

REVIEW AND APPROVALS

WHEELER NATIONAL WILDLIFE REFUGE

Decatur, Alabama

ANNUAL NARRATIVE REPORT

Calendar Year 1993

<u>H.T. Stone</u>	<u>3-24-94</u>	<u>Frank McDuff</u>	<u>4-20-94</u>
Refuge Manager	Date	Refuge Supervisor	Date

<u>Harold W. Benson</u>	<u>4/21/94</u>
Regional Office Approval	Date



The Stately King of the Airways

We dedicate the 1993 Annual Narrative
to the SJBP recovery work.

INTRODUCTION

Wheeler National Wildlife Refuge was established by Executive Order of President Franklin D. Roosevelt on July 7, 1938. Overlaid on the middle third of the Tennessee Valley Authority's Wheeler Reservoir, it was placed on land purchased by TVA as a bed for and buffer strip around the reservoir in 1934 and 1935. The reservoir was impounded in 1936.

The Refuge is located in the Tennessee River Valley of Northern Alabama in Morgan, Limestone and Madison Counties. Its western end lies within the city limits of Decatur, population approximately 50,000, and its eastern end touches the city limits of Huntsville, population about 170,000. Several cities, smaller towns and communities are nearby. Nashville is about 110 miles north, and Birmingham is 85 miles to the south. Its topography is flat to rolling. Temperature extremes range from 5 degrees below zero to 110 degrees, although winters are seldom below zero and summer temperatures rarely exceed 100 degrees. Humidity is normally 90% or above in summer. Rainfall is approximately 50 inches per year, and there is seldom extended accumulations of snow or ice cover.

TVA, the agency that purchased the area, considers over 40,000 acres lie inside its perimeter, although the official acreage given is 34,170 omitting navigable water. It includes 19,000 acres of land and 15,000 acres of water. The land acreage consists of some 10,000 acres of Mississippi Valley type hardwoods, 3,000 acres of pine plantations, 5,000 acres of farmland with the remainder being open shelves, rocket test ranges, etc. About 4,085 acres lie inside the Redstone Arsenal boundary, while about 1,500 acres of this are partially administered by the Marshall Space Flight Center, National Aeronautics and Space Administration. Interstate 65 crosses the Refuge. U.S. Highway 31 is part of its western boundary and State Highways 20 and 67 cross parts of the Refuge and closely parallel the remainder.

Considered the eastern most national wildlife refuge of the lower Mississippi Flyway, Wheeler Refuge supports the southern-most and Alabama's only significant concentration of wintering Canada geese. It also serves as winter habitat for the State's largest duck population. It was the first national wildlife refuge ever placed on a multipurpose reservoir and has supported up to 60,000 geese and near 100,000 ducks, although modern peaks until 1990 are nearer 30,000 geese and 60,000 ducks. Since 1990, the peak has dropped below 10,000 geese. It includes interesting flora, a bird list of over 300 species, mammals ranging from shrews to deer and a wide variety of reptiles, amphibians and fishes.

The Refuge is well developed with over 100 miles of graveled roads, 2,500 acres of managed wetlands, a modern Headquarters

Complex and a large Visitor Center and Waterfowl Observation Building. Public use is heavy and visits of all types normally total over 650,000 annually.

The address is Wheeler National Wildlife Refuge, Route 4, Box 250, Decatur, Alabama 35603. The telephone number for the Headquarters Office is (205) 353-7243, for the Visitor Center (205) 350-6639. The Headquarters Office is open Mondays through Fridays from 7:00 AM until 3:30 PM. The Visitor Center and Observation Building are open 10:00 AM until 5:00 PM Wednesday through Sunday from March through October, and seven days each week November through February.

The Refuge also administers three satellites, all established to protect endangered species. These are Blowing Wind Cave National Wildlife Refuge, near Scottsboro, Alabama, Fern Cave National Wildlife Refuge, near Paint Rock, Alabama, and Watercress Darter National Wildlife Refuge located in the outskirts of Bessemer, Alabama. Four Farmers Home Administration tracts are under refuge administration.

Key Cave NWLR coming on-line in '94 !

INTRODUCTION

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A. HIGHLIGHTS

- B. Seven inches of snow fell March 12.
 - C.1 Key Cave NWR acquisition proposal was developed.
 - C.3 Triana Recreation Area permit terminated; renegotiations initiated.
 - E.1 Assistant Manager Shearer transferred to Upper Souris NWR, North Dakota.
 - E.1 Coop student Steve Mayo worked 10 weeks at Wheeler.
 - F.4 Removal of atrazine from farming programs causes weed problems.
 - F.4 ATTRA participates in Refuge IPM planning.
 - G.2 Alligator nest confirmed in Blackwell Swamp.
 - G.3 Canada geese peak at only 3,800; ducks at 36,000.
 - G.3 SJBP declines, generate several meetings and study groups.
 - H.17 Continued problem prosecuting artifact cases.
 - I.1 Handicap accessible fishing pier and boardwalk/trail completed.
 - I.2 Problems with VC & OB re-siding contractor.
 - I.2 Visitor Center AC/heating replacement contract awarded.
 - J.3 Refuge and Beautification Committee received Governor's Award.
- American hart's-tongue fern propagation project initiated.

B. CLIMATIC CONDITIONS

A quick look at Table 1 shows only four months with above average rainfall. For the year, the 51.54 inches was 5.64 below normal. Rainfall was distributed even enough to avert a crop disaster or seriously impacting natural vegetation. The key event was the 8.27 inch rainfall in May that carried over through a dry June and July. An all-time record high 104 degrees occurred July 27. Snow fell October 30 and 31, but none accumulated.

Table 1. Temperatures and rainfall in 1993 by months compared to the average.

	Temperatures		Rainfall	Average Rainfall	Departure from normal
	Maximum	Minimum			
JAN	64	22	4.52	5.17	- .65
FEB	73*	14*	2.79	4.87	-2.08
MAR	83	12*	7.90	6.62	+1.28
APR	82	31	3.51	4.93	-1.42
MAY	88	43*	8.27	5.08	+3.19
JUN	94	49	1.56	4.13	-2.57
JUL	104**	63	2.17	4.85	-2.68
AUG	98	64	5.72	3.47	+1.25
SEP	98*	44	4.48	4.08	+ .40
OCT	84	29	1.83	3.25	-1.42
NOV	79*	24*	3.88	4.86	- .98
DEC	65	17	<u>4.91</u>	<u>5.87</u>	<u>-.96</u>
			51.54	57.18	-5.64

*breaks or ties record

**all-time record

The Wheeler Reservoir remained at normal levels during the first seven months, except minor floods March 23 and April 25. The reservoir rose six inches above normal during July and August as a result of the mid-west flooding and a very full Mississippi River. The normal reservoir drawdown began in mid-September and remained at or near the 550-foot level for the balance of 1993.

C. LAND ACQUISITION

1. Fee Title

Manager Stone and Forester Bays met with TVA Biologist Scott Atkins and Alabama Non-game Biologist Keith Hudson July 29 to conduct a field review for the proposed 2,300-acre Key Cave NWR in Lauderdale County near Florence, Alabama. The proposal calls for 1,500 acres fee title and 800 acres off sinkhole easements. The cave is located on TVA owned property and serves as habitat for endangered Alabama cave fish and gray bats. The proposed acquisition will secure adjacent farmland that threatens to contaminate water that enters the cave system. The Jackson Endangered Species Office prepared an environmental assessment for the proposal in November.

3. Other

The joint 25-year lease to Madison County/Town of Triana for use of the 83-acre Triana Recreation Area terminated December 31, 1993. Discussions occurred with Triana Mayor Wanda Jordan and Madison County Commissioners in preparation for renewal. Manager Stone met with Regional Director Pulliam, Deputy Director Eadie, Assistant Regional Director Benson and District Manager McDaniel December 17 to discuss the matter. Issues discussed dealt with compatibility and non-compliance problems during the past 25-years. The desired option will be to renew the permit for 25 years, reduce the size of the use area and restrict use to wildlife oriented recreation.

D. PLANNING

4. Compliance With Environmental and Cultural Resources

The Olin DDT Review Panel held its two regularly scheduled meetings during the year. The first technical session was held on Redstone Arsenal January 12 and the full Review Panel met at the Refuge Visitor Center on the 13th. On July 14 and 15 the second Review Panel meeting was held at Triana including a town meeting and fish fry.

During the year, refuge personnel collected duck wings, duck eggs, and red-winged blackbird nestlings for DDT analysis. Thirteen duck wings from mallards and gadwalls were collected from Redstone Arsenal hunters. Wood duck eggs were collected from Huntsville Spring Branch - 20 eggs; Indian Creek - 20 eggs; and 10 from the Blackwell Swamp control area. Laboratory analysis is not available at this time.

Olin Corporation collected fish and surface water samples during the year. Fish sample analysis was not complete at the end of the year. DDT levels in water columns of Huntsville

Spring Branch and Indian Creek continue to decline and are now at about 0.4 ug/l. This is down from 1.4 ug/l in 1989.

Dr. Allen Robison of the Cookeville, Tennessee Enhancement Office replaced Mark Wilson of the same office and is now working with the Refuge's DDT monitoring program. Chuck Facemire took Don Shultz's place when he retired. Chuck has now turned all this over to Allen, including the seat on the Review Panel.

During the year we received laboratory analysis on fish and sediment samples collected in 1992. Ten fish samples (four species) and eleven sediment samples were collected and analyzed for 24 organochlorine compounds. Fourteen organochlorine compounds, including six DDT-related compounds, were detected in the whole-body fish samples. Concentrations for the DDT-related compounds ranged from 0.11 ppm (p,p'-DDT) in bullheads to 41 ppm (p,p'-DDD) in carp. Concentrations of p,p'-DDD in largemouth bass ranged from 29-36 ppm. Overall, contaminant concentrations were generally highest in carp and lowest in bluegill.

Nine organochlorine compounds, including all seven DDT-related parameters, were detected in the sediment samples. Concentrations ranged from 0.01 ppm to 23 ppm (p,p'-DDT) and were typically higher from Huntsville Spring Branch Milepoint 3.3 to 3.8.

For 1994, Olin's monitoring work will consist of their annual fish collection, young of the year fish collection, long-term monitoring water samples, daily water samples, and water flow rate studies.

Refuge monitoring work for 1994 will consist of fish collection and sediment sampling.

The refuge continued its twice yearly sampling of surface water at nine sites. Waters were tested for five metals - cadmium, copper, zinc, nickel, and manganese - and for turbidity, hardness, phosphate, nitrates, sulfates, alkalinity, pH, and conductivity. Laboratory analysis indicated that all elements tested were well within allowable limits.

6. Other

In April, a pre-construction meeting was held with the State Highway Department, contractors and sub-contractors to begin construction of a replacement bridge for U.S. Highway 31 over the Tennessee River, on the Refuge's western boundary. Work continued throughout the year with an enormous amount of rip-rap and fill placed on the northern end and pier construction in the river channel and south bank.



Work started on the Tennessee River Bridge at Decatur. About six acres of refuge were lost in this construction.

12/93 F. Dukes

The City of Hartselle began construction of a 20" water main from Decatur to Hartselle along the U.S. Highway 31 right-of-way. On October 25, Hartselle was found to have drifted onto refuge lands. Construction was halted until proper permits and archeological studies were made. An after-the-fact permit was issued to continue the work.

During the year, Manager Stone met with several off-refuge groups dealing with land use surrounding the refuge. In January, a second meeting was held with the Technical Advisory Committee for the Huntsville International Airport. Their 20 year master plan calls for expanding the airport. The plan projects an airport larger than the present day Atlanta Airport and would have a dramatic impact on the refuge.

On February 11, Manager Stone and Tim Merritt of the Cookeville Fish and Wildlife Enhancement attended a pre-application meeting with the U.S. Army Corps of Engineers and the Tennessee Valley Authority for the proposed Point Mallard Marina and Resort Hotel Complex.

In June, Manager Stone met with representatives of Post, Buckley, Schuh, and Jernigan, Inc. consulting firm of Winter Haven, Florida concerning a feasibility study for a proposed toll road and bridge. The goal is to connect Huntsville and

Cullman with a thoroughfare crossing the refuge in the Bluff City vicinity. They were informed of the permit requirements and compatibility problems.

In October, Manager Stone met with Soil Conservation Service and Corps of Engineers personnel concerning a request to use water from a source off-refuge that is continuous with a refuge body of water to irrigate non-refuge farmland. An agreement was made to conduct a trial take-out with the SCS overseeing the project. If refuge waters are affected, the permit will be denied.

In November, Manager Stone met with Bill Frazier, Engineering Services Associated in Birmingham, to discuss additional water intake capabilities for the City of Madison. A water intake facility is already located east of Watkins Bluff in Madison County.

On August 19, Manager Stone and Cookeville Field Office Contaminant Specialist Allen Robison attended a Super Fund site meeting on Redstone Arsenal concerning 239 individual contaminant sites. Ten sites are adjacent to and two sites are partially on the Refuge. Numerous other sites are near wetland sites. Other agencies attending the meeting were EPA, Alabama Department of Environmental Management, TVA, NASA, and the Department of the Army. Possible contaminants were lead, mercury, arsenic, mustard gas, and others.

E. ADMINISTRATION

1. Personnel



back row 8, 12, 4, 13, 11, 1
middle row 5, 9, 14, 7, 6, 15
front row 2, 10, 3

1. Harry T. Stone, Refuge Manager, GS-13, PFT, EOD 08/03/87
2. Frank C. Dukes, Assistant Refuge Manager, GS-12, EOD 08/17/87
3. Richard M. Bays, Forester, GS-11, PFT, EOD 07/01/63
4. Harvie L. Fowler, Supv Park Ranger, GS-11, PFT, EOD 05/15/61
5. Carolyn R. Garrett, Park Ranger, GS-07, PFT, EOD 10/09/79
6. Kelly J. Smith, LE Officer, GS-07, PFT, 04/21/91
7. Roberta F. Blankenship, Range Tech, GS-06, PFT, EOD 06/28/82
8. Elizabeth C. Gilbert, Office Asst, GS-06, PFT, EOD 06/03/90
9. James D. Ammons, Maint Worker, WG-08, PFT, EOD 12/17/79
10. David L. McCaghren, Eng Equip Operator, WG-08, PFT, EOD 09/10/89
11. Grady D. Swann, Eng Equip Operator, WG-08, PFT, EOD 08/25/91
12. Walter E. Buckner, Tractor Operator, WG-06, PFT, EOD 09/27/86
13. Dale J. Payne, Tractor Operator, WG-06, PFT, EOD 04/23/90
14. Lisa A. Spencer, Custodial Worker, WG-01, EOD 04/13/92
15. Darrin P. Speegle, Laborer, WG-03, TPT-NTE 1-yr appt

Not pictured:

John Ann Shearer, Asst Refuge Manager, GS-07, transferred 04/18/93
Steven T. Mayo, Co-op Student, GS-04

The following personnel actions occurred during 1993.

- Auburn University co-op student Steve Mayo worked at Wheeler Refuge January 11 through March 5.
- John Ann Shearer was selected for an Assistant Manager position at Upper Souris NWR, North Dakota effective April 18.
- Darrin Speegle returned to work as laborer May 3 through September and again in December for 2-1/2 weeks.
- Kelly Smith was promoted to GS-7 LE Officer and began receiving 25% AUO premium pay effective July 11.
- Lisa Spencer was selected to fill the Custodial Worker WG-01 position effective July 11.
- David McCaghren, Grady Swann, Jim Ammons and Dale Payne received Special Achievement Awards for work performed on the Penney Bottoms dike construction.
- Harvie Fowler received an On-The-Spot Award for his contribution in completing the Visitor Center heating and air conditioning replacement.
- Background investigations for LE Officers Smith and Dukes were initiated in September.



L to R: Grady Swann, Jim Ammons, Dale Payne and David McCaghren receive awards for work at Penny Bottoms.

5/93 J. A. Shearer



Harvie Fowler pocketed \$100 for his work in resolving the Visitor Center heat/air condition dilemma.

5/93 J. A. Shearer

Table 2. Staffing pattern for previous 5 years.

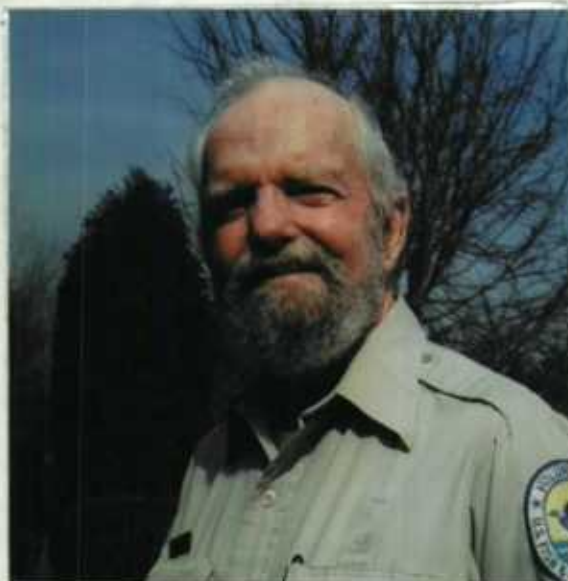
	Permanent			Total
	<u>Full-Time</u>	<u>Part-Time</u>	<u>Temporary</u>	<u>FTEs</u>
FY-93	14	0	1	15.5
FY-92	14	0	2	15.5
FY-91	15	0	2	15.0
FY-90	15	0	2	15.0
FY-89	14	0	2	15.0

In other personnel activities:

- David McCaghren attended the required two-week US Army Reserve summer camp June 10-25.
- Dale Payne attended two-week Alabama Army National Guard summer camp August 16-27.
- Frank Dukes attended a mid-career retirement seminar September 15 in Stuttgart, AR.
- Tuck Stone conducted an imprest cash audit at Eufaula NWR October 1.
- Tuck Stone presented a Career Day program June 10 to 25 Tennessee Tech University students at Cookeville, TN.



Mary Ratliff
EOD: 2/21/88



Willie Williams
EOD: 2/27/89



Nancy Armstead
EOD: 1/18/90



Beverly Thomas
EOD: 10/5/91

These faithful volunteers have carried their share of the load
performing weekend duty at the Visitor Center.

12/93 H. Fowler

4. Volunteer Program

Volunteers contributed 2,386 hours during the year. The majority of donated time was assisting with operation of the Visitor Center (1,424 hours). Other support received was re-decking the Beaverdam Peninsula Overlook Tower and assisting decking the new Flint Creek boardwalk by the US Army Reserves, trash pick-up by the Mooreland Hunting Club, trail maintenance by Boy Scouts, collar observations by several individuals and Earth Day activities by numerous persons.

Regular volunteers at the Visitor Center shouldered 70% of the weekend duty. They included Willie Williams, Mary Ratliff, Nancy Armstead and Beverly Thomas. They have been faithful for several years.

5. Funding

Table 3 shows the base funding for Wheeler Refuge during the past four years. The total funding was \$812,500 in 1993, which included funding for special projects: \$73,200 for VC heating-A/C system, \$20,000 for handicap accessibility, \$45,000 for DDT monitoring, and \$20,000 for IPM chemical residue sampling.

Table 3. Refuge funding for four years - base funding only.

	<u>FY 90</u>	<u>FY 91</u>	<u>FY 92</u>	<u>FY 93</u>
Wildlife Resources	625.4	598.5	672.9	647.4
Expense for Sales	2.0	2.0	2.0	2.0
Quarters Maintenance	6.0	6.9	3.9	2.9
Presuppression	1.0	2.0	2.0	2.0

A funding analysis exercise was completed in December. The purpose was to identify station priorities should the station budget and staff be reduced by 20% and what new projects would be completed if the budget and staff should be increased by 20%.

Revenue sharing checks were distributed to the three counties in which the refuge lies. Checks were presented as follows: Morgan County - \$39,499, Limestone County - \$10,631, and Madison County - \$18,004.

6. Safety

Faye Blankenship served as the safety chairman during the year. Monthly safety meetings were held with different employees leading each meeting with a topic of their choice.

Jim Ammons and Dale Payne were involved in a minor accident April 22 while in a government vehicle. The vehicle was rear-ended by a private vehicle while they were making a proper right turn. Apparently, the private vehicle had faulty brakes and could not stop. There were no personal injuries, insignificant damage to the private vehicle and about \$400 damage (bumper replacement) to the government owned vehicle.

Safety awards for employees were presented based on how many years of service had been worked without a lost-time accident.

After Phase I radon testing, exhaust fans were placed in the basement of both residences and test kits placed again in the residence #1 kitchen and both basements. After one year of kits remaining in place, test results showed an improvement, but the residence #1 basement still measured 5.8 pico Curies per liter which is 1.8 above acceptable. The results were passed on to the Regional Safety Officer for further action.

8. Other

Travis McDaniel became Wheeler's District Supervisor after Regional re-organization July 1. He made an orientation trip to the refuge November 23 and 24.

F. HABITAT MANAGEMENT

1. General

Wheeler Refuge provides large acreage of diverse habitat from mud-flats to permanent water, old fields to croplands, hardwoods to pines and natural areas to intensively managed areas. Ample diversity produces a diversity of resident and migratory animal life.

2. Wetlands

Wetlands make up about 45% of Wheeler Refuge excluding the main channel of the Tennessee River. These 15,000 acres consist of fluctuating waters in the reservoir and managed waters within man-made impoundments. Managed waters are controlled by gravity flow, pumping with portable units and use of two permanent pump facilities.

The White Springs Unit is served by a permanent pump station on the west end that must be shared with Alabama's Swan Creek Management Area. Total acreage of 1,535 acres is subdivided into seven sub-impoundments. A gravity flow structure is located on the Limestone Creek end of the unit. It is only usable when the reservoir is lower than the impounded water. In most years dewatering is too late or re-flooding occurs and makes corn planting on lower elevations impossible. Following is a brief explanation of how each sub-impoundment was managed in 1993.

As in 1992, WS-1A and WS-2 were drawn down as early as possible to allow planting milo/millet. Poor success resulted in 1992, but 1993 was a better effort. The highest ground in this area was disked, prepared and planted to milo; some of the poor-stands were replanted in brown-top millet. Even the highest ground was too wet to prepare a proper seed bed. The lower elevations were conveniently managed for natural foods. Alligatorweed has become a major problem in this unit. Desirable foods were sedges, eleocharis and panic grass.

WS-3 was dewatered slowly to encourage moist-soil vegetation. Alligatorweed was a major problem in the western half. There were strong stands of smartweed with sedges in the central part, but willow and green ash have again dominated the eastern third.

WS-4 and WS-5 are difficult to dewater due to beaver problems, sluggish drainage caused by willows and other vegetation and a blocked water structure. Despite willow encroachment, both of these units produced good waterfowl foods. Panic grass dominated in WS-4 and a wide variety of excellent foods were again produced in WS-5.

In 1992, WS-1-B dewatering occurred too fast and dense stands of cocklebur resulted. In 1993, we did a much better job, but the results were not much better. Willows, cocklebur and pepper vine were dominant plants throughout, but some patches of eleocharis and sedges were present.

WS-6 was again managed as a farmed unit. Dewatering started about mid-February by gravity flow. Progress was slow due to ample spring rains. Almost continuous pumping with a portable gator pump was required to remove water from the unit. Most of the land was planted in row crops, but some lower areas produced fair to good natural foods.

The Rockhouse/Buckeye Unit was 770 acres and served by a permanent pump station. The unit is sub-divided into four separate impoundments.

The Buckeye Unit was dewatered as early as possible, but that was barely good enough. About 40 acres of milo was planted, but results were poor. Natural foods did not respond to the disked ground and only did well in the extreme north end where the ground was not disturbed.

The Thorsen Arm was to be dewatered slowly to encourage natural food response. A mis-calculation caused dewatering to occur too rapidly and the results were primarily cocklebur, paspalum (knotgrass) and alligatorweed. Half of the impoundment was mowed on August 1 just to see what would result. What resulted was a solid stand of wild millet. The alligatorweed test plots that were initiated in 1988 were abandoned after the 1993 growing season. A summary of these findings will be compiled in 1994.

The Rockhouse Impoundment was dewatered early and managed as a farm unit. This will continue to be a normal scheme because the other three sub-units must empty into Rockhouse in order to be dewatered. All fields except low wet areas were cultivated to maintain open fields.

The Rockhouse II Impoundment was farmed on the higher elevations and allowed to fallow on the lower elevations. This provided a good mixture. The more common natural foods were sedges, sprangle-top eleocharis and some millets.

The newest managed unit in 1993 was the Penney Bottoms Impoundment. Considerable effort was needed to dewater via gravity flow and use of a power-driven gator pump. Pumping was required every time significant rainfall occurred. The result was an exposed mudflat that had been flooded for 50 previous summers. The natural foods responded superbly producing a dense mosaic stand of wild millet, sedges, eleocharis, panicum, duck potato, sprangle-top and love grass. This coupled with good stands of planted corn and milo made this unit a very attractive waterfowl and water bird area.



Thorsen Arm was cocklebur and alligatorweed rich until mowing
August 1 released a dense stand of wild millet.

9/93 F. Dukes



Penney Bottoms, when dewatered, produced dense stands of natural
foods to supplement corn on higher ground.

8/93 F. Dukes

Blackwell Swamp, Crabtree and the Display Pool were all managed at full pool for the entire year and all provided excellent natural aquatics and cover for wood ducks. Crabtree Slough was far superior to the other two in food production.

One non-managed area that provided excellent waterfowl and water bird use was the milfoil grass beds located outside and adjacent to the White Springs dike. This area has provided a quality feeding area for the last six or seven years.

Considerable time and effort was spent removing hardwood encroachment within dewatered impoundments and along shorelines. Tree cutter and JD-4020 problems limited mowing with the tree cutter. The greatest progress was made along shorelines around Penney Bottoms and Flint Creek Island. TVA Biologist Scott Atkins negotiated a contract with Tanner mowing contractor Bob Westbrook to remove hardwood vegetation within the White Springs area.

District Biologist Ron Freeman assisted Faye Blankenship September 16 and 17 with several established vegetation transects. Faye completed the unfinished transects. Transects in Buckeye and Rockhouse were not done this year because these areas had been cultivated during 1993.

During August and September, much time and effort was spent spraying American lotus in the Display Pool and Crabtree Slough. A one-quart rate of 2,4-D was used with a sticker agent. The work was slow, but had to be done to prevent lotus from taking over this heavy waterfowl use area. Crabtree Slough has almost a 100 percent coverage of a mixture of Eurasian milfoil, Naias, and Chara and provided a wealth of food through the winter months. Any required spraying in 1994 will be spot spraying since we did not get 100 percent control of lotus.



Reclaiming portions of Crabtree Slough from lotus encroachment was time consuming, but effective.



Much time was spent around Flint Island clearing shoreline to make flight corridors between fields and water more open for waterfowl.

12/93 F. Dukes



Shoreline clearing was also completed around the perimeter of the Penney Bottoms Impoundment.

6/93 R. Bays

A "Clemson beaver pond leveler" installed in 1992 in the Moon Bottoms continued to keep water levels at an acceptable level. While water was kept off adjacent private lands; beaver still have enough to keep them happy and provide good wood duck brood and roost habitat. Elsewhere, many hours were spent removing beaver dams throughout the refuge.

In past years, TVA has constructed and maintained vector control ditches in some refuge wetlands. In March, the Corp of Engineers visited the refuge to look at these ditches for possible 404 permit needs.

The Flint Creek Watershed Project, a combined effort by numerous federal, state, and local agencies, was kicked off April 17 during the Earth Day activities. This model program will look at point and non-point source industrial, agricultural, and municipal pollution and seek solutions. Manager Stone is a member of this Committee.

Manager Stone met with personnel from the City of Huntsville, TVA, Corps of Engineers, and the Soil Conservation Service in June to discuss a wetland development project for Hobbs Island. Huntsville is applying for a grant through the Fish and Wildlife Service under the North American Wetland Conservation Act.

In November, Managers Stone and Dukes travelled to TVA's main office in Knoxville, TN to present a program to their Reservoir Operations Branch. A general slide presentation was made followed by discussions about Wheeler Reservoir management and how it benefits or conflicts with refuge management efforts.

3. Forests

Only one Special Use Permit for Compartment IV was issued during the year and that was to Grayson Lumber Corporation to remove 363,476 board feet of pine sawtimber, 155 cords pine pulpwood, and 25 cords of hardwood pulpwood for a combined value of \$125,710. No harvesting was done during the year.

Lumber prices have skyrocketed with a resulting increase in stumpage prices. Several reasons have been given for the price jump, including the recent hurricane in Florida and Louisiana, and the spotted owl controversy in the Northwest.

Table 4. Summary of timber harvest.

	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>
Number of Permits	3	3	2	1
Acres	66	72	28	80
Pine Sawtimber (bf)	25,270	70,364	0	363,476
Pine Pulpwood (cds)	500	1,093	800	155
Hardwood Pulpwood (cds)	350	46	20	25
Value	\$10,769	\$27,181	\$25,000	\$125,710

In March, Nuttall Oak acorns were picked up from Tensas River NWR and planted on the newly acquired Packard Tract.

4. Croplands

Wheeler's cropland program is used to provide food for resident and migratory species, maintain diverse habitats and keep fields free of brushy growth. Most farming is performed by twelve cooperative farmers. Shares for 1993 remained at 75% to farmer and 25% to Refuge. Shifts to newer and safer, but more expensive, chemicals have made the 75:25 share ratio less acceptable to farmers.

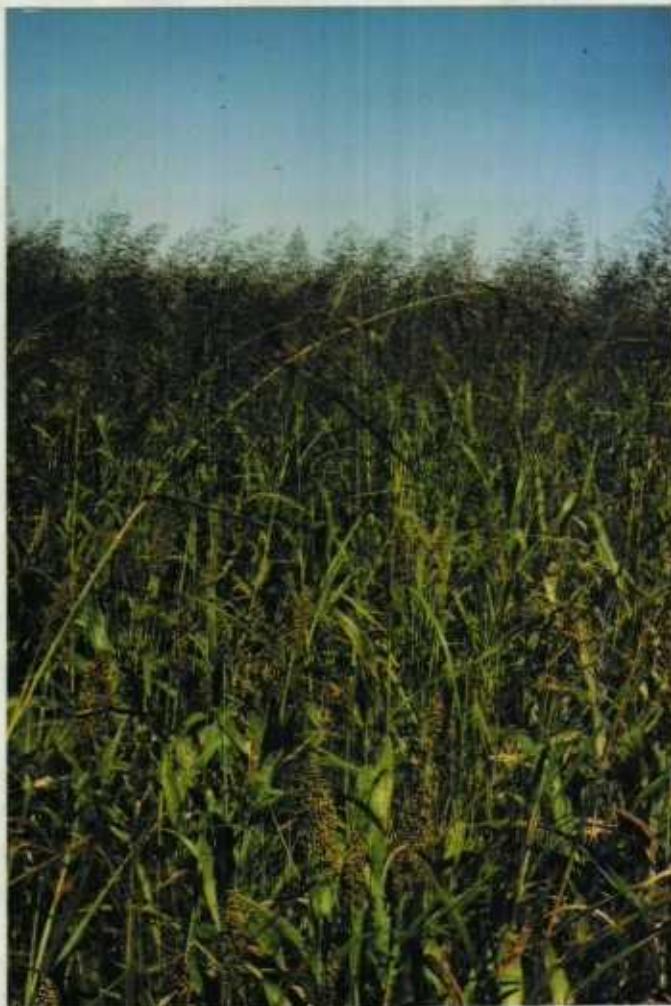
The twelve cooperative farmers planted 3,682 acres in 1993. This total was divided into the following acreages: corn - 1340, soybeans - 1785, milo - 345, millet - 60 and wheat - 151. Refuge shares were as follows: corn - 329 acres unharvested and 19 acres harvested for baiting, wheat - 57 acres harvested for fall browse planting, milo - 325 acres unharvested and brown-top millet - 60 acres.

Production was average during the year. Rainfall of spring bordered on excessive followed by a dry June and July. August and September were above average which helped late planted corn and milo, most soybeans and natural foods. Refuge-wide, corn averaged about 60 bushels, soybeans - 20 to 25 bushels and wheat - 25 bushels. Production estimates of unharvested milo was 50 bushels per acre.

In March, Preston Sullivan of ATTRA met with refuge personnel to discuss Integrated Pest Management proposals and interview three cooperative farmers. Considerable time was spent working with ATTRA to re-write their proposal for submission to the National Fish and Wildlife Foundation for possible financial assistance. By the end of April, ATTRA was unable to find a matching grant to an approved



Corn without atrazine wasn't pretty. Farmers are already threatening to discontinue corn planting except for refuge shares.



No-till milo without atrazine did not fare any better.

9/93 T. Stone

\$15,000 Challenge Grant Project. A purchase order was issued to ATTRA to reimburse them for about 80 hours of consultation performed or to be performed. Their assistance was for providing guidance in chemical residue sampling procedures, developing recommendations for better IPM farming practices, and analyzing the results of the chemical residue sample effort. In September, ATTRA provided the refuge with a rough draft of an IPM plan. This plan was not as thorough as expected and by December further discussions were held with Preston Sullivan, ATTRA, to facilitate completion of this plan which should be completed in early 1994. An Integrated Pest Management questionnaire was completed and submitted to the Regional Office for consolidation. Although it provided an opportunity to document some non-chemical pest control measures, it by and large was a duplication of other data already submitted.

In consultation with ATTRA, a soil pesticide residue study was conducted. Three target chemicals were selected for testing. The three chemicals were atrazine, simazine and dicamba. Testing periods were pre-treatment, post-treatment, pre-harvest and post-harvest. For each chemical and time period, composite samples were collected randomly from all over the field at the 0-4", 4-8" and 8-12" inch depths. The post-harvest sampling was canceled due to continued wet weather. By harvest time, no detection of atrazine was found at the 4"-12" zone and a trace (less than .01 ppm) atrazine detected at the 0-4 inch layer. Banvel was never recovered during the tests. Princep (simazine) concentrations were .06 ppm at the 0-4" zone and only traces at the 4"-12" zone.



Darrin Speegle is shown collecting soil samples to study chemical residue persistence.

9/93 F. Blankenship

Assistant Manager Dukes attended an IPM/Pesticide Workshop, August 2-6, at the Oregon State University campus in Corvallis, OR. The training focused on identifying chemical and natural die-offs and use of safer techniques and chemicals. He also attended a meeting August 25 with Chuck Facemire, Larry West, and Jerry O'Neal in the Regional Office to streamline the pesticide use proposal approval system.

Nineteen chemicals were submitted for approval including six for refuge use. Only one of the six were used. The other chemicals for cooperative farmer use included no restricted use chemicals. Farmers scrambled to find a suitable substitute for atrazine.

Several chemicals and combinations were used to control Johnson grass, but none did the job. One farmer used atrazine as part of the above soil pesticide residue study and his weed control was excellent. Where no atrazine was used in corn and milo, Johnson grass reduced production about 10-15 bushels per acre.

In December, a one-row corn picker was used to pull about five acres of corn for banding purposes. Ear corn lasts longer than shelled corn, especially when ducks are feeding on the site.

Refuge personnel planted about 500 acres of wheat as goose browse in various harvested corn fields and other idle lands where expected goose use may occur.

7. Grazing

The fifty-four acre Dillard pasture rental was inspected and found to be in compliance except for one downed fence. Mr. Dillard was notified that the current compatibility issue for refuges may require termination of his privilege.

9. Fire Management

No major fires occurred during the year. One 15-acre wildfire occurred near Blackwell when someone burning seed bags caused a fire to enter a refuge pine-hardwood stand from private land. Another 18-acre brush fire was started on refuge lands inside Test Area One of Redstone Arsenal, resulting from rocket testing. The fire was controlled by Army contractors.

One hundred acres of pine were prescribe burned for habitat enhancement; eight acres on Flint Creek Island and 92 acres in Tally Bottoms.

Three acres of field edges (13,200 linear feet by 10 feet) were burned on Flint Creek Island and the Bean Road area.

Manager Stone traveled to Minneapolis, Mn on May 3 to attend the "Fire Management for Line Officers" course.

14. FmHA Conservation Easements

Manager Stone and Refuge Officer Smith visited all Lamar and Marion County FmHA easements to check for compliances on June 22. A few boundary signs were down, but there were no major problems.

15. Private lands

An on-site review of private lands was conducted on March 17 with Jack McQuinn, Paint Rock, Alabama.

Comments were provided on a proposed Green Tree Reservoir/impoundment to be constructed in Moon Bottoms on the Crowder property.

G. WILDLIFE

1. Wildlife Diversity

In keeping with the refuge system's objective to provide habitat for a diversity of wildlife species, Wheeler Refuge, with its diverse habitats, provides food, water, and shelter for nearly 500 species. The refuge species lists include 303 birds, 46 mammals, 49 reptiles, 25 amphibians, and 115 fishes. The Audubon Christmas bird count, conducted December 18 by about forty individuals, tabulated a record 111 species during the one day count on Wheeler Refuge.

2. Endangered and/or Threatened Species

Six adult bald eagles were sighted during the early and latter part of the year. Sightings occurred as follows: on January 21, one adult over Limestone Bay; in February, one adult in White Springs and another in the Thorsen Arm area; in March, an adult in the White Springs area; in November, one adult in the Bluff City and Rockhouse/Buckeye areas; and in December, an adult was seen in the White Springs area.

Keith Hudson conducted a census of Cave Springs Cave July 7. He recorded 18,500 gray bats during an exit count. He entered the maternity section and estimated about 2,440 young bats.

Manager Stone and Forester Bays met with Scott Atkins of TVA and Keith Hudson of Alabama Game and Fish to look at Key Cave and surrounding land near Florence, Al. Plans are under way to purchase and obtain easements to protect this cave since the gray bat and the only population of the Alabama cave fish is found here.

In April, the appearance of several alligators began the usual spring stir from fishermen, newspapers, and television crews. Sightings were documented at the Mooresville gravel pits, Decatur Boat Harbor, Limestone Creek, Blackwell Swamp, and Flint Creek. Sightings continued throughout the summer. One of the two frequently seen in the Mooresville gravel pit area appeared to be 9-10 feet long. The one at Blackwell was about 4 feet long. A ten foot alligator was shot and killed on May 8 near the Decatur Boat Harbor. Suspects and rumors were rampant, but no solid leads developed despite a reward offer. Dr. Gartska, University of Alabama Huntsville, and some of his students found seven young alligators about 8-inches long in Blackwell Swamp, indicating that they are nesting and raising young on the refuge. Refuge personnel returned in December to find nest remnants and confirm one ten-inch gator.

3. Waterfowl

A January 26 aerial waterfowl census showed 2,750 Canada geese, 1,200 snow geese, and 11,000 ducks. Ground counts were made throughout January in the various impoundments and duck numbers remained consistent with the previous month, but were more scattered. Canada goose numbers had dropped to 500 and ducks to 5,000 by the end of February. A Ross's goose was sighted on February 6. By March, all migratory geese were gone and only a few hundred scattered ducks were left.

During August, blue-winged teal began to move into the area and about 50 were observed in Kimbrough Slough.

As usual, Canada geese began to arrive about the third week in September. Thirty were recorded on September 17 in the Garth Slough area. It is becoming more difficult to distinguish the early arriving migrants from the increasing number of giant residents found in the north Alabama area. By the end of September, the total count was about 600 geese using Limestone Bay and Garth Slough and about 500 ducks, which was low despite unseasonably cool weather. Species present were blue-winged teal, widgeons, gadwalls, and mallards.

By October 22, Canada goose numbers were no better than the same period last year with a census showing 630 Canadas, 375 snow geese, and 5,050 ducks. Another 5,000 ducks were counted down river off the refuge feeding in large beds of natural aquatic vegetation.

Another aerial census was taken November 24 tallying 1,400 Canadas, 450 blue geese, and 24,000 ducks. Another 40-50,000 ducks were found down river as far as Browns Ferry Nuclear Plant feeding in the aquatic vegetation beds. Most of the refuge ducks were feeding in the large aquatic vegetation beds outside the White Springs dike. Goose use was found mostly in Limestone Bay, Garth Slough, and Flint Creek areas.

At the end of the year, two aerial counts were made. On December 16, the count revealed 36,000 ducks, 2,000 Canada geese, and 600 snow geese. On December 30, those totals changed to 32,000 ducks, 3,800 Canada geese and 850 snow geese.

Due to a growing concern over the continued loss of Canada geese at Wheeler Refuge, an in-depth meeting was held on March 30 and 31 at the Visitor Center. This meeting was called by the State of Alabama to discuss the status of the Southern James Bay Population of Canada geese, reasons for their decline, and potential solutions. The following people attended: Bob Trost, Ken Gamble, Richard Bays, Gary Phillips, Harvie Fowler, Frank Dukes, John Ann Shearer, Ron Freeman, Otto Flourshutz, Frank Bowers, and Don Orr of the Fish and Wildlife Service; Keith McCutcheon, David Hayden, and Gary Moody of Alabama Game and Fish, Scott Atkins of TVA, and Don Rusch of the Wisconsin Cooperative Research Unit. As a result of this meeting, a second meeting was held August 3 at the Visitor Center with about 50 selected local conservationist attending. Don Orr and Keith McCutcheon attended this second meeting. Other meetings were held September 9, October 4, and October 25. Problems and solutions are complex. Loss of geese are resulting from decline of breeding pairs on Akimiski Island where Wheeler's geese originate, habitat deterioration in breeding grounds, subsistence hunting, sport hunting from Canada to Alabama and then back, competition from snow geese on breeding grounds, and loss to fox depredation on breeding grounds. It will not be easy, if at all possible, to restore Wheeler's Canada geese to former numbers of 30,000 plus. A public meeting is planned for early 1994.

During March, a wood duck hen count was conducted as requested by Jim Kelly of the Migratory Bird Office. Only six hens were counted during three morning surveys.

During the year, refuge personnel built 15 wood duck nesting boxes from cypress. Another 30 cypress boxes were built by the Hartselle Jr. High School, and 25 built by the Alabama Sheriff's Boys Ranch at Danville. These will be used to replaced boxes where needed and to locate boxes in new areas as appropriate.

In April, a wood duck box check was started but stopped when too many hens were being flushed from nests. A decision was made to postpone the check until late summer when nesting was over or almost so. Two hundred, fifty-four boxes were checked; 128 by boat, 95 from land, and 24 by airboat on Redstone Arsenal. Seven old boxes were removed and another 10 new boxes erected. Use is summarized in Table 5.

Table 5. Wood duck nest box data for 1993 and compared to 1991 and 1992.

	<u>1993</u>	<u>1992*</u>	<u>1991**</u>
Total boxes up	254	146	317
Total useable boxes	247	146	289
Boxes used by wood ducks	230 (93%)	138 (98%)	239 (83%)
Boxes with dump nests (>15)	35 (14%)	72 (51%)	59 (25%)
Successful boxes	191 (77%)	80 (61%)	51 (21%)
Used by other ducks	1	0	0
Period checked	August	April August	August
Use by other wildlife	15 (6%)	32 (22%)	37 (13%)
Total wood ducks hatched (# of membranes)	1417	688	338
Wood duck broods produced	177	84	58
Wood ducks surviving to flight stage	708	336	169

*excludes Redstone Arsenal DDT monitoring boxes. This was first year that re-designed predator guards were in use.

**excludes Redstone Arsenal DDT boxes.

4. Marsh and Water Birds

The most common species that used the refuge were great blue heron, great egrets, snowy egrets, green-backed herons, pied-billed grebes and coots. The grebes and coots are winter visitors to open waters, but other species utilize the shallow impoundments throughout the year.

5. Shorebirds, Gulls, Terns and Allied Species

Common representative of this category include semi-palmated plovers, greater and lesser yellow legs, semi-palmated, western, least and pectoral sandpipers, common snipe, Bonaparte's, ring-billed and herring gulls, and Forster's and black terns. Killdeer and spotted sandpipers nest on the refuge.

6. Raptors

A merlin, uncommon to this area, was sighted on February 6. Eight osprey were observed throughout winter, spring and fall months with four seen at one time in the Buckeye area.

7. Other Migratory Birds

Blue birds continue to do well. The refuge has 25 boxes that are monitored and serviced for continued use. Hartselle Jr. High School students made and donated 25 boxes to the refuge for our use or to donate to private use.

8. Game Mammals

Hunting opportunities were available for squirrel, deer, rabbit, raccoon and opossum. Harvest numbers were as follows: 2,700 gray squirrel, 110 fox squirrel, 400 cottontail rabbits, 75 swamp rabbits, 800 raccoon, 25 opossum, 57 deer on non-Arsenal portion of refuge and 88 deer on the Arsenal portion of refuge. Kill data was reported on a voluntary basis. A breakdown of the 1992-93 non-Arsenal deer kill is shown in Table 6.

Table 6. 1992-93 deer harvest and antler development, excluding the Redstone Arsenal harvest.

	Total	Female	Male	Button Buck	2	3	4	5	6	7	8	9	10
Bow	37	17	20	2	6	1	4	-	3	-	2	1	1
Flintlock	19	6	13	5	1	-	2	1	1	-	1	2	-
Total	57	23	34*	7	7	1	7*	1	4	-	3	3	1

*one 4-point killed by automobile

The Redstone Arsenal deer harvest total of 88 consisted of 43 bucks and 45 does. The Arsenal administers this hunt. See H.8. Hunting for more details on the refuge hunts.

11. Fisheries Resources

Carbon Hill NFH delivered about 2,250 nine-inch channel catfish on June 25. They were released into the display pool to enhance future youth and handicap fishing rodeos.

Concern was raised by local fishermen and local news media about a fish kill in Blackwell Swamp. This almost annual event was more severe this August when hundreds of nice sized bass and other fish died. State fish biologist measured the dissolved oxygen and found it to be less than 1 PPM.



This rare photo of a king snake attacking a copperhead was taken by a refuge volunteer.

6/93 T. Hadder



After the victory, the king snake ate his victim.

6/93 T. Hadder

15. Animal Control

It was brought to our attention that Huntsville Animal Control was releasing 400-600 raccoons, opossums, and skunks annually near Blackwell Swamp. The refuge responded in writing opposing this practice and the city administrators terminated the practice. Animal rights groups were opposing the killing of these animals, so Huntsville was bringing them to the refuge. Assistant Manager Dukes met with Huntsville Officials on June 7 to explain reasons for the position.

16. Marking and Banding

Nineteen Canada geese were banded and collared at Harold Hill's Rosemary Refuge on January 20.

In January, 219 collared Canada geese were observed; 147 were blue, 69 orange, and 3 white. In February, 50 collars were observed; 33 blue, 16 orange, and 1 white. By the end of the waterfowl season, another 12 blue and 4 orange collars were observed, bringing the season's total to 610 collars. Fall collar observation began in October striving to meet a quota of 500. Observations were painfully slow due to the low numbers of birds present. By the end of December, 71 blue, 47 orange, and 7 white collars were observed for a season total of 125.

Prebaiting began in April for wood ducks; trapping began July 1. By the end of the season, the refuge had banded 439 wood ducks. The quota was 200.

H. PUBLIC USE

1. General

With the refuge lying within a heavy populated area, the public's use of the refuge continues to be a major program. Since this area continues to expand, public use can be only expected to increase. The public comes to the refuge to enjoy fishing, hunting, hiking, boating, bird watching, photography and horseback riding and to visit the Visitor Center and Observation Building to view exhibits, ducks and geese. They also walk nearby trails.

Visitors totalled 650,000 during the year. This is a slight decrease from the previous year. The reduced visits are contributed to the heavy rains and snow during March causing floods that reduced fishing during the periods when fishing is normally at a peak.

The public use staff included 2.5 members at the beginning of the year, but was increased to 3.0 on July 11 when Custodial Worker Lisa Spencer was converted to full-time. The capable and consistent volunteers, R. B. "Willie" Williams, Beverly Thomas, Mary Ratliff and Nancy Armistead, continued to assist operating the Visitor Center on weekends. The Visitor Center schedule continued unchanged, opening seven days per week during January, February, November and December and Wednesday through Sunday the remainder of the year. The hours of operation were from 10:00 am until 5:00 pm daily.

The Visitor Center was busy throughout the year hosting workshops, seminars and meetings. These included:

January	-Decatur Chamber of Commerce Beautification Committee -DDT Review Panel meeting
February	-EARTH DAY Planning/Beautification Committee meeting
March	-Decatur Chamber of Commerce Beautification Committee -American hart's-tongue fern planning meeting -Southern James Bay Population goose meeting -District Meeting - Alabama Game and Fish
April	-Decatur Chamber of Commerce Beautification Committee -EARTH DAY planning meeting -Flint Creek Watershed Improvement Project meeting -Hunter Safety Instructor's Training Session
May	-Morgan County Sheriff's Department Firearms Refresher
June	-In-service Firearms Training - Morgan County Sheriff's Department -Alabama Department of Environmental Management meeting
July	-Alabama Game and Fish meeting -Firearms Training Session - Morgan County Sheriff's Department
August	-Morgan County Soil and Water District meeting -Alabama Forestry Commission meeting -Alabama Department of Conservation District meeting
September	-Southern James Bay Population goose meeting -Tennessee Valley Audubon Society meeting -Forestry Awareness Week Committee meeting -Goldfish Pond Workshop -Morgan County Sheriff's Department Training -Alabama Game and Fish meeting
October	-Home School Photo Session -Retirement Seminar - FWS -Tennessee Valley Resources Conservation and Development Committee meeting -Southern James Bay Population goose meeting
November	-Forestry Awareness Committee meeting -Southern James Bay Population goose meeting
December	-Alabama Game and Fish Fishery management meeting

In addition to the above meetings, there were other workshops dealing with hunter education, environmental education for teachers and general workshops for the public that are discussed in their respective narrative sections.

The practice of scheduling visiting groups continued. There were a total of 287 groups, consisting of 11,920 individuals, that visited by pre-arrangement. A single month record was established during January when 59 groups totalling 1,960 individuals visited. The predominance of these groups were school classes, with the remainder including scouts, church groups, senior citizen groups and others.

The refuge staff continued to be active members within the community and to keep a high level of communication with county, city and state governments, civic organizations and the news media. Manager Stone served as a member of the Decatur Chamber of Commerce Beautification Committee and the Wildlife Festival Committee. Other staff members assisted these committees on a number of projects. Park Ranger Fowler continued to serve as a Eagle Scout Project Counselor. A total of twelve Eagle Scout Projects were developed

and completed on the refuge. These included such things as trail construction and maintenance, blue bird box construction and painting and refurbishing of boardwalks.

Lisa Spencer assisted with the Atlanta Home Show March 18-21.

Twenty-three, off-site programs were presented by refuge staff members to the following organizations:

Julian Harris 1st Grade	Lawrence County 4-H Club
Cotaco Jr. High School	Tennessee Valley Audubon Society
Eastwood School 1st Grade	Chrysler Learning Center
Eva Jr. High Special Education	Athens Rotary Club
Priceville 6th Grade	Chrysler Learning Center
Calhoun Pre-school	Priceville Garden Club
Union Hill School	Julian Harris 4th Grade
Eva School	Chestnut Grove 3rd Grade
Decatur Civitan Club	Morgan County Rotary Club
Frances Nungester 3rd Grade	Madison's Country Day Care
Priceville 7th Grade	Hartselle Jr. High Wildlife Club
	Calvary Christian Academy 3rd Grade

In compliance with the Americans With Disabilities Act and Section 504 of the Rehabilitation Act of 1973, the following were accomplished during the year:

1. A handicap-accessible hunting area was established near Blackwell Swamp. It was signed and an accessible parking lot was built.
2. Re-striping of handicapped parking was completed at the Visitor Center.
3. A handicap accessible fishing pier and boardwalk was constructed. See 9. Fishing for more details.

2. Outdoor Classrooms - Students

The "Earthscope" environmental education program sponsored by the Huntsville School System, that has been held here during winter months for a number of years, was continued with 1,857 third graders participating. In addition to the above effort, 32 different classes comprising 1,096 students received structured programs. Fourteen of these groups were off-site and 18 were on-site.

3. Outdoor Classrooms - Teachers

Workshops for teachers have become extremely popular with Athens State College and local teachers. The following were held during the year:

January	EE for Teachers	15 participated
July	Project Learning Tree	41 participated
August	Aquatic PROJECT WILD	26 participated
October	EE for Teachers	15 participated
December	Wetland Workshop for Teachers	5 participated

All workshops, except the one held in December, were approved by the Athens State College and North Alabama Teachers Exchange.

Participating teachers received college credit for attendance and completion. Some of the workshops were taught solely by the refuge staff. Others were taught by refuge staff with assistance from Alabama Game and Fish PROJECT WILD coordinators and qualified individuals from the private sector.



A hunter enjoys the opportunity to bow hunt for deer in the designated handicap-accessible hunting area at Blackwell Swamp.

10/93 F. Dukes

4. Interpretive Foot Trails

The three major trails, Dancy Bottoms, Beaverdam Boardwalk and the Environmental Study Area, continued to receive good use. Minimum maintenance was required on the Dancy Bottoms Trail and Beaverdam Boardwalk. The trail at the Environmental Study Area began receiving considerable undesirable use which generated complaints from the general public. The road leading to this trail was gated off. A new parking lot and boardwalk/trail system were built to the west of the old trail as a connecting route to hopefully eliminate this problem. The parking lot visible from State Highway 67 and boardwalk, built to handicap-accessible standards, is part of the recently constructed handicap fishing pier complex.

5. Interpretive Tour Routes

Upon request, interpretive tours were provided to groups of ten or more. Eleven tours were provided by staff members. Other tours were guided by volunteers such as college instructors and Audubon members when possible. White Springs, Rockhouse and Beaverdam

Peninsula were the most used routes because these were areas where waterfowl observation was best.

6. Interpretive Exhibits/Demonstrations

Visitor Center exhibits and the Observation Building were popular with the public. There were 30,019 visitors recorded for the Observation Building in 1993. This is a 10% increase over 1992.

"Hunting and Fishing" exhibits were developed and staffed at the Morgan County Farm Fair and the Southern Wildlife Festival.

Working with the Decatur Chamber of Commerce Beautification Committee, Morgan County and the cities of Decatur and Hartselle, an EARTH DAY event was held at the Visitor Center on April 16 and 17. The two-day event was known as the Envir-O-Fair. Twenty-two environmentally related exhibitors, including TVA, EPA, SCS and other public agencies and private sector organizations, participated with educational exhibits. The first day was kid's day; about six-hundred 5th graders from the Morgan County School System were bused to the event. The second day was for the public; 1500 people attended.

7. Other Interpretive Programs

The refuge's orientation slide-tape program was shown on the hour throughout the year. It was taken on occasions to off-site programs. Wildlife films and videos were shown on request and in connection with other programs. News releases were written and distributed to inform the public of special programs, hunting seasons and hunting permit issuance procedures. Local newspaper reporters and television personnel visited often to obtain information and get statements related to the refuge or other resource issues.

8. Hunting

Three small game hunts and one big game hunt were allowed on the refuge; permits were required.

A hunt coordination meeting was held with Alabama Game and Fish personnel during the early part of the year.

With a new state law in effect requiring hunters 16 years of age to have the Alabama Hunter Safety Course prior to purchasing a hunting license, Hunter Safety Education classes taught at the Visitor Center were expanded considerably. Four classes were taught; more than one hundred individuals were certified. Instructors were Alabama Game and Fish personnel, refuge personnel and other local qualified instructors. Staff members Fowler, Smith, Spencer, Speegle and McCaghren are certified instructors.

Hunts on the 4,085 acres of refuge lands lying within Redstone Arsenal were administered by the Redstone Arsenal were administered by the Redstone Recreation Center.

a. Deer

Hunting on the Redstone Arsenal portion of the refuge began with the opening of the state bow season on October 15, 1992

through January 30, 1993. Hunting was allowed on weekends and holidays. Only shotguns with rifled slugs were permitted on gun hunts. Total deer harvested were 43 bucks and 43 does.

On non-Arsenal portions of the refuge, hunting began with state bow season, October 15, 1992 through January 30, 1993. The only gun hunting was by flintlock from January 18 through January 30. Fifty-seven deer were harvested, 37 by bow and 19 by flintlock. Of the deer harvested, 34 were buck and 23 were doe. Hunter use days were estimated at 8,200.

b. Raccoon and Opossum

The raccoon and opossum season was February 12-27. An estimated 800 raccoons and 25 opossums were harvested during an estimated 750 hunter days.

c. Rabbit

The refuge rabbit season was February 12-27. An estimated 400 cottontail and 75 swamp rabbits were harvested. There were 420 estimated hunter days, a slight increase over the 1991-92 season.

d. Squirrel

The refuge squirrel season was October 1-13. There were 2,700 gray squirrels and 110 fox squirrels harvested during an estimated 1,800 hunter days.

9. Fishing

Fishing continued to be the most popular form of recreation on the refuge, though it was slowed in March by a winter storm and periodic high reservoir water levels. The refuge is open to year around fishing with the exception of the 25 acre Display Pool which is closed. State regulations are enforced. Success from refuge water continued to be good with target species consisting of largemouth bass, crappie, bream and catfish.

The annual Youth Fishing Rodeo was held at the Display Pool on June 5 to commemorate National Fishing Week. Crappiethon, USA, again sponsored the event. There were over 300 youths under 15 years of age participating. Good catches were made and considerable favorable publicity resulted from the event. This event generates much favor from the public and is one of the least costly.

Through a cooperative funding effort by the Refuge, EPA, SCS and Morgan County Commission, the refuge built a handicap accessible fishing pier near the Refuge headquarters on Flint Creek. A modified version of Hatchie's Project Fish handicap-accessible pier was used. See I. EQUIPMENT AND FACILITIES for details of construction.

11. Wildlife Observation

The Display Pool was a popular viewing area during the winter. Viewing was excellent as geese and ducks made constant use of the pool. The Tennessee Valley Audubon Society, North Alabama Bird Watching Society, other Audubon chapters from Birmingham and Muscle

Shoals and many universities were regular visitors to the refuge for birding.

The Backyard Wildlife Demonstration Project completed in 1992 continued to receive considerable attention from the public as well as other agencies and Fish and Wildlife Service employees. It has been satisfying to note that this project is considered one of the best in Region 4.



The Back Yard Wildlife demonstration area was pleasing to critters and refuge visitors.

10/93 F. Dukes

12. Other Wildlife Oriented Recreation

Six permits were issued to different clubs for raccoon dog trials on the refuge. Two retriever dog trial permits were issued for use of the White Springs area. The Mooreland Hunt Club conducted ten Tally-Ho fox hunts on the Refuge in 1993. An effort to reduce the number of annual hunts continued.

13. Camping

In keeping with current policy, no camping was permitted.

14. Picnicking

Picnicking and the associated litter continued to be a problem. There are no improved facilities on the Refuge.

15. Off-Road Vehicling

Off-road vehicling is not permitted, although it does occur. A number of citations are made annually keeping the unauthorized use at a manageable level.

16. Other Non-Wildlife Oriented Recreation

Boating, water skiing, and jet skiing are very popular throughout this area. Jet skiing is prohibited except in the main river channel, and water skiing has been restricted in Cotaco Creek, Indian Creek and part of Flint Creek.

Horseback riding is similarly popular and has had to be controlled somewhat. Horseback riding has been prohibited behind locked gates, off-road and during refuge hunts.

17. Law Enforcement

Refuge law enforcement continued to be active throughout the year. Enforcement efforts shift from hunting in the fall and winter months to fishing, boating and various other activities in the spring and summer. State and local law enforcement agencies have continued their support in combating violations occurring on the refuge and we have had excellent support from the special agent in the Montgomery office.

Deer baiting and illegal tree stands are still sporadic problems on the refuge. Considerable effort was put into investigations, however no cases were made. The number of complaints received concerning these types of violations was noticeably less than in years past. In February, four local men were charged with using a spotlight to locate deer. All were issued violation notices and have paid their fines.

Special Agent Garry Phillips and Managers Stone and Dukes met with the Chief Assistant U.S. Attorney Bud Henry and his senior aide, Ms. McCarty, during May to discuss FWS enforcement problems, a new collateral system for north Alabama and, more specifically, difficulties in prosecuting artifact cases on Wheeler NWR. The results were promising. He indicated he did not want to commit his criminal attorneys to jury trials concerning artifacts, but he would prosecute a limited number. Agent Phillips suggested a new schedule based on the Refuge Recreation Act, thus avoiding jury trials. Mr. Henry was very receptive to the idea.

Several weeks later, a repeat offender and companion were apprehended along the river bank collecting artifacts. He acknowledged the law, admitted what he was doing and 8-10 artifacts were seized from his pockets.

Within one week, the U.S. Attorney's Office dismissed five other cases and declined prosecution of the above two offenders. Four of the seven cases involved persons that were prior offenders.

Refuge officers are still encountering persons unlawfully carrying/possessing firearms, primarily large caliber handguns and rifles, however all concerned were cooperative and have paid their fines.

Table 7. Summary of on refuge cases by refuge officers in 1993.

Unauthorized Use of a Motor Vehicle on a NWR	8
Fishing w/o a License	7
Exceed Daily Bag Limit (deer)	1
Use of Artificial Lights on NWR (Spotlighting)	4
Search For/Removal of Artifacts from a NWR	8
Possession of Firearm(s) on NWR	6
Driving w/o a Valid Driver's License on a NWR	1
Failure to Obey Authorized Official Directing Traffic	1
Driving Carelessly/Heedlessly on a NWR	1
General Trespass	2
Disposal of Waste on a NWR (dumping)	4
Operating a Jet Ski in a Restricted Area	2
Water Skiing in a Restricted Area	1
Hunting w/o a Refuge Permit	1
Possession of Marijuana on a NWR (Not Prosecuted)	1
Possession of Drug Paraphernalia on a NWR (Not Prosecuted)	1
TOTAL	49

Summary of off refuge cases by refuge officers in 1993

Take Waterfowl by the Aid of Bait	5
Take Doves by the Aid of Bait	23
Take Waterfowl with Unplugged Gun	2
Take Dove with Unplugged Gun	1
Take Waterfowl with Unsigned/Unattached State Stamp	2
Take Waterfowl with Unsigned/Unattached Federal Stamp	2
Take Waterfowl w/o a State Stamp	5
Take Waterfowl w/o a Federal Stamp	3
Take Waterfowl After Hours	1
Take Waterfowl During the Closed Season	1
Take Doves During the Closed Season	1
Take Waterfowl w/o a Hunting License	1
Take Waterfowl While Possessing Lead Shot	3
Exceed Daily Bag Limit (Doves)	3
TOTAL	53

Summary of refuge cases by state conservation officers in 1993

Fishing w/o a License	62
Hunting w/o a License	4
Possession of Firearm(s) on a NWR	9
Possession of Bow/Arrow w/o a Permit	2
Hunting w/o a Permit	2
Failure to Wear Hunter Orange	6
Littering on a NWR	2
Blocking a Gate or Road on a NWR	1
Possession of Marijuana on a NWR	1
Musselling w/o a License	2
Taking or Possessing Undersized Mussels	3
Operating Boat Not Registered for Current Year	6
Operating Boat with Insufficient Life Preservers	5
Hunting in a Federal Game Sanctuary (Fern Cave NWR)	2
TOTAL	107

Total Cases by Refuge Officers and State Officers 207

Refuge Forester Bays found a Nissan Sentra burned and left near Beaverdam Creek on the refuge. The car had been stolen.

There were two incidents of vandalism to refuge equipment during the year. A small fuel trailer had been set on fire while it was parked near a refuge job site. The amount of damage was \$150. The windows of the John Deere 4055 tractor were broken out also and caused \$500 in damage. There were no suspects in either case and no arrests were made.

All refuge officers attended annual refresher training in Quincy, Florida in March. Refuge Officer Smith completed the following training courses: Firearms Instructor Training & Semi-Automatic Pistol Program held at FLETC and the Smith & Wesson Semi-Automatic Pistol Armorer Course at Palm Bay, Florida. Refuge Officer Smith also served as an instructor at the Refuge Officer Basic Course at FLETC in August and as a firearms instructor/armorer at the semi-automatic pistol transition training held in Jackson, MS in October.

Refuge officers also worked with special agents and state conservation officers during dove and waterfowl seasons in areas surrounding the refuge. Several cases were made.



Despite road-side garbage pick-up, trash dumping continues to be a serious problem.

4/93 F. Dukes

I. EQUIPMENT AND FACILITIES

1. New Construction

Plans were made in June to construct a handicap accessible fishing pier and boardwalk on Flint Creek at the Dock Field road. Permits were secured from the COE and TVA. Engineering approval was received using a modified design of the Hatchie NWR pier. Funding was secured through appropriated funds, the Flint Creek Watershed Project (multi-agency), Decatur Amoco Chemical Plant, Southern Wildlife Festival, Morgan County Commission and Challenge Grant matching funds.



Work started on the handicap-accessible fishing pier with a local contractor driving pilings.

9/93 F. Dukes

Pier work started in July with Tennessee River Marine Service driving pilings for the pier. The pilings, braces and deck were completed by the contractor in September. Jim Ammons and Richard Bays constructed rails and fishing stations for wheelchairs.

The nearby boardwalk across an adjacent slough was started by driving 6x6 treated posts using the excavator. This work started in October. By the end of November, pilings, braces, runners and the decking were complete and by December the handrails, rest benches, connecting trails and parking lot was expanded. All work was performed by the refuge staff.

A parking lot was built in July at the intersection of the HGH and Blackwell roads to allow for handicap access to this portion of the refuge. This was the initial year that a special area was designated as a handicap hunting area. The area was also signed.



After the contractor completed the decking, refuge personnel built the rails and fishing stations.

10/93 T. Stone



The "cow-catcher" fishing stations were built after the Hatchie NWR design. It provides a better view of the water.

10/93 F. Dukes



This side-view was taken during low water level; the actual summer level will be about 3-4 feet higher.

10/93 T. Stone



The refuge crew placed the boardwalk pilings using an excavator.

10/93 F. Dukes



The next step was bracing the 6x6 posts and adding runners between the pairs of posts.

10/93 F. Dukes



The decking and handrail posts were completed by the end of November.

11/93 F. Dukes



The final product was a well-constructed boardwalk at a considerable savings to the Service.

12/93 T. Stone

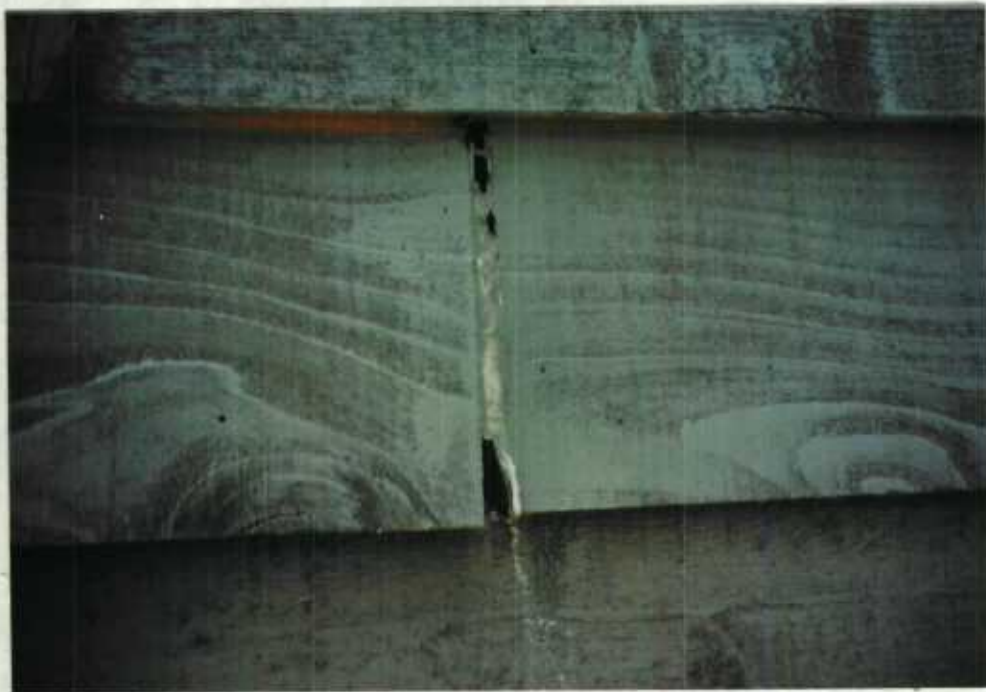


This side-view was taken during low water-level; the actual spring and summer level will have two-feet of water under the boardwalk.

12/93 T. Stone

2. Rehabilitation

In a carry-over project from 1992, the Visitor Center and Observation Building re-siding project was finally completed, but not without difficulty. John Holtman and Son, Inc. contractors claimed the work was complete, but thirty-eight omissions and defects were identified at a January 7 final inspection. The contractor ignored the deficiencies and did not return to the Center to correct them until April 29. The major correction was re-staining portions of siding where shrinkage occurred and re-caulking butt joints where boards had separated. All this was caused by failure to use cured lumber as specified by the specifications. Holtman argued the Service owed him for changes in work orders; the Service estimated corrections totalling \$20,000. An agreement was made between both parties, no more payments made to either party and Holtman would correct the above problems.



A photo worth a thousand words; the contractor used uncured wood which created severe shrinking problems.

2/93 T. Stone

The approach ramp to the Observation Building was modified to make it handicap-accessible. The old fence was removed, fill dirt hauled in, a more gentle 6% slope created with rest levels and a new fence constructed and stained.

About 1,500 tons of rip-rap purchased by TVA and placed along the Rockhouse Road section of the river in March.

Morgan County re-built the non-refuge road that enters the refuge at Cain's Landing. The road had become almost impassible. Refuge personnel built a small parking lot inside the boundary.

Limestone and Morgan County personnel graveled and graded portions of several Limestone County refuge roads. The gravel was hauled from the Mooresville gravel pits.

Efforts to replace the Visitor Center heating and air conditioner system continued throughout 1993. The old mega-therm unit utilized heated water circulated throughout the Center to produce heat. The new proposed system was based on a TVA's design utilizing pre-conditioned air circulated through a subterranean pipe system. Underground rocks and unexpected high costs caused estimates to exceed available funds by 200%, so the design was scrapped. The next system design was a compartmentalized air to air heat pump system where each unit heated/cooled sections of the Center. Sue-Jac of Decatur was the lone bidder on the job at \$73,128. Replacement started November 5 and the units were 95% complete and functional by the end of 1993.

3. Major Maintenance

Roads, bridges and culverts continued to deteriorate during the year due to heavy traffic and inadequate funds to place gravel on refuge roads. Limestone County handled the north side roads; refuge staff members maintained the south side roads.

Other maintenance work was performed during 1993. The most major were as follows:

- bat wing mower required \$100 of repair
- road grader needed \$1,200 repair after the turn table yoke broke
- 1988 Chevy 4x4 pick-up transmission was replaced at a cost of \$1,200
- John Deere 4020 clutch was resurfaced, labor was done force account for \$400
- two John Deere 4055 cab windows were broken by vandals and replaced for \$500
- the Ford 8000 transmission was overhauled, cost was \$2,200
- a hydraulic pump on the bat-wing mower froze-up requiring \$600 to repair
- 1990 Dodge pick-up air conditioner was repaired for \$200
- the Motrim required its customary trips into the shop for welding
- the 50 HP Evinrude outboard was repaired when the automatic oiler failed, cost was \$1,600, one piston was replaced
- the wheel axle on the heavy-duty Rome disk broke; another one was fabricated for \$250
- the three-point hitch spreader gear box was replaced for about \$200
- the 50 HP Evinrude outboard electric module was replaced at \$150

4. Equipment Utilization and Replacement

The John Deere 690 excavator was loaned to Eufaula NWR April 7 to assist with construction of a Ducks Unlimited project. They returned it June 29.

Wapanocca NWR borrowed the excavator August 10 to complete some private lands work and returned it in early October.

We borrowed Eufaula's D-7 dozer in October to assist with shoreline vegetation clearing and kept it through the close of the year.

Two new vehicles were received during June. One was a four-door, 4 WD Chevrolet Blazer for LE duties and the other a Chevrolet S-10 4x2 pickup. The two trade-in vehicles were transferred to the Auburn's Wildlife and Fisheries Research Unit. They identified two older vehicles as trade-ins.

8. Other

Thirty miles of boundary were re-painted and signed during January and February. The section posted was on the south side from Slaughter Landing to Cave Springs and about seven miles on the Redstone Arsenal portion of Wheeler Refuge.

J. OTHER ITEMS

3. Items of Interest

Kirk Minor, grandson of Jack Minor, visited Wheeler Refuge in March. He was in north Alabama visiting Harold Hill in Madison. Manager Stone gave him a tour of the refuge.

Don Voros, Refuges - Washington, visited Wheeler in April to meet with refuge personnel concerning a Refuge Functional Review. He talked with refuge people from Wheeler, Tennessee, Noxubee, Eufaula and Choctaw NWRs.

A drowning occurred July 28 at 3:00 am when Brian Lee Davis waded out into Flint Creek at the Hickory Hill boat ramp with friends. He went under and never surfaced. His body was recovered by divers. The death was determined to be alcohol related.

Another death occurred at Hickory Hills boat ramp during August. A local fisherman, Charles Ikner, had returned to the ramp from a fishing trip and collapsed near his vehicle in the parking lot. CPR was administered, but he was pronounced dead on arrival at the Decatur General Hospital.

Manager Stone served as chairman of the county-wide clean-up effort involving Morgan County and the Decatur Chamber's Beautification committee. Tuck travelled to Montgomery in November to receive the Governor's Award for this year's Enviro-Fair Earthday Activities hosted at the Visitor Center.

Photographer John Hollingsworth visited Wheeler Refuge December 13-15 to take pictures for a book and calendar project. He was contracted by the Service to write a book about National Wildlife Refuges.

4. Credits

The following persons contributed to writing and preparing the annual narrative: Richard Bays, Faye Blankenship, Frank Dukes, Harvie Fowler, Liz Gilbert and Kelly Smith.

BLOWING WIND CAVE NATIONAL WILDLIFE REFUGE
Scottsboro, Alabama

ANNUAL NARRATIVE REPORT
Calendar Year 1993

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

BLOWING WIND CAVE NATIONAL WILDLIFE REFUGE

Blowing Wind Cave NWR lies just above the Sauty Creek embayment of TVA's Guntersville Reservoir, seven miles west of Scottsboro, Jackson County. The refuge consists of 264 acres of hardwoods with a double entrance cave in the hillside. The land was acquired by the Service in 1978 to provide protection for the endangered gray and Indiana bats and their critical habitat. The cave serves as a minor hibernation cave and historically a major maternity cave.

On February 19, the annual census of Indiana bats was conducted in Blowing Wind Cave. Two hundred-six Indiana bats were counted. This figure is consistent with the counts for the past several years. Twelve gray bats and six pipostrelles were also counted. Dr. Troy Best of Auburn University and Keith Hudson of Alabama Game and Fish were the primary counters.

Gray bat exit counts were conducted June 1 and 22. The first count by Richard Bays and Keith Hudson, Alabama Game and Fish, varied considerably from 150,000 to 250,000. The second count was much closer at 180,000 and 200,000. No young were sighted June 1 and only 550 seen June 22. This supports Dr. Troy Best's opinion that Blowing Wind Cave now serves more as a bachelor colony.

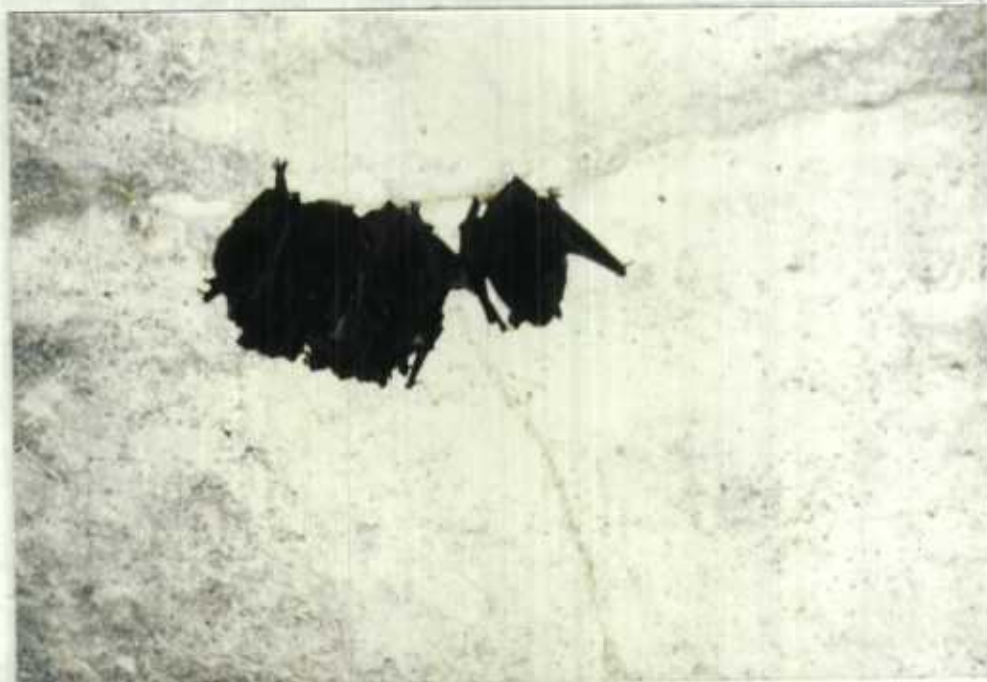
Dr. Troy Best and Auburn University students continued their telemetry study by placing transmitters on bats and tracking their movements to and from Blowing Wind Cave and adjacent caves. Their studies indicate a daily movement from one cave to another, thus fluctuating bat populations on any given night.

A Revenue Sharing check was given to Jackson County for Blowing Wind Cave and Fern Cave NWRs. The check was for \$918.



Dr. Troy Best and Auburn students are shown with telemetry equipment as they work on their bat movement study.

6/93 J. A. Shearer



Several of the 200,000 bats that used Blowing Wind Cave during the maternity season.

6/93 J. A. Shearer

FERN CAVE NATIONAL WILDLIFE REFUGE

Paint Rock, Alabama

ANNUAL NARRATIVE REPORT

Calendar Year 1993

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

FERN CAVE NATIONAL WILDLIFE REFUGE

Fern Cave NWR, located 20 miles west of Scottsboro and two miles north of Paint Rock in Jackson County, consists of 199 acres of forested hillside. Beneath the hillside lies a massive cave with many stalactite and stalagmite-filled rooms. It has five hidden entrances. The property was acquired in 1981 by the Service to provide protection for gray and Indiana bats. Over a million gray bats hibernate in Fern Cave, as do several hundred endangered Indiana bats. Fern Cave also has the threatened American hart's-tongue fern at one of its entrances.

For the sixth year, John Van Swearingen of the Huntsville Grotto, National Speological Society, served as the Fern Cave Access Coordinator by Special Use Permit. His organization handles all permits to enter the cave and monitors the cave's condition. He reported no unauthorized entries into the cave, thus no vandalism noted.

Thirty-four access permits were issued to 240 persons on 58 trips entering the cave. About 81% (195) of these people were part of the Fern Cave Project. This five year project was initiated in 1991 to map the cave system within a 1% margin of error. During 1993, the team mapped 11,907 feet for a project total of 24,943 feet. There were 984 hours spent on the 1993 progress.

Plans were made during the year to initiate an American hart's tongue fern collection and propagation project. Bob Currie, Asheville Endangered Species office presented a program to the Huntsville Grotto in January about endangered bats and the population status of the fern. Ideas were exchanged for protecting the fern as well. An additional meeting was held in March with Bob Currie and representatives from Wheeler Refuge, University of Tennessee, University of the South, Alabama A&M, Tennessee Department of Natural Resources, the Nature Conservancy, the Center for Plant Conservation and the Huntsville Grotto. After the Visitor Center meeting, the group travelled to the Morgue Pit on Fern Cave NWR to examine the three remaining plants. One sporeling thought to be an American hart's-tongue fern was determined to be another species.

In July, Dr. Steve Garton, Alabama A&M and John Van Swearingen, Huntsville Grotto made an effort to collect hart's-tongue fern spores. This initial effort to collect spores to propagate greenhouse ferns for re-introduction to natural sites failed because the spores had already matured and fallen.

On September 15, Karen Rheams, geologist - Geological Survey of Alabama, Stuart McGregor, biologist - Geological Survey of Alabama and Randall Blackwood and John French - Huntsville Grotto, entered the lower entrance of Fern Cave to survey life forms. They found the following.

- 23 cave fish (*Typhlichthys subterraneus*), 1 collected
- 34 cave crayfish - one female had eggs attached, 2 collected
- 1 surface crayfish
- 2+ banded sculpin (*Cottus carolinae*)
- 2+ bluegill (*Lepomis macrochirus*)
- 1 yellow bullhead catfish (*Ictalurus natalis*)
- 2 cave salamanders (*Eurycea lucifuga*)

2 northern slimy salamanders (Plethodon glutinosus)
honey-colored crickets (Orthoptera: Euhadonecus)
mosquitoes (Diptera: Culicidae)
crane flies (Tipulidae)
Heliomyzid flies (Diptera: Heliomyzidae)
1 frog (Anura)
white millipedes (Diplopoda)

Manager Stone met in Scottsboro, Alabama with Huntsville Grotto Cave Rescue, NSS Cave Rescue Coordinator, Jackson County Emergency Management, Jackson County Sheriffs Department, and Jackson County Rescue Squad concerning a rescue plan for Fern Cave. It was decided that the Director of Jackson County Emergency Management will take the lead role in drafting a plan.

A Revenue Sharing check was given to Jackson County in the amount of \$918.

WATERCRESS DARTER NATIONAL WILDLIFE REFUGE

Bessemer, Alabama

ANNUAL NARRATIVE REPORT

Calendar Year 1993

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

WATERCRESS DARTER NATIONAL WILDLIFE REFUGE

Watercress Darter NWR, near Bessemer, Jefferson County, was acquired by the Service in 1980 to provide protection for the endangered watercress darter fish. Although the refuge is only seven acres of bushy vegetation, it contains a quarter acre pond, Thomas Spring, which is vital habitat to the darter. A second pond was built on the refuge in 1983 to provide additional darter habitat.

There are seven sites in the area where the Darter is known to occur or has been introduced. Two of these are part of the refuge.

There were no apparent problems at Watercress Darter NWR during the year, at least at the Thomas Spring and man-made pond.

On May 17 it was discovered that an adjacent neighbor, Mr. Jimmy Collier, was again using a portion of this small refuge to store equipment and material. He had moved two boundary signs and was dumping kitchen waste-water onto the surface of the refuge. He was given a written warning and three weeks to correct the matter.

A June 22 follow-up was made to check for compliance. He had complied with all provisions except there was still about 5-tons of gravel piled within the refuge boundary. He explained he had problems getting equipment to move the gravel and was granted additional time.

A Revenue Sharing check for \$131 was given to Jefferson County.



Wheeler
National
Wildlife
Refuge

Wheeler
National Wildlife
Refuge,
established in
1938, lies
between the
cities of Decatur
and Huntsville,
Alabama, along
the Tennessee
River and its
tributaries.

The 34,500 acre refuge was established as a wintering area for ducks and geese and other migratory birds and continues this role today. Thousands of Canada geese, snow geese, mallard, wigeon, gadwall, black duck, shoveler, canvasback and a host of other ducks migrate to the refuge from northern nesting grounds in the fall. They rest and feed throughout the winter and return to their nesting grounds in the spring.

Wheeler National Wildlife Refuge is one of 500 refuges in the United States dedicated to meeting the needs of migratory waterfowl and endangered species.

The U.S. Fish and Wildlife Service manages this system of refuges aimed at preserving our wildlife resources for enjoyment by the people.

Management Supports An Abundance of Wildlife

The refuge is managed to support more ducks, geese and other wildlife than the area could under natural conditions.

Management Activities Include:

Waterfowl Food Production - Approximately 3500 acres of cropland are cultivated by local farmers on a share arrangement. Crops grown include corn, grain sorghum, millet and soybeans. The refuge's share is left in the field where it is used by geese, mallards, wigeon, pintail and black ducks as well as many other species of wildlife.

Winter wheat is planted each fall to provide green browse for geese, since this makes up a substantial part of their diet.

Water Control - Water control structures in wet areas allow water to be raised and lowered encouraging the growth of moist-soil plants which provide the natural food waterfowl need and prefer.

Waterfowl Banding - Geese and ducks are banded each year to keep abreast of nesting success, birds harvested, migration routes and the general condition of waterfowl populations.



Providing Habitat Diversity - Unfarmed uplands, shoreline woodlands, open water, hardwood bottomlands and pine plantations are managed to provide food and cover for hawks, owls, songbirds, deer and many other species of wildlife.

Use by the public - The public is encouraged to visit the refuge and participate in the many activities designed for outdoor enjoyment. Wildlife observation,



fishing, hiking, nature study and hunting for small game or deer are just a few of the opportunities.

The Visitor Center on Highway 67 should be the first stop where more complete details are available and where life-like exhibits, trails, an observation building and other interesting activities are available.

For future information, contact the Visitor Center at (205) 350-6639 or (205) 351-6948.

Enjoy Your Visit



Visitor Center Hours - November 1-February 28-Daily 10:00am-5:00pm. March 1-October 31-Wed.-Sunday 10:00am-5:00pm.



Wildlife Observation - Permitted year-round. An observation building and platform is provided for your enjoyment.



Fishing and Hunting - Open to fishing subject to State regulations; managed hunts are held for squirrel, rabbit, raccoon and opossum and white-tailed deer.



Boating - Permitted. Six improved boat-launching ramps available. Water skiing restricted and jet skis prohibited.



Bicycles - Permitted on graveled roads only.



Horses and Mule Riding - Permitted on open graveled roads. Not permitted on refuge hunts.



Vehicles - Only licensed vehicles permitted. No unlicensed ATVs. Access is limited to graveled roads and a portion of these are closed at certain times.



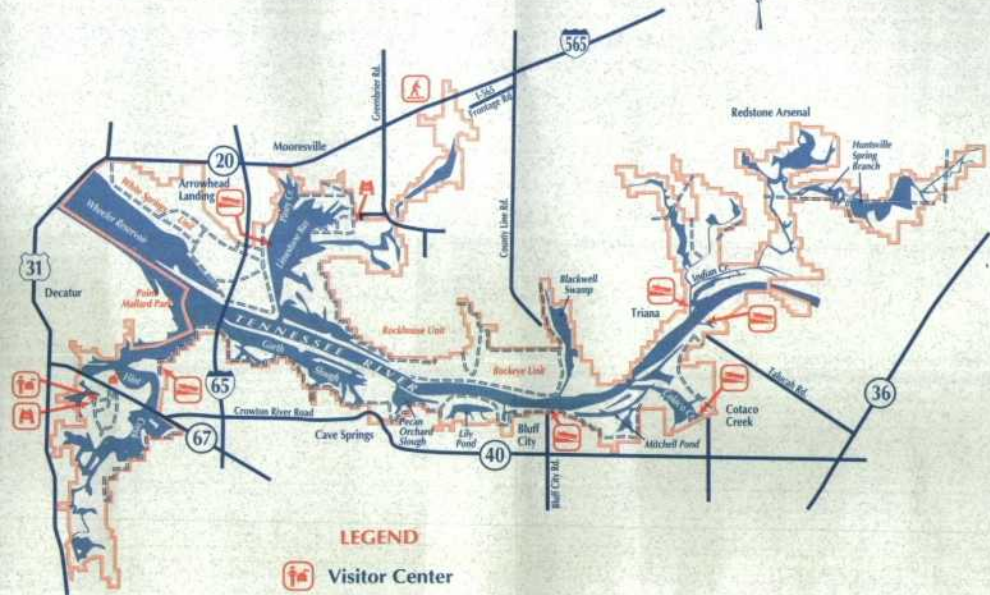
Firearms - Prohibited, except on managed hunts.



Camping - Not permitted.

WHEELER

National Wildlife Refuge



LEGEND

- Visitor Center
- Refuge Office
- Boat Ramp
- Observation Building
- Observation Platform
- Boardwalk
- Refuge Boundary
- Refuge Road



Vicinity Map

Department of the Interior
U.S. Fish and Wildlife Service
August 1992



Recycled paper



Postage and Fees Paid
U.S. Department of the Interior
INT423



To:

U.S. Fish and Wildlife Service
Wheeler National Wildlife Refuge
Route 4, Box 250
Decatur, Alabama 35603

Official business
Penalty for Private Use, \$300



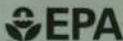
Southeast Region Refuges



Wheeler
National
Wildlife
Refuge

One of almost
five hundred refuges
in the United States.

A L A B A M A



Superfund At Work

Hazardous Waste Cleanup Efforts Nationwide

Triana/Tennessee River Site Profile

Site Description: Rural area, within the boundaries of a national wildlife refuge and a U.S. Army Installation

Site Size: An 11-mile stretch of two tributaries of the Tennessee River

Primary Contaminants: DDT and related degradation products (DDD, DDE)

Potential Range of Health Risks: Kidney ailments, central nervous system disorders, and increased risk of cancer through direct ingestion

Nearby Population: 600 in Triana and several hundred in nearby towns

Ecological Concerns: Bald eagle and migratory birds; habitat for several endangered species

Year Listed on the NPL: 1983

EPA Region: IV

State: Alabama

Congressional District: 5

Success In Brief

EPA and Olin Clean Up Triana Site: "A Major Victory for the Environment"

The rural community of Triana, Alabama is no longer exposed to DDT contamination, due to efforts by the U.S. Environmental Protection Agency (EPA) and Olin Chemical Corporation.

Cleanup at the Triana/Tennessee River also involved the participation of the local community and a variety of state and federal agencies. Although contamination at the site occurred over a 23 year period, DDT levels in river sediments have been reduced by over 90% in only five years. EPA's efforts included:

- Reaching an agreement with Olin to perform the cleanup, valued at over \$30 million;
- Designing a comprehensive cleanup plan for an 11-mile stretch of the Tennessee River system;
- Re-routing a portion of the Huntsville Springs Branch River, a tributary of the Tennessee River; and
- Receiving the support of the local community.

The site's success is measured not only by the innovative measures taken to cleanse the river system, but by the full cooperation of Olin throughout the enforcement process. Olin and EPA's efforts at the Triana/Tennessee River site have achieved, in the words of former EPA Assistant Regional Administrator Howard Zeller, "a major victory for the environment."

The Site Today

Construction and cleanup are complete. DDT levels in fish and water are decreasing steadily, and wildlife habitat has improved significantly. Olin is monitoring three species of fish, as well as surface and ground water, and sediment migration. Providing DDT levels continue to drop and remain at federal standards, the site will again be reviewed by EPA in 1998, to assure that court-ordered performance standards have been attained.



Photo: Olin Chemical Corporation

Olin's crew encounters Wheeler Wildlife resident. An American alligator wandered onto the Triana/Tennessee River cleanup area, and was safely returned to the refuge.

A Site Snapshot

The Triana/Tennessee River Superfund site consists of an 11-mile stretch along two tributaries of the Tennessee River, the Huntsville Spring Branch and Indian Creek.

The nearby Wheeler Wildlife Refuge (WWR) provides a sanctuary for nearly 60,000 migratory birds, as well as habitat for several endangered species, including the bald eagle, gray bat, Indiana bat, American alligator and mollusks. Established in 1937, WWR was among the first protected wildlife refuges in the nation.

Commercial DDT production began in the area in 1947 at Redstone Arsenal in Huntsville, Alabama, by a firm which subsequently went out of business. In 1954, Olin purchased the business from the previous owner. DDT production was resumed and continued until 1970. The insecti-

cide was banned from the U.S. market in 1972.

During manufacturing, Olin discharged DDT wastewater into drainage channels feeding into the Huntsville Spring Branch, 11 miles upstream from Triana. Approximately 409 tons of DDT accumulated in the nearby tributary system. The plant was closed and demolished by the U.S. Army in 1971, but local residents and the surrounding environment — including fish and the national wildlife refuge — were contaminated with DDT, a probable human carcinogen.

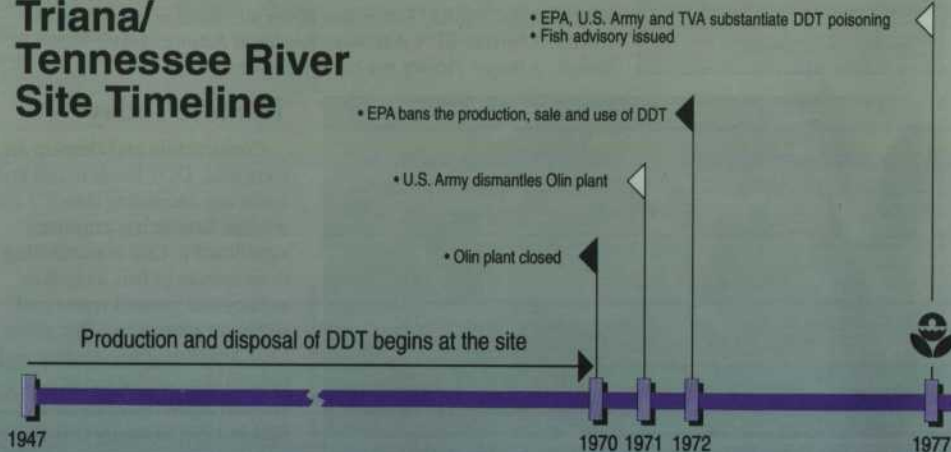
The rivers provided drinking water until 1967. In addition, several species of fish (channel catfish, largemouth bass and buffalo fish) inhabit the rivers, supplementing the income and diet of this rural community. In the most extreme cases, DDT levels in local

fish exceeded 100 parts per million (ppm) — 20 times the guideline level set by the Food and Drug Administration.

Many Triana residents have been affected to some degree by DDT. Although questions were raised as to the linkage of illnesses caused by DDT exposure, one thing was certain: the community had lost an essential source of food and income — the fish of the Tennessee River System.

As a public health precaution, the State of Alabama issued a fish consumption advisory in September 1991 for residents in the Indian Creek/Huntsville Spring Branch area, including Triana, citing high DDT levels. This extended a previous fish advisory that had been in effect since 1978.

Triana/ Tennessee River Site Timeline



Cooperative Cleanup Efforts Overcome Long History of DDT Pollution

EPA Involvement at Site Pre-Dates Superfund

EPA became involved at the site before the enactment of Superfund. In 1977 EPA, the U.S. Army and the Tennessee Valley Authority (TVA) began joint investigations of the site area. DDT contamination was found throughout portions of the river system. TVA issued advisories to the public regarding the dangers of consuming local fish. The U.S. Fish and Wildlife Service posted signs along the river, warning the public that local fish were contaminated with DDT. Eight days before the passage of Superfund legislation, EPA brought a legal

action against Olin, pursuant to the *Rivers and Harbors Act* of 1899, one of the few enforcement tools available at the time. Once Superfund was passed in 1980, EPA acquired new enforcement authorities.

In 1981, the site was proposed for inclusion on the National Priorities List (NPL), EPA's roster of sites requiring long-term cleanup. In 1983, the Triana/Tennessee River site was formally added to the NPL, making Triana one of the Superfund program's earliest sites.

EPA's Enforcement Matched by Olin's Cooperation

In 1983, EPA and Olin signed a consent decree in which the company agreed to clean up DDT-contaminated sediments and to mitigate natural resource

damages. To date, Olin has paid over \$30 million in cleanup costs. In addition, the company has consistently met all EPA deadlines.

To oversee Olin's compliance with the terms of the court-approved agreement, a multi-agency review panel was created, consisting of four federal agencies (EPA, the U.S. Army, TVA, and the Fish and Wildlife Service) and the Alabama Department of Environmental Management (ADEM). The panel, headed by EPA, was charged with overseeing Olin's work at the site until its satisfactory completion. Members of the Town of Triana and the Olin Chemical Corporation also participated on this review panel as non-voting members.

Following the signing of the consent decree, EPA representative and review panel Chairman Howard D. Zeller remarked, "I

- EPA files suit against Olin
- Superfund enacted

- Triana proposed to the NPL

- Final NPL listing
- Olin agrees to clean up site
- Review panel formed

- Review panel accepts Olin's cleanup plan

- Environmental Impact Statement prepared

- Construction on Area I begins

- Construction on Area I completed
- Long-term monitoring begins

- All cleanup activities complete
- State continues fish advisory

- Long-term monitoring period ends (planned)

1980 1981

1983 1984

1985 1986

1987

1991

1998

view this as a continued indication of cooperation on behalf of the Corporation, the Town of Triana, and the state and federal agencies represented on the Review Panel... Olin's efforts are a positive improvement to the environmental quality of this area."

"Olin's [cleanup] efforts are a positive improvement to the environmental quality of this area."

— Howard Zeller, EPA
Official

Multi-Agency Review Panel Oversees Design

The review panel met over 30 times between 1983 and 1991. Meetings were open to the public

and were announced by EPA to local news media and the national wire services. Cooperation among the different members of the review panel was excellent, according to one participant.

The review panel collectively took on the traditional role of EPA in generating technical plans and reviewing Olin's proposed designs. From 1984 to 1986, the panel evaluated Olin's proposals for cleaning up the most contaminated tributary, the Huntsville Spring Branch. In August 1984, Olin submitted its design for the first portion of cleanup. In addition, USACE submitted an Environmental Impact Statement (EIS), addressing the proposed federal actions and potential effects. Olin and the review panel spent the better portion of 1985 finalizing the EIS, continuing sampling, holding public meetings, and preparing engineering designs. In addition, Olin secured several federal and state permits before work began.

The Cleanup Plan

Engineers divided the 11-mile stretch of the Huntsville Springs Branch and Indian Creek into three areas, or reaches. Area I (Reach A) comprised a three-mile portion of the Huntsville, where the vast majority of contamination was located. Area II (Reach B) identified the point at which the Huntsville and Indian Creek converge.

Finally, Area III (Reach C) extended from that point to the Tennessee River.

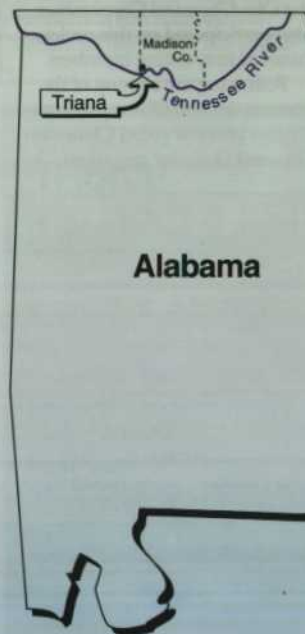
For Area I, the review panel initially considered dredging the channels and disposing of the DDT-contaminated sediments off-site. Upon further evaluation, however, they decided that dredging could destroy aquatic and wetland habitats and potentially expose downstream populations to the contamination. Another alternative — building low-level dams to halt the movement of contaminated sediments — was also considered. This option was rejected as well, since it would not attain required standards. The review panel decided that the best alternative was stream diversion and burial of DDT-contaminated sediments.

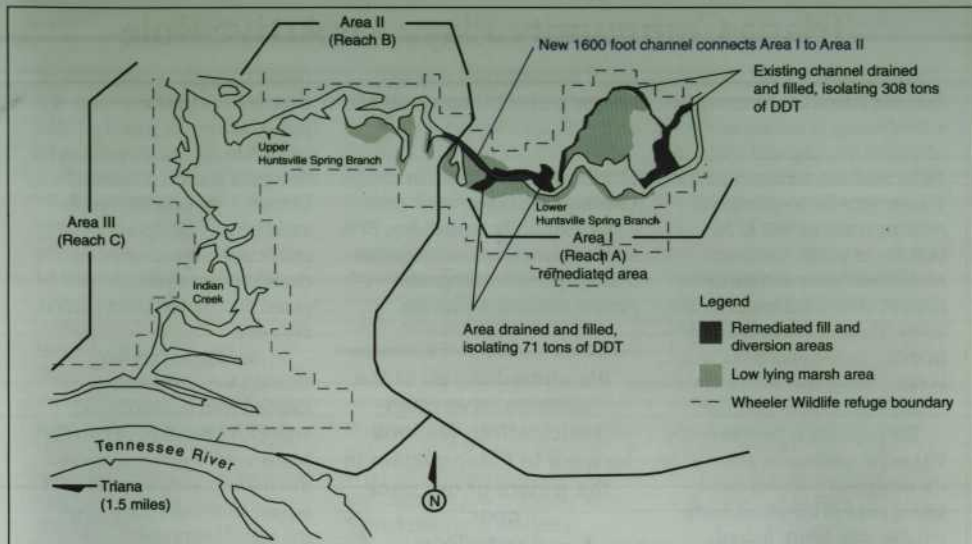
Engineers divided the 11-mile stretch of the Huntsville Springs Branch and Indian Creek into three areas, or reaches.

Stream Diversions Dramatically Lower DDT Levels

Work began on the upper portion of Area I in April 1986, to isolate 308 tons of DDT-contaminated sediments. Cleanup personnel drained and rerouted the water from this area by constructing diversion ditches and levees, linking the upper and lower portions of Area I. Once drained of water, the exposed DDT sediments were covered with state-of-the-art, durable fabric and crushed rock. The area was then filled in with clean soil and replanted with vegetation.

In December 1986, the review panel approved Olin's second cleanup design for the lower portion of Area I. A new 1,600





foot channel between the upper and lower portions of the area was built to drain and divert clean water from this second section of heavy DDT concentration. In this bypassed section, 71 tons of DDT were isolated. Just as in the upper portion of Area I, contaminated soil was buried, covered, and replanted. As a result, the stream flowing throughout Area I ultimately was connected to the rest of the Huntsville Spring Branch/Indian Creek system, containing significantly lower levels of DDT.

As for the remaining two Areas of the Triana site, DDT contamination remaining in river sediments was comparatively small. EPA determined that the best course of action in these two Areas was to conduct long-term monitoring of water, sediments and fish to ensure that DDT levels diminished and remained at court-approved levels.

Cleanup Activities Eliminate 93% of Contamination

In October 1987, the construction work on both portions of Area I was completed. Three miles of contaminated stream channels had been successfully isolated and rerouted. During operations, Olin constructed over five miles of access roads, over

The cleanup effort was twice nominated for a National Wildlife Corporate Conservation Council Award.

one mile of new stream channel, and over two miles of diversion structures. Some 150,000 cubic yards of soil were removed. Approximately 217,000 cubic yards of clean soil and 190,000 cubic yards of rock were used to fill in contaminated portions of

Area I. Altogether, 28,000 truck loads of clean soil and rocks were transported to the site. The total amount of DDT sediments contained and buried at the site amounted to 379 tons — 93% of all contaminated sediments estimated to be in the river system.

All In a Night's Work

The Triana site lies partially within the boundaries of the U.S. Army's Redstone Arsenal. The focal point of the construction activity was located within the restricted access area of a missile range and a NASA spaceflight center — one of the world's most advanced laser technology and testing stations. Therefore, Olin was obligated to work within the Army's and NASA's tight security restrictions to gain site access to conduct the cleanup. This was accomplished by working at night under flood lights.

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Triana Community Plays An Active Role

For the past 30 years, the Town of Triana has been on a steady course of economic revitalization. The mid-1960s and 1970s marked a turn-around for Triana, from the installation of running water in 1967 to the building of public housing, recreational areas and the development of new industries for the town. These activities resulted from the tireless efforts of Clyde Foster, the popular mayor of Triana from 1954 to 1984.

The population grew to nearly 600, as people became attracted to the progressive development taking place in this small, northern Alabama town. Indeed, things were looking up for the town when the DDT contamination was detected.

Triana residents and area fishermen were suddenly faced with the hazardous poisoning of their most valuable resource, the river itself. Thus began the long-term involvement of the community in the day-to-day cleanup of their river. The town was also

forced to find the best way to address the health impacts of DDT on the community.

EPA Involves Residents in Cleanup Decisions

As with all Superfund sites, EPA staff inform affected communities through public meetings and printed materials explaining

"It's something all of the citizens have been anticipating. We look forward to fishing again in the waters of our back door."

— Alonzo Toney,
Former Mayor of Triana

current and proposed actions at the site. Triana residents were active throughout the cleanup process and participated regularly in the various public meetings with EPA and Olin. Residents were represented on the review panel by a non-voting member. For example, in July 1984,

over 400 people — two-thirds of the town's population — appeared at a public meeting held by EPA to discuss alternatives for the upper portion of Area I. In October 1986, over 100 people attended an EPA-sponsored public meeting to discuss the cleanup progress and the proposed plan for the lower portion of Area I.

In the aftermath of the cleanup, the community is satisfied with the results and with EPA's handling of the effort. Moreover, the public is relieved that the imminent threat of DDT is past. Community members still attend bi-annual review panel meetings. Alonzo Toney, the former mayor, anticipates a return to normal pastimes: "It's something all of the citizens have been anticipating. We look forward to fishing again in the waters of our back door." Today, residents of Triana are looking forward to a new era for their children and grandchildren.

Triana Cleanup

continued from page 5

Working at night required more intensive management and coordination with the Army, as well as a host of construction companies to ensure delivery of raw materials to the site. Nevertheless, Olin never missed a deadline, and no adverse environmental effects occurred during these nighttime operations.

Cleanup Complete, Long-Term Monitoring Continues

By 1990, as a result of cleanup efforts, the overall ranges of DDT concentrations in fish had dropped by as much as 86 percent, while DDT levels in the waters decreased by 93 percent. Considering the poisoning of the river system was 23 years in the making, the river and the wildlife are making a dramatic comeback.

The cleanup effort was twice nominated for the National Wildlife Corporate Conservation Council Award in 1990 and 1991. The National Wildlife Federation presents this award for outstanding corporate responsibility toward the environment. The award recognizes innovative and creative accomplishments in cases where site cleanup has generated proven economic and environmental benefits.

DDT: The Consequences of Exposure

DDT is a highly toxic and inexpensive chemical which received the widest commercial marketing of any insecticide in the history of U.S. agriculture. DDT was patented in 1942 and produced until 1972, when its production, sale and use were banned by EPA. Research indicates that, because of DDT's widespread usage throughout three decades, anyone born in the U.S. between the mid-1940s and 1970s has had some exposure to the chemical through their food. Fortunately, DDT concentrations per capita have been steadily declining since the 1970s.

Direct ingestion of high concentrations of DDT (10 ppm or greater) may potentially damage the central nervous system. DDT is stored in fatty tissues, therefore its concentration will increase over prolonged periods of low-dosage exposure. Symptoms from ingesting high quantities of DDT include: acute nervous tension, dizziness and convulsions. In addition, liver deterioration, cancer and reproductive complications have been associated with DDT poisoning. In wild, fish-eating birds, DDT poisoning at levels greater than 5 ppm results in weaker egg-

shells and greater vulnerability of offspring. This phenomenon has been especially noted in the case of bald eagles and other rare and endangered species.

Fish, birds and humans absorb DDT into their systems by ingesting water and/or food contaminated with DDT. Fish absorb the contamination from other fish; birds consume fish and accumulate DDT. At the top of the food chain, humans consume both fish and sprayed crops, such as vegetables and grains, accumulating still higher concentrations of DDT and storing it in fatty tissues.



Photo: John Cossick, U.S. Fish and Wildlife Service



Photo: Emano Variso, U.S. Fish and Wildlife Service

The American bald eagle is among the endangered species that are known to nest in the Wheeler Wildlife Refuge (right). The blue heron (left) is another inhabitant of the refuge, a sanctuary for over 60,000 migratory birds. Blue herons are widespread throughout North America, and depend on the nation's abundant lakes and marshes for feeding and reproduction.



Olin cleanup workers dredge a stream channel in Lower Reach A of the Huntsville Spring Branch. This new 1,600 foot channel connects the upper and lower portions of the river area, by-passing 71 tons of DDT-contaminated sediments.

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Success at Triana

Cooperation between EPA, Department of the Army, FWS, TVA, State of Alabama, the town of Triana, and the Olin Corporation has been the main ingredient of this successful cleanup. As a result of EPA's effective, multi-lateral enforcement and full compliance by the company, Triana residents may once again look forward to a healthy future for themselves and generations to come. Likewise, local fish and wildlife will have a secure habitat for their offspring. The DDT contamination that has plagued this river area for so many years is rapidly becoming a distant memory.



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