike. By season's end dry dike soil had been pushed to cover about 60% of the barrow pits and other soft soil. The refuge is hoping that the dirt work accomplished this year will consolidate this winter and so allow the refuge to establish the original slope of the land around the walk-in duck trap.

4. Croplands

The refuge farm program for this year included 1,292 acres in Cooperative Farm Agreements and 570 acres of refuge force account farming activities. Unlike last year all the force account farming was accomplished on the ground. There was no aerial seeding of winter wheat over standing soybeans. As last year, the refuge had three Cooperative Farming Agreements. These agreements covered 825 acres available on the south side of the Cumberland River and 467 acres available on the north side of the river.

In February, MM Welker picked up 4,500 pounds of millet at Big Lake NWR. It seems a commercial grower had produced a mixture that could not be sold on the market. At ten cents a pound, the refuge was able to plant more acres for about a third of the cost.

The first six months of 1996 did not provide favorable farming conditions. From February through June the refuge received continuous rain. It was not uncommon to receive six inches of rain during March, but when such a weather pattern continued into June, farming almost came to a halt. The cooperative farmer started discing corn ground during the first week of June. Heavy rains on the night of June 11 stopped farming activity for almost another week on the south side of the river. By the end of June, approximately 250 acres of corn had been planted on the south side. The south side farmer wanted to put the remaining acres designated for corn into soybeans. As the planting season for corn was done at the end of June the refuge allowed the south side farmer to plant soybeans on his remaining corn acreage.

The cooperative farmer on the north side of the river was able to disc and plant between April showers. By the first week of June the cooperative farmer on the north side of the river had 240 acres of corn in the ground. Although the refuge received nearly six inches of rain in June and July and some impoundments encroached into the margins of the farm fields, the north side corn crop did better than expected. Less than 10% of the corn crop was lost.

Force account farming went as well as could have been expected with this years' weather and the resources at the refuges' disposal. This year refuge staff broadcast 300 acres winter wheat and drilled another 150 acres.

MM Welker prepares Lower Pool 4 for winter wheat planting.
07.25.96 SMW

Soybeans that didn't drown-out during early summer produced good yeilds.
08.30.96 **SMW**

1996 Croplands Summary

Crop	Coop Share	FWS Share	Sp Use Permit	Aerial Cont.	Force Acct.	Total Acres
Corn	362	120	0	0	0	482
Millet	0	0	0	0	120	120
Soybeans	802	0	0	0	0	802
Wheat	0	8	0	0	450	458
Moist Soil	0	0	0	0	850	850
Wetlands	0	0	0	0	200	200
	1164	120	0	0	1620	2912

10. Pest Control

The refuge made available for use twenty-nine (29) herbicides in the 1996 management programs. The refuge submitted eighteen (18) pesticide use proposals for regional office approval, with the remaining eleven (11) chemicals being approved at the refuge level. Of the twenty-nine (29) chemicals available to conduct the refuges management programs, seven chemicals were used during 1996. The table below summarizes Cross Creeks NWR 1996 pesticide use.

Cross Creeks NWR 1996 Pesticide Use

Chemical (Trade Name)	Amount Used	Acreage Treated	Target Pest	Crop
Assure II	35 gal.	450	Johnson grass/Annual grasses	Soybeans
Bicep II	115 gal.	220	Johnson grass/Broadleaf Weeds	Corn
Blazer	121.57 gal.	725	Broadleaf Weeds	Soybeans
Broadstrike & Dual	70 gal.	280	Johnson Grass/Cocklebur	Corn/Soybeans
Canopy	23.9 gal.	370	Johnson Grass/Cocklebur	Soybeans
Classic	1.23 gal.	305	Broadleaf Weeds	Soybeans
Select	17.2 gal.	275	Johnson grass/Annual grasses	Soybeans

ARM Neasbitt sprayed the herbicide Round-up in the headquarters parking lot, around the shop buildings, the bone yard, and around signs as needed to control grass and weeds. Round-up was also sprayed on re-sprouting woody vegetation that had been boom-axed several weeks before on the Lower Pool 1 dike in August.

G. WILDLIFE

1. Endangered and/or Threatened Species

Two pair of bald eagles were sighted throughout the refuge the first of the year, both pair having nests on or near the refuge. Birds were incubating at the Pool 5 nest on the refuge possibly as early as February 6. Both pair were in incubation posture at both the Pool 5 and Westvaco nests by early March. On March 1, an immature eagle (one to two years old and possibly a "big brother"), was perched quietly on a branch several feet below the Pool 5 nest. He was seen later in April flying overhead as if keeping watch on the proceedings! On April 2, little downy eaglets were observed within both nests, the two Pool 5 eaglets being slightly older than the lone Westvaco eaglet.

Both of the nests, holding newly hatched young, survived several days of brutal snow, sleet, hail, wind, lightning, rain and "thunder snowstorms". By the time the Eagle Banding Team arrived in late April to band the eaglets, the team was unable to safely climb the trees due to too many dead limbs or bases, possibly as a result of earlier lightning strikes.

These two pair of eagles, having nests on and near by the refuge, have been the most successful nesting pair of bald eagles in this part of the southeast since 1983. They both have produced eaglets well into the double digits.

An immature golden eagle was noted on a few occasions in January and February.

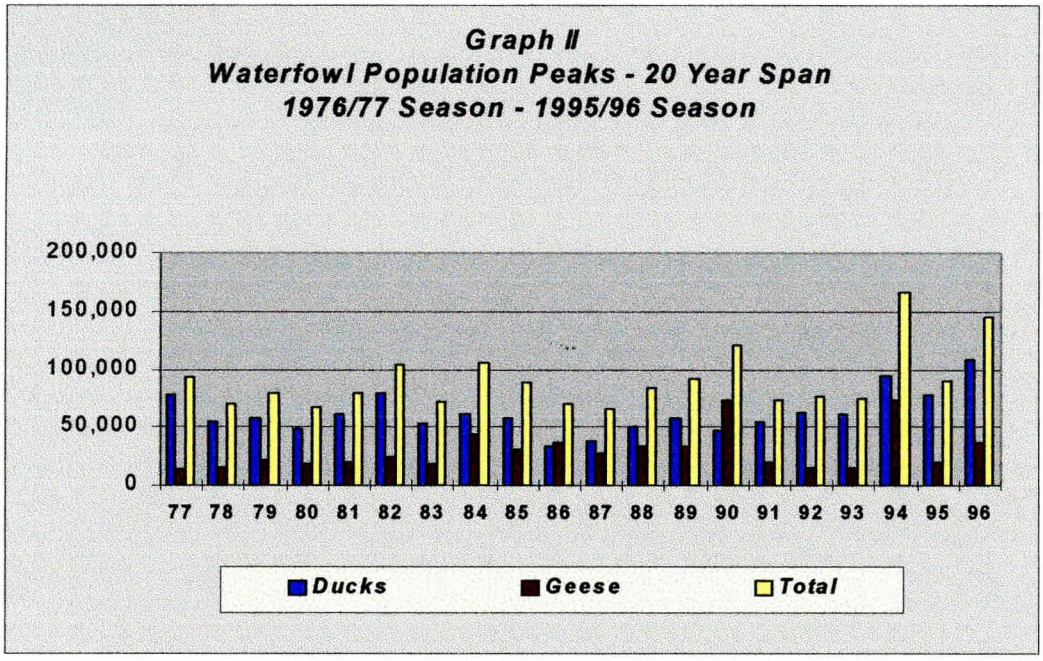
WIS Welker attended the Kentucky/Tennessee/Illinois Eagle Management Team meeting at Reelfoot NWR on October 25.

2. Waterfowl

Waterfowl surveys were conducted most weeks from January 1 to February 22 and October 30 to December 26, alternating between ground and aerial surveys. This year's mid-winter waterfowl survey scheduled between January 2 - 5, was not completed this year due to the furloughs caused by the government shutdown. The mid-December goose survey was completed on December 13 with 4,247 Canada geese and 41 snow geese recorded.

Waterfowl Summary, January 1 - February 22, 1996 and 95/96 Season:

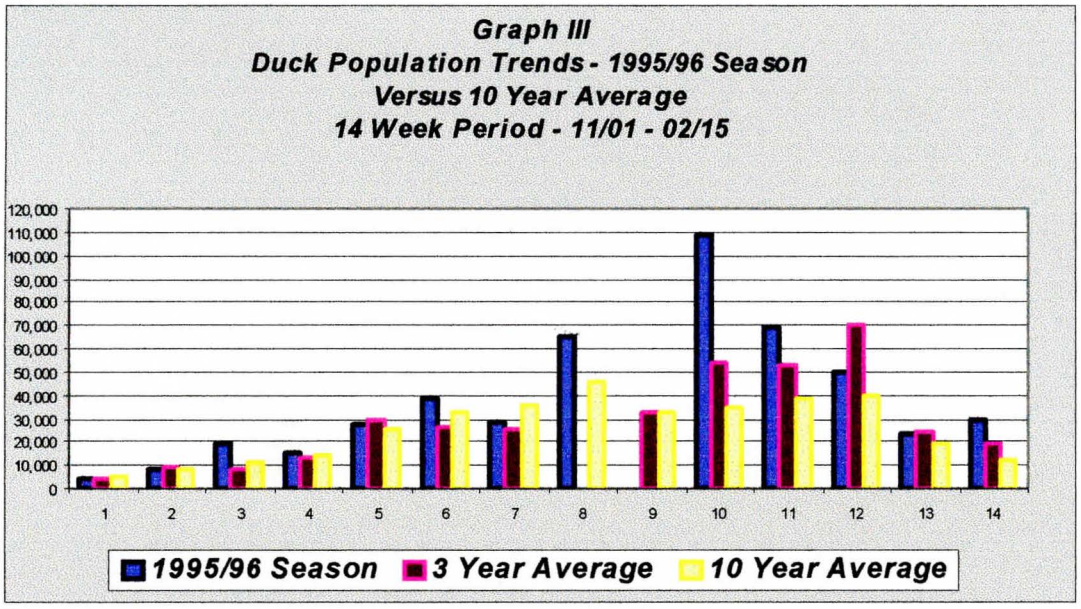
Graph II shows a twenty year comparison of peak winter duck and goose populations, as well as a comparison of total winter waterfowl peak populations. In mid-January Cross Creeks experienced the highest duck peak and third highest Canada goose peak in the past twenty years. A sever cold front which froze over most of the impoundments brought 108,630 ducks and 36,620 geese.



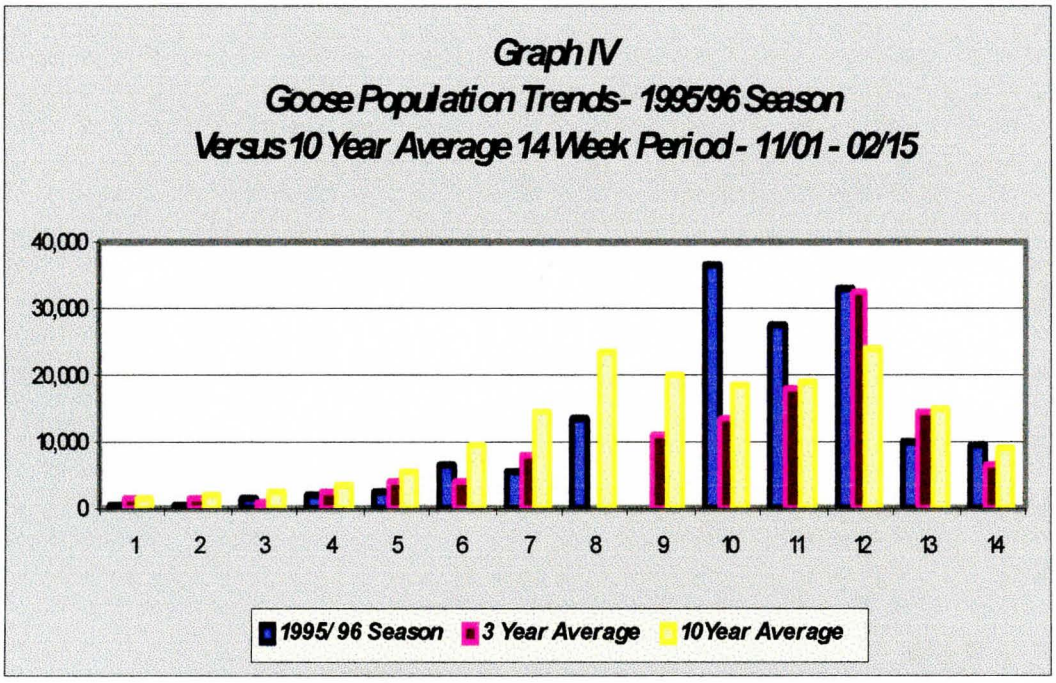
January 1996, began with typical winter temperatures with night temperatures dropping into the upper 20's and daytime highs in the upper 30's. Over 20,000 geese and over 50,000 ducks were observed on the refuge during the first week of January. On January 7, a cold front and snow storm moved through middle Tennessee dropping temperatures into the teens and putting five inches of snow on the ground. By January 12, waterfowl numbers increased to 36,620 geese and 108,628 ducks. As the weather moderated waterfowl use dropped steadily. Only 10,232 geese and 23,397 ducks were recorded on the January 31 survey.

The refuge experienced the coldest weather of the season during the first two weeks of February with five days never reaching above freezing and two nights dropping below zero. Refuge staff surmised that the cold weather kept refuge waterfowl use fairly stable throughout February. February began with 10,232 geese and 23,397 ducks using the refuge. The last survey of the season, February 22, recorded 9,433 geese and 11,534 ducks on the refuge.

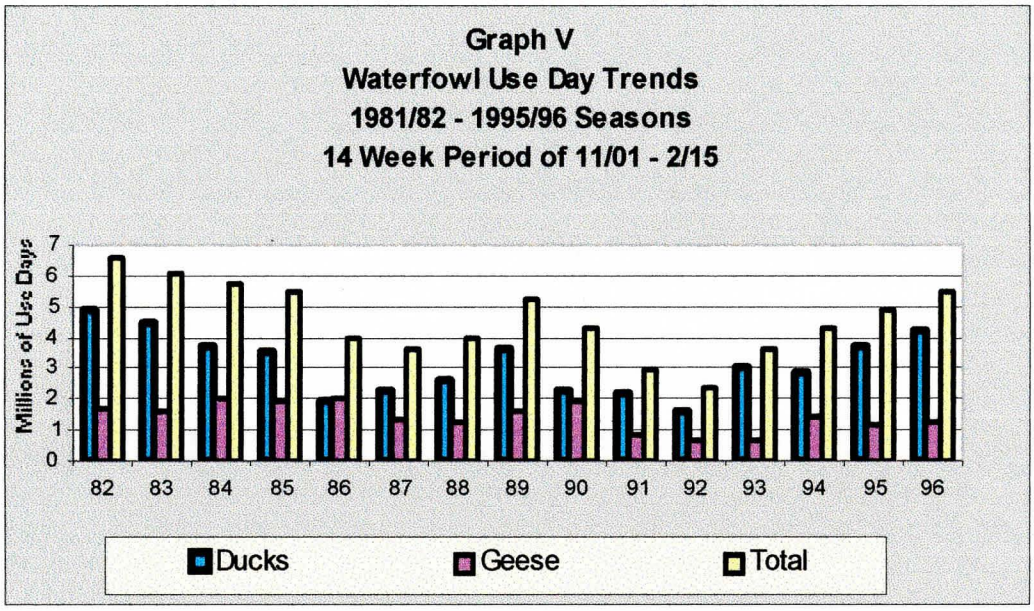
Graph III shows a comparison of duck populations for the entire 95/96 season versus the three and ten year averages for a fourteen week period. Based on the information depicted in this graph, the 95/96 season was better than average for refuge duck use. This years' duck surveys recorded numbers higher than the 3-year average eight out of the twelve weeks, for which comparison data was available. Comparing the 95/96 duck season against the 10-year average, this season was higher eleven of the thirteen weeks for which a comparison could be made. A cold front that moved through middle Tennessee at the end of the first week of January produced a significant increase in duck numbers. The January 12th waterfowl survey recorded duck numbers 101% above the 3-year average and 217% above the 10-year average.



Graph IV shows a comparison of the Canada goose population for the entire 95/96 season versus the three and ten year averages for the same period. From the beginning of November to the beginning of January the refuge experienced a slow and steady increase in geese, however five out of the first seven surveys recorded fewer geese than recorded for the corresponding 3-year averages. For the first eight weeks of the 95/96 season the number of geese using the refuge remained below the 10-year average. During the second week of January goose numbers increased 175% from the previous waterfowl survey. Goose numbers peaked during the second week of January with 36,620 birds observed. As weather remained cooler than average for the remainder of the January and February, goose numbers continued to remain above the three and ten year averages.



Graph V shows both duck and goose use day trends from the 1981/82 season through the 1995/96 season, November 1 through February 15 recording period. Graph V shows a 13% increase in total waterfowl use days for the 95/96 season, when compared with the previous year. The waterfowl use day increase recorded from 94/95 to 95/96 represents a 506,438 day increase for ducks and 110,337 day increase for geese, for the 14 week period. The increase in both groups of birds translates into a average of 4,733 and 1,031 more ducks and geese, respectively, per day used the refuge during the 95/96 season than the previous year.



4. Marsh and Water Birds

A single white pelican was first sighted in January within the Elk Reservoir area and was noted on several occasions throughout the month. At times during the month it was seen in the company of two tundra swans. In February the pelican moved into the Pool 2 and Pool 4 areas nearer the refuge headquarters. After several observations, it was apparent that the bird had some form of injury.

From summer on into early fall, notable water bird sightings included great egrets, little blue herons, black crowned night herons, and double crested cormorants.

5. Shorebirds, Gulls, Terns, and Allied Species

Even though common along the bays and waterways of the Cumberland River, large numbers of ring-billed gulls were noteworthy the first of the year. Early spring shorebirds

using refuge pool edges included lesser yellowlegs, greater yellowlegs, killdeer and pectoral sandpipers. In April, volunteer birders sighted an unusual species, a Western sandpiper. A Forster's tern was observed the last day of the month. Seen later in May were semipalmated plovers, dunlin and short-billed dowitchers.

6. Raptors

Osprey were observed on several occasions during the year, often seen diving for fish within refuge pools. A striking Harlan's hawk also was seen in the spring soaring over the Pool 3 area of the refuge. The normal complement of red-tailed hawks, red-shouldered hawks, Cooper's hawks and kestrel were evident during the year. Also anticipated in the fall was the sight of Northern Harriers hovering low over fields in search of prey.

7. Other Migratory Birds

Light snow flurries did not deter the appearance of the first blue-gray gnatcatchers that arrived in March. Later in that month, common yellowthroats, prothonotary warblers and parula warblers could be heard singing sweetly. In April came more migrants including indigo buntings, yellow throated warblers, yellow warblers, chipping sparrows, ruby-throated hummingbirds, scarlet and summer tanagers and bobolinks. Chuck-will's- widows could be heard making their distinctive call during early morning. Later in the summer, 64 bobolinks were counted, and yellow-billed cuckoos were heard more often.

Planning for International Migratory Bird Day, May 11, included ordering materials, writing a news release and contacting volunteers. As part of the activities, the North American Migration Count was conducted on May 11 by staff and volunteers. Two programs were presented on site for 82 children on May 13 with emphasis on neotropical migrants.

WIS Welker also organized materials and contacted volunteers for the Audubon Christmas Bird Count, planned for January 4, 1997.

10. Other Resident Wildlife

In November, eight otters were observed near a refuge pool area. One of the young otters was almost totally white.

Turkey and black vultures congregated once again in large groups in November.

11. Fisheries Resources

April 9th and 25th, staff from Private John Allen Fish Hatchery attempted to net paddlefish in the South Cross Creek Reservoir. Due to unfavorable water temperatures and windy weather conditions they had limited success.

12. Wildlife Propagation and Stocking

For the past several years the refuge has allowed Tennessee Wildlife Resource Agency to capture wild turkey on the refuge for the state's turkey restocking program. While TWRA Stewart Co. Game Wardens invested significant hours in this effort they concluded this year's operation capturing only five birds (2 gobblers and 3 hens).

16. Marking and Banding

January - March 1996 and 95-96 Season Canada Goose Collar Observations:

There were a total of 144 Canada goose neck collars observed from January through March of 1996. From August 1995 through March of 1996, 267 collars were observed for the season. Collar colors seen included orange, blue, white, green and one black collar. Six volunteers assisted refuge staff in this endeavor. A final report on collar observations was sent in April to Waterfowl Biologist Don Orr and the Migratory Bird Office.

Wood Duck Banding

A total of 101 wood ducks were banded during the summer months of July and August.

Fall 1996 Canada Goose Collar Observations

From September through December 1996, a total of 48 neck collars were seen. In October, only white collars and blue collars were found. Very few, only 2, orange collars were picked up during the fall period.

Eagle Banding

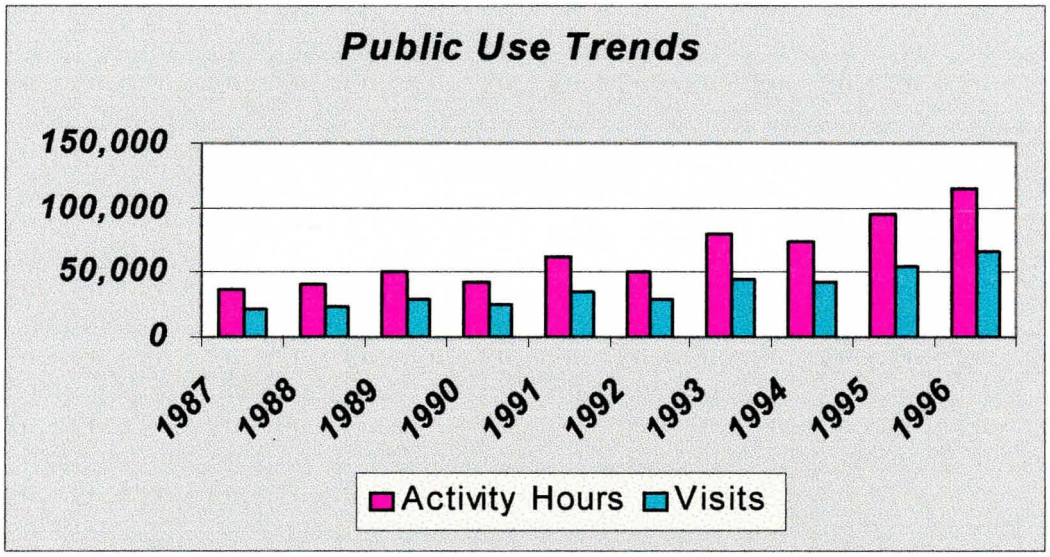
The Eagle Banding Team was unable to band eaglets this year due to the nest trees either being dead or having dead branches.

H. PUBLIC USE

1. General

Visitation increased slightly with 65,357 visits recorded as compared to 1995's figures of 54,000. Visitors flocked to the refuge in April and May as fishing activity improved.

Public Use Trends - 1987 thru 1996



WIS Welker, OA Rule and volunteers Gayle Boone and Corinne Sinks assisted with the Jr. Duck Stamp judging competition on March 29 held at the Duck River Unit of Tennessee NWR. Judges this year included Regional Director Sam Hamilton, TWRA Director Gary Myers, refuge supporter Ms. Jeanette Rudy, singer Ms. Irlene Mandrell and artist Ralph McDonald. Over 1000 entries were judged. WIS Welker, volunteer Justin McClellan and OA Rule assisted with the Jr. Duck Stamp Award ceremony held at Orpyland Hotel in Nashville, TN on April 27. First, Second, and Third place awards and Honorable Mention Awards were presented in four grade categories; K-3, 4-6, 7-9 and 10-12. Every entrant at a minimum was awarded a beautiful ribbon, a Duck Stamp pin and a certificate.

In October, WIS Welker began making plans for next year's Jr. Duck program, as Tennessee NWR would be losing their WIS and would be without someone in that position indefinitely.

WIS Welker reviewed and commented one more time on the "final" Draft of the Jr. Duck Stamp Curriculum Guide and forwarded to the National Jr. Duck Stamp office for their approval. Also reviewed by Welker was the Five Rivers Resource Conservation and Development Plan, a program designed to evaluate existing natural resources and determine how best to utilize them for the benefit of all citizens. The goal of the group was to help provide for a better quality of life, conserve natural resources and foster economic development.

National Wildlife Refuge Week packets were distributed to all teachers at local schools. A news release was prepared and activity report was sent to the Regional Office outlining events to be held. These included putting fliers and posters at the Visitor Center and public library, a program and tour for Audubon Elementary School group, Earth Camp Steering Committee volunteer recognition cookout, and assisting Tennessee NWR staff at Octoberfest festival in Paris, Tennessee.

In July, refuge pictures were sent to Nashville Chamber of Commerce for inclusion in their Bicentennial Booth which would be on display during the remainder of the year.

Technical advice was provided for a 3rd grader and Boy Scout from Clarksville, TN in April.

WIS Welker attended the Project Wet Facilitator Workshop at Pickwick State Park, November 19 - 21.

2. Outdoor Classrooms - Students

Initial planning for the fourth annual Stewart County Earth Camp began in January. Thereafter, steering committee meetings were held weekly, with programs and volunteers lined up by the first of March. Letters to all 4th and 5th graders and confirmation letters to program presenters were mailed out in April. Requests were made to the Kiwanis club for their assistance during camp. Final preparations were made during May and June, and then the big week of June 17 - 21 arrived.

A total of 69 campers signed up for this year's Earth Camp, and most were on hand for each day's activities. The camp was sponsored by the U.S. Fish and Wildlife Service, National Park Service, U.T. Agricultural Extension Service and Dover Kiwanis. The four wildlife related programs presented each day were aptly handled by university professors and other wildlife professionals. Education specialists directed the campers in Project WILD and similar games. This year's "celebrity" visitors included State Congresswoman Carol Rice, and Tennessee Outdoorsman's Jimmy Holt and Glen Smith. This year's camp was a huge success, largely due to a volunteer force of 60 eager folks.

A total of six on-refuge educational programs, combining nature hikes, tours and Visitor Center activities was presented for 314 students ranging in age from 3rd grade to college. One of the programs for Cub Scout Troop 501 was conducted by volunteer Justin McClellan. The program dealt with snakes, and scouts were actually able to handle a rough green snake while on the hike. The volunteer was versed in snake biology and was able to pass this knowledge along to the scouts as a direct result of assisting Dr. Jim Byford (U.T. Martin) with his snake program at Stewart County Earth Camp. Other outdoor classroom programs were conducted by WIS Welker. Subjects included waterfowl management and bird identification, neotropical migratory birds, tree identification, predator/prey relationships, wetlands, migration and bird banding.

Earth Campers enjoy a misty morning canoe ride.
06.96 SMW

Earth Campers learn about water safety from knowledgeable Corps of Engineers Ranger.
06.96 SMW

Lennie Fettrell gives instruction to campers about Native American tools and artifacts.
06.96 SMW

This is how to throw an atlatl - everybody duck!
06.96 SMW

4. Interpretive Foot Trails

Five of the interpretive programs held on the refuge involved nature trail hikes for 251 people, either as ways to identify birds or trees and plants.

5. Interpretive Tour Routes

Seven programs conducted by WIS Welker during the year involved tours. A total of 238 people were given birding, waterfowl, eagle, or neotropical migrant bird tours.

6. Interpretive Exhibits/Demonstrations

On May 3, the Westvaco Keel Spring Nature Trail was dedicated at a morning ceremony hosted by Westvaco Corporation and the Stewart County Chamber of Commerce as part of the Stewart County Bicentennial Celebration. Governor Don Sundquist and a host of local dignitaries were on hand to welcome visitors to the event. Numerous businesses and groups set up booths and displays for the enjoyment of the public. Among those was an exhibit highlighting Cross Creeks National Wildlife Refuge and the U.S. Fish and Wildlife Service. OA Rule was available to staff the booth which was visited by an estimated 400 people.

WIS Welker presented a slide show and talk to 50 members of the Five Rivers Resource Conservation and Development group on July 11. The topic of discussion was the recent Stewart County Earth Camp. Representatives within this group were either program presenters or volunteers at this year's camp.

On August 8, Law Enforcement Agent Mike Elkins was the guest speaker at the Stewart County Kiwanis Club lunch meeting. Approximately 12 members enjoyed the presentation on wildlife law enforcement.

Refuge staff and volunteers set up and staffed a refuge exhibit at the annual Rivers Days Festival held at the City Park on August 31. Over 300 visitors enjoyed the photo boards and other refuge displays and had many and varied questions and comments in regard to the refuge or resource related issues. Free brochures, coloring books and posters were most popular.

WIS Welker assisted WIS Dunstan (Tennessee NWR) in Paris, TN on October 5 at the annual Oktoberfest celebration by staffing a refuge booth. National Wildlife Refuge Week and other refuge materials were distributed to the public. Approximately 200 people stopped by the exhibit.

7. Other Interpretive Programs

A total of 246 people in eight different groups were presented off refuge programs during the

year. These included two conducted by volunteers. Volunteer Ken Haskins gave a program on bluebirds to over 15 people at the Stewart County Senior Citizens Center in March. Thirty Bible School participants studying about Noah's Ark were given a snake program by volunteer Justin McClellan. Other programs conducted by WIS Welker included two summer reading programs for 81 children ages three to twelve. Illegal Wildlife Trade was the topic for 90 elementary school children at Dover Elementary, and 30 in the Forestry and Wildlife class at Stewart County High School were given a talk on careers in the Fish and Wildlife Service.

8. Hunting

The annual District meeting for Tennessee Wildlife Resource Agency Officers and Game Biologists was held at the refuge Visitor Center on August 22.

Squirrel season began on August 24 with a noted increased interest in the hunt. The deer archery hunt began the following month with 44 known hunters opening the season. At least two bucks and two does were taken the first weekend.

WIS Welker and OA Rule traveled to Tennessee National Wildlife Refuge during August to assist in their quota hunt drawings.

11. Wildlife Observation

WIS Welker discussed with Dave Erickson what information should be included in the Birding Festival Directory, a yearly guide for bird watchers.

12. Other Wildlife Oriented Recreation

The Stewart County Riding Club held an organized trail ride on April 20 on the refuge to benefit St. Jude's Childrens' Hospital (Memphis, TN). Approximately 100 people participated in this worthy cause.

17. Law Enforcement

RM Wigginton attended both the March 11-15 and 18-22 annual forty hour Law Enforcement Refresher Training at the Lively Law Enforcement Training Academy in Quincy, Florida, as a student and Firearms Instructor.

March 18 - 22, ARM Neasbitt attended annual forty hour Law Enforcement Refresher Training at the Lively Law Enforcement Training Academy in Quincy, Florida.

During March, Native American Shawn Longfellow, under the direction of the Division of Law Enforcement, checked the river corridor for possible digging/removing of artifacts. He found forty-two sites on the Cumberland River downstream from the Tennessee Valley Authority steam plant in Cumberland City, TN. Not all sites were on the refuge.

September 13, ARM Neasbitt attended semi-annual firearms requalification at the Tennessee NWR's Duck River Unit near New Johnsonville, TN.

I. EQUIPMENT AND FACILITIES

2. Rehabilitation

In March the water drains to the office sinks and toilet became clogged. MM Welker attempted to unclog the drain pipes with a roto-rooter but after several treatments the drains became clogged again. To solve this problem MM Welker and ARM Neasbitt dug up the water line starting at the office septic tank. It was discovered the original cast iron pipe had cracked and was filled with tree roots. Welker and Neasbitt cut out 30 feet of the old pipe and replaced it with PVC pipe. The new pipe did the trick, no more over flowing toilets for the rest of the year.

March 13, refuge staff discovered that a vehicle had crashed through the South Cross Creek Reservoir entrance sign and gate. Both 4x4 sign posts were snapped, and the 1/8 inch welded metal locking strap on the pipe gate had been ripped from the steel cross member. Tire tracks at the site gave the impression someone mistakenly made a sharp turn off of State Route 49 and descended down the entrance being stopped by the 1/4" thick steel tubular steel gate. ARM Neasbitt inquired about any reported accidents in the South Cross Reservoir area with the Stewart County Sheriff, but no reports had been filed. Replacing the sign and post cost the refuge $600.

Entrance sign survives collision with unknown vehicle, but both 4X4's were snapped mid way.
03.13.96 **WHN**

3. Major Maintenance

October 23 - 24, MM Welker and ARM Neasbitt replaced the old five foot high 2B stop log riser with a new nine foot high riser. The new riser won't have to be sealed off with plywood half way through the winter to bring Lower Pool 4 up to its maximum water holding capacity. Additionally, the new riser will allow water to be transferred from Lower Pool 4 to Pools 1 and 3 once Pool 2 nears its maximum holding capacity. This improvement will also reduce or eliminate the need to use the gator pump to get water into Pools 1 and 3 to provide winter waterfowl habitat.

New 2B water control structure is four foot taller than the old one, improving water management of Pool 2.

4. Equipment Utilization and Replacement

March 26, the refuge received a new 310D John Deere front-end loader and backhoe. The new machine is equipped with heater enclosed cab and an extendable backhoe boom. This piece of equipment has been needed for several years since the old backhoe loader usually required repairs before every job and the backhoe boom was claimed border line safe because of the significant amount of slack it had developed over the years of use.

In July the refuge took delivery of a new John Deere 755 lawn tractor with a 60" mid mount mowing deck. The refuge chose the four wheel drive model hoping it will better negotiate the steep sloped headquarters lawn. Until now all the refuge's lawn mowing equipment was Yazoo and Hustler mowers transferred from Fort Donelson National Battlefield. The Yazoo and Hustlers were designed to mow even lawns and consequently did not provide good traction on the headquarters steep graded lawn. The refuge hoped the new JD 755 four wheel drive lawn tractor would improve its ability to keep the grass cut around the office, visitor center and shop.

In October the refuge took delivery of a new John Deere 630, seventeen foot rigid disc. The new disc replaced an old 630 thirteen foot finishing disc. The rigid disc can be used to break wet ground and also function as a finishing disc.

Refuge staff wasted no time putting the new 310D front-end loader and back hoe to use.

10.25.96 **WHN**

This new 17' 630 disc cut will cover almost twice as much as the disc it is replacing.

04.20.96 **SMW**

5. Communications Systems

In October the twenty year old analog phone system was replaced with digital system. The new system required the contractor (Expanets, Memphis, TN) to run new lines within the office and visitor center, not a pleasant task in structures that were built in the early 1960's. After fine tuning the system software several times, the system became functional at the end of October.

6. Computer Systems

In July the refuge took delivery of the refuge's first Gateway Solo laptop computer. ARM Neasbitt will use the laptop since office space is limited.

May 7- 8, ARM Neasbitt attended the Computer Application in Fish & Wildlife Management training in Atlanta, GA.

8. Other

During February and March USACE survey teams spent several days surveying the Cumberland River and shoreline for its Cross Creeks National Wildlife Refuge River Bank Stabilization project. This project will use a combination of riprap and bioengineering to stabilize the twenty-four miles of river bank that lie within the refuge boundary.

April 8, RM Wigginton met with USACE Daphne Jackson (Design Engineer) to discuss the Cross Creeks Refuge Riverbank Stabilization Project. RM Wigginton reviewed the project plans and offered comments.

August 7, the USACE Value Engineering Team met with RM Wigginton to discuss the shore line stabilization project.

August 30, RM Wigginton met with representatives from R. Christopher Goodwin and Associates, Inc., to discuss the scope of work proposed by the USACE for protecting archeological sites within the work area.

On October 4, Mr. Lawrence Kopas, Auditor-in-Charge, Office of Inspector General, conducted a spot check of refuge property and administrative procedures. Mr. Kopas was looking for a motor grader in the refuge's capitalized property inventory. As luck would have it the grader was being used on the north side of the river. RM Wigginton took Kopas to Pool 12 so he could verify the existence of the equipment.

October 11, USACE Deputy District Engineer reviewed the scope of work for the riverbank project. It seems there will be some changes in the timetable for the project and funding allocations.

October 28 - 31, USACE Bio engineering A&E contractors, The Bio Engineering Group, Inc., Salem, MA. visited the refuge. The group looked for potential sites where riverbank erosion can be stopped with vegetative control.

The USACE survey team lead by Design Engineer Daphne Jackson, look over the river banks one last time before finalizing the shoreline stabilization plan.
02.09.96 JWM

J. OTHER ITEMS

4. Credits

RM Neasbitt - Sections A, B, C, D, E, F, G (3), H (17), I, K
WIS Welker - Sections E (4), G (but not 3), H, J, photos
OA Green - Typing, creating tables and graphs, assembly, editing

L. INFORMATION PACKET