

TENNESSEE NATIONAL WILDLIFE REFUGE  
Paris, Tennessee

ANNUAL NARRATIVE REPORT  
Calendar Year 1983

NATIONAL WILDLIFE REFUGE SYSTEM  
FISH AND WILDLIFE SERVICE  
U.S. DEPARTMENT OF THE INTERIOR



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## INTRODUCTION

Tennessee National Wildlife Refuge was established on December 28, 1945, by Harry S. Truman, President of the United States, who signed Executive Order No. 9670, designating the area for use by the Department of the Interior as a wildlife management area for migratory birds and other wildlife. On December 29, 1945, the Department of the Interior and the Tennessee Valley Authority entered into agreement with respect to the lands that were to be reserved and used as the wildlife refuge. The establishment of Tennessee Refuge in Benton, Decatur, Henry, and Humphreys Counties was undertaken to further the purpose of the Migratory Bird Conservation Act (45 Stat 1222) and be in the public interest.

Tennessee National Wildlife Refuge lies within the Tennessee River Valley with Kentucky Lake being the dominant feature of the refuge. Three separate units make up the 51,358 acres, Duck River Unit with 26,738 acres, Big Sandy Unit with 21,348 acres and Busseltown Unit with 3,272 acres. Headquarters for the Tennessee Refuge is in Paris, Tennessee, but a sub-headquarters exists on all three field units. Nearby Cross Creeks National Wildlife Refuge became a part of the Tennessee Refuge complex during late 1982.

A distance of as much as sixty air miles separates the three units of Tennessee National Wildlife Refuge. Lands now managed by the refuge were among the tracts purchased by the Tennessee Valley Authority in the construction of Kentucky Dam and the subsequent impoundment of Kentucky Lake. However, the Tennessee Valley Authority reserved all rights on these three units essential for the full operation of Kentucky Dam for flood control, navigation, and power production. Kentucky Lake has an annual water fluctuation which is exactly backwards for good waterfowl management. Normal summer pool is 359' with a drawdown to 354' during the winter months. At times, this water fluctuation turns out to be a "manager's nightmare" when operating for waterfowl. The Tennessee River just happens to run north in this part of the country and it takes a newcomer awhile to catch onto the phrase "up south" when referring to the refuge gradient.

The primary habitat types on Tennessee Refuge are 23,550 acres of rivers, streams, and water, 18,800 acres of various timber (primarily upland hardwood), 5,200 acres of farmland, 3,580 acres of seasonally flooded basins, and 228 acres of miscellaneous lands. The 5,762 acres of Duck River Bottoms (within the TVA diked area) has consistently been the "hub" of the refuge and supports an above average quantity of both waterfowl and eagle use-days.

Tennessee National Wildlife Refuge was established primarily as a resting and feeding area for waterfowl and other migratory birds. Waterfowl utilization in recent years has varied between 16 and 24 million use-days in a single year. During the past ten years, geese have peaked at 60,000 and ducks have peaked at more than a quarter million. In addition to waterfowl, Tennessee Refuge hosts a sizeable population of bald eagles, sometimes numbering as many as fifty birds.

Historically, Tennessee Refuge is located within a flavorful area. The Chickasaw Indians were the dominant tribe in this locale and many remnants

of their presence still remain such as pottery fragments, arrowheads, bones, kitchen middens, flint fragments and other relics from their culture. Nearly all of these remnants are found along the shoreline of the Tennessee River. Steamboats once used the river for transportation of commodities and many boat landings still bear the names established and recognized by the river traffic of more than 100 years ago. Log structures are nearly a thing of the past although a few remnants can be found on and around the refuge. The Civil War left its mark on Tennessee Refuge as control of the river traffic became vitally important to both the Union and Confederate forces.

#### A. HIGHLIGHTS

1. A barnacle goose was sighted in Duck River Bottoms on January 4, 1983. Word of this unusual sighting quickly got out to local birders and many got to see this strange visitor. See Section G.3, for more details on this observation.
2. Both January and February of 1983 turned out to be very busy months at the refuge office. Paperwork included the writing of annual work plans, refuge objectives, the annual narrative report, an environmental assessment, 404 and 26a permit applications, Section 7's, a FONSI report, and various other requested reports. See Section D.4, for more information.
3. Major breakdowns on our two TD-15 International Harvester dozers were critical this year. One dozer needed a complete engine overhaul while the other both a complete engine overhaul and a complete rebuild on the transmission. Refer to Section I.3, for additional information.
4. The weather during 1983 was definitely not typical. We went from a very mild winter into a wet, cool spring and then into a long, hot and dry summer. From there it was back into a very wet fall and on into December with record setting low temperatures. See Section B. for more details on the weather.
5. Heavy rains during the winter, spring and late fall caused flooding within Duck River Bottoms. Flood waters inundated the bottoms for an unprecedented three times during 1983. Refer to Section B. for more information.
6. The problem of the three right-of-way corridors at Antioch came more into focus during 1983 as adjacent landowner Ben Gaines sought for special privileges on refuge lands. It now appears that the Fish and Wildlife Service will grant him a special permit for a boat dock on refuge lands and waters. See Section H.16, for further information on this dilemma.
7. A very wet spring made for late planting by the local farmers. This late planting followed by an overall hot, dry summer made for extremely low corn yields. The lack of adequate precipitation also made for overall low yields on other crops such as milo, millet, etc. Refer to the Crops-lands section, F.4, for more details on the poor agricultural year.

8. Former residents of the Big Sandy Peninsula (the old 23rd civil district) became very interested this year in trying to preserve the old Mount Zion Church, a national historic site located on the Big Sandy Unit. An on-site meeting was held on January 13, 1983, between the Service and representatives from former landowners which was the starting point looking toward a long term maintenance contract with the group. See Section F.12. for more details on this subject.

9. Several inspections were undertaken during the year. Refuge Supervisor Sam Drake made his annual inspection on August 9-11, 1983. Deputy Assistant Regional Director Don Hankla was present for our annual programatic inspection on August 31-September 2, 1983. A second administrative inspection was conducted by Sam Drake on November 8 and 9, 1983. Refer to Section E.8. for more information on this matter.

10. For the fourth time in its eleven year history, Mansard Island Marina is under different ownership. Mr. Chuck Woods of Murray, Kentucky, purchased the concession on September 27, 1983. See Section H.19. for more details on the sale of the marina.

11. The construction of the ten sub-impoundments within Duck River Bottoms was by far our most important and time consuming operation during the year. Thousands of man hours were directed at implementing and constructing the various levees which will make up the low-level dike complex for the ten sub-impoundments and associated water control structures. For more information on this subject, see Section I.1.

12. Maintenance Worker Elgin "Dick" Himes fell from a truck loaded with culverts on October 6, 1983, and injured his neck and back. His personal physician has advised against him returning to work due to his current physical condition. Paperwork has been forwarded to OWCP. For more information on this incident, refer to Section E.1.

#### B. CLIMATIC CONDITIONS

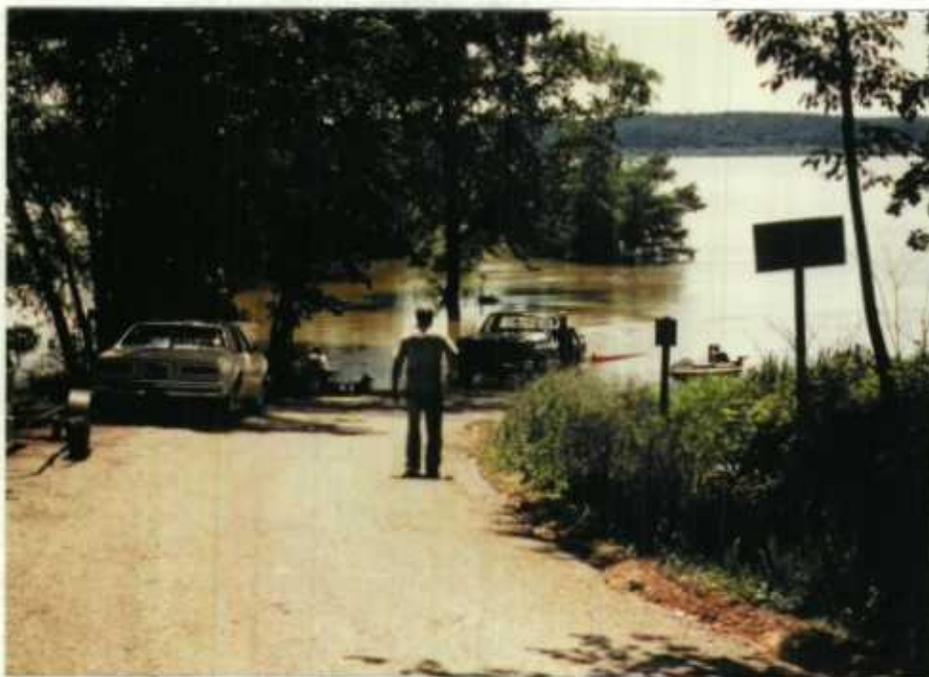
The winter of 1983 was relatively mild. Temperatures rarely dropped below twenty degrees. A two inch snowfall fell on January 20 followed by freezing rain and sleet which brought the limbs out of many trees.

The spring of '83 turned out to be a wet one. We were looking for balmy weather during April but instead got a cool, rainy month. Some portions of the refuge reported more than eight inches of rain during April. Needless to say, Duck River Bottoms flooded again. The cool, wet weather of April pushed local farmers way back in their planting efforts. A killing frost was even recorded as late as April 26, 1983.

If April precipitation was not bad enough, then May made up for it with nearly twelve inches. Much of this rain ran off from already water logged soils. We had just started to recover from the April flood when the May flood descended upon the Tennessee Valley. For the second time during 1983, flood waters came over the dikes at Duck River Bottoms and covered the entire area. Kentucky Lake hit an all time high on May 24, 1983,



83-3-24. The floods of 1983 played havoc with much of our shoreline. Nix Landing really took a beating as the Tennessee River overflowed its banks in this area and went on a tear. (LR)



83-3-24. An all time high Kentucky Lake level was reached on May 24, 1983 with eleven feet above normal. An elevation of 370.0' was officially recorded at Paris Landing on that date. It was often difficult to locate the known boat launching sites. (RC)

when the water hit 370.0' on the Big Sandy Unit, 371.1' on the Duck River Unit, and 376.0' on the Busselton Unit

An old saying predicts "one extreme follows another" and it surely did for us here in West Tennessee. July and August temperatures generally ranged between 95 and 102 degrees. Along with the extreme heat came a disastrous drought with less than one and one half inches of rain falling in these two critical months. The hot, dry growing season spelled doom for many local farmers. The summer of 1983 proved to be the hottest and driest in more than thirty years and August 1983 proved to be the hottest August ever.

Someone must have heard us complaining about the drought too much because on September 12 a total of three and one half inches of rain fell in the Paris area in less than an hour. We're never satisfied, are we!

The year 1983 proved to be either hot and dry or cold and wet. November and December turned out to be extremely wet as nearly seventeen inches of rain fell during these two months. The wet, soft ground proved to be a complicating factor as farmers tried desperately to get their crops out of the fields. There are times when nothing seems to go right! And would you believe Duck River Bottoms flooded again for an unprecedented three times in a year as waters raced over the dikes during the final week of November,

The final week of December 1983, turned out to be extremely bitter cold for the entire area. The morning of December 24 was minus five degrees with only a high of three degrees on Christmas Eve. This was followed by a two inch snow on December 26 and freezing rain on December 27. The frigid weather damaged some water lines both above and below ground on the sub-headquarters areas.

The 1983 weather was definitely the top story of the year and its effects spilled over into most everything that we did at the station. The chart below will give an indication of the extremes which we faced during the year. Our source of data is the Henry County Weather Station.

<u>1983</u>	<u>Rainfall</u>	<u>Snow</u>	<u>High</u>	<u>Low</u>
January	2.16	2.2	58	15
February	2.20	T	71	16
March	3.22	.4	81	23
April	7.91		83	26
May	11.81		85	39
June	2.87		92	48
July	1.12		100	56
August	.35		102	59
September	3.54		97	35
October	4.12		85	37
November	9.33		72	27
December	7.43	4.8	62	-5
Total	56.06"	7.4		

Total rainfall in 1983 was 56.06 inches which was somewhat above the normal of 48.35 inches. It was a year of either flood or drought, a most unusual year!

## D. PLANNING

1. Master Plan. Station refuge objectives were revised for Tennessee Refuge during the winter of 1983. They were revised in accordance with the planning needs assessment program. The objectives were brought more in line with the refuge's capability and updated Service policy along with being more simplified than the previous version. Refuge Division Supervisor Sam Drake visited the refuge on February 28, 1983, to review these updated objectives. Refuge Manager Carrell Ryan met with Regional Office representatives in Atlanta, Georgia, on March 31, 1983, to discuss further this station's revised refuge objectives.

The one page development plan has been revised to reflect the ten sub-impoundments planned for Duck River Bottoms. The one page development plan was also updated to delete items already accomplished and those projects superseded by the sub-impoundment construction. No rewrite in the refuge's master plan is envisioned until possibly 1985.

2. Management Plan. Area Forester Clyde Stewart has initiated a rewrite on Tennessee Refuge's timber management plan. This document has needed rewriting for several years.

A specific water management plan was not written for Tennessee Refuge for 1983. Previous plans had looked more like reports rather than predictions since the refuge has no control over the water levels of Kentucky Lake. However, we do anticipate writing a "Annual Water Management Program" for CY 1984 which will outline what happened during 1983 and describe our water management plans for 1984, especially with the ten new sub-impoundments under construction within Duck River Bottoms.

3. Public Participation. The public was directly involved in getting attention drawn to the Mount Zion Church (National Historic Site) located on the Big Sandy Unit. Former members of the church and adjacent landowners wanted some type of rehabilitation project undertaken on the old structure to better preserve the church. More will be said about this endeavor in Section F,12 (Special Areas).

Two local public meetings were held in Paris, Tennessee, during 1983, which were of interest to the refuge and to the Service. On November 8, 1983, Tennessee Valley Authority conducted a public meeting to gather input on how to best manage 66,000 acres of undesignated lands along the Tennessee River. More than a hundred people showed up to voice their opinions on TVA's performances, what they liked about the lake, what they didn't like, present and foreseeable problems, and which direction they would like to see TVA head. The other public meeting at Paris, Tennessee, was held on December 7, 1983, and concerned the placement of several pairs of red wolves on the nearby 170,000 acre Land Between the Lakes recreation area. People were invited to come and listen to the proposal and other pertinent data on the red wolf and have an opportunity to voice their opinion on the project. Public opinion in Henry County ran against the red wolf but not overwhelmingly. TWRA voted to "kill" the red wolf project on Land Between the Lakes.

4. Compliance with Environmental Mandates. The year 1983 was a very active period for acquiring permits and satisfying various requirements for the proposed ten sub-impoundments within Duck River Bottoms. Two big permit hurdles were TVA's 26a permit and the Corps of Engineers 404 permit. Various on-site inspections were made of the proposed construction area by TVA and the Corps during February, March and April as the various agencies looked into both functional and biological aspects of the project. Other documents required by the Service and the various agencies were an environmental assessment, a Section 7 document, and an archaeological survey of the project. By early summer all of the permits had been acquired for the project and all other requirements met. At last the dirt could move! Some projects can't even start until the paperwork is done!

5. Research and Investigation. Tennessee Refuge was again asked by the U. S. Forest Service to participate in the gypsy moth study in this region. Pheromone traps were placed at both of our marina concessions which were thought to be likely collection sites. No gypsy moths were collected at either location during the summer.

Moist soil vegetation transects were again sampled during the late fall within Duck River Bottoms and productivity ranged between 750 and 2,000 pounds of waterfowl foods per acre. It was estimated that an average of 850 pounds per acre of moist soil foods were produced on 3,200 acres at this location (lands between the 354 and 359 MSL).

The Tennessee Valley population of Canada geese is currently being studied by Richard Kasul of L.S.U. who is looking at survival patterns and distribution densities of the TVP flock. This station made some minor changes to some of our 1971 and 1973 banding schedules on Canada geese which now more consistently reflect age codes with other Tennessee Valley refuges which were also providing data into the study.

#### E. ADMINISTRATION

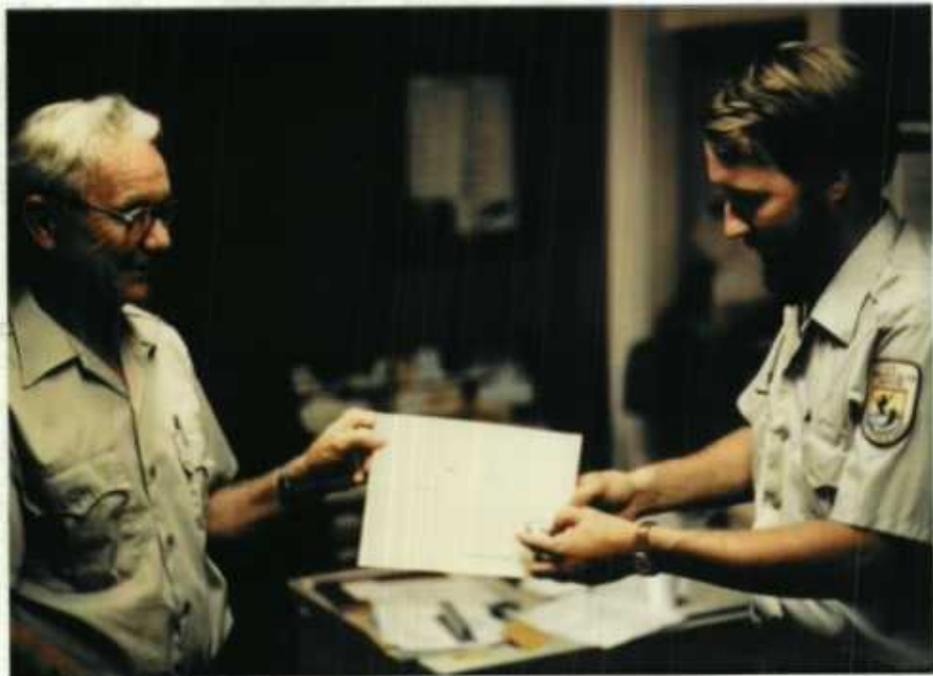
1. Personnel. The following table will give a five year analysis of the on-board personnel strength at Tennessee Refuge. There are currently no vacancies at Tennessee Refuge which we are authorized to fill.

	<u>Permanent Full Time</u>	<u>Permanent Part Time</u>	<u>Temporary</u>
FY 83	13	0	0
FY 82	10	3	0
FY 81	10	3	0
FY 80	10	5	1
FY 79	11	7	3

During the year, position descriptions were rewritten on four employees at this station due to changes in duties and responsibilities. No action has been taken on any of the four positions.



83-6-21. You're right! Normally the telephone would be in use and the desk would be piled much higher with overdue reports. However, Complex Manager Carrell Ryan can get prepared for a photograph. (LR)



83-4-8. June 28, 1983 marked ten years of Government service by Assistant Refuge Manager J. Randy Cook. Complex Manager Carrell Ryan presents the appropriate pin and certificate. (LR)

Assistant Refuge Manager J. Randy Cook recently received a ten year service pin. Mr. Cook officially had ten years with the U.S. Government as of June 28, 1983. Manager Ryan also received his thirty year pin,

2. Youth Programs. Tennessee Refuge was alerted early in 1983 that it would be a participant in the Youth Conservation Corps program. Vacancy announcements were sent to the various school systems in Henry, Benton, Decatur and Humphreys Counties on April 4, 1983. A public drawing of eleven enrollees from more than a hundred applicants was made on April 22, 1983. These eleven enrollees were notified to report for work on June 13, 1983. Laborer Foreman Johnny Whit Lewis was selected to assist with the YCC program.

The YCC program officially started at Tennessee Refuge on June 13, 1983. Of the eleven enrollees, two were assigned to the Big Sandy Unit, seven to the Duck River Unit, and two to the Busseltown Unit. We experienced the normal amount of enrollee declinations and alternate replacements.

The YCC enrollees always worked in the company of one of the refuge staff members or the Laborer Foreman specifically hired for that assignment. A wide variety of jobs were accomplished by the YCC which included mowing grounds, clearing back trees from roadways, painting buildings, removing flood drift, picking up litter, rehabilitating a nature trail, pouring concrete logs for boat launching ramps, replacing siding on buildings, etc. The YCC program ended on August 5, 1983, with no serious accidents reported and a lot of meaningful work accomplished.

3. Other Manpower Programs. This station was able to secure the secretarial services of Brenda Sneed who was provided to us by CETA for a period of six weeks. Miss Sneed worked in the headquarters office from June 20, 1983, until July 29, 1983, and performed various clerical services such as typing, filing, answering the telephone, and greeting visitors.

4. Volunteers Program. Shirley Nobles was a carry-over volunteer from 1982 and donated two days a week of her time from January 1, 1983, until August 30, 1983. Her volunteer duties included typing, receptionist activities, processing refuge hunt applications, telephone services, handling the refuge mail, filing, etc.

5. Funding. The FY 83 budget definitely bounced around several times during the year. To be more definite, there were eight changes in our allotment during the FY. What started out as a budget of \$385,000 (\$319,000-1210, \$10,000-1220, \$56,000-1240) eventually ended up at \$403,800 (\$317,200-1210, \$30,600-1220, \$56,000-1240). All those changes definitely kept the clerk on her toes. There were no extra monies in the FY 83 budget to replace aged equipment. The only mechanical equipment purchased during the year were two pieces of transportation equipment, a compact pickup truck and compact station wagon.

The following five year funding level will indicate what fiscal progress has been made in recent years for Tennessee Refuge's budget.

<u>Fiscal Year</u>	<u>Rehab Funds</u>	<u>Special Projects</u>	<u>B.L.H.P.</u>	<u>Station Funding</u>
1979	0		92,668	330,000
1980	0		93,822	330,000
1981	12,000		0	328,000
1982	4,000		0	351,000
1983	10,000	15,000	0	403,800

6. Safety. Three reportable accidents took place during 1983 at Tennessee Refuge. On March 24, 1983, Maintenance Worker Elgin M. Himes was backed into by another vehicle as he was driving from one portion of the refuge to another. The privately owned vehicle backed out of a driveway and struck Himes' pickup in the side. Insurance covered the complete cost of repairing the refuge vehicle. On June 9, 1983, Biological Technician Eddie V. McKissick injured his back while removing a rear tire from a tractor. One day of lost time resulted from this accident. On October 6, 1983, Maintenance Worker Elgin M. Himes fell from a truck that was delivering culverts to the refuge. Mr. Himes fell while removing a tie down cable that had become imbedded in the asphalt coated culvert. Mr. Himes had not returned to work by the end of the calendar year.

The accident involving Maintenance Worker Elgin "Dick" Himes has proven to be a serious one. Mr. Himes fell on his head and shoulder and damage was inflicted on his neck and spine as a result of the fall of about twelve feet. He spent several days in the hospital as a result of his injury and utilized the 45 days of administrative leave available to him. The appropriate documents were forwarded to OWCP so that he could be picked up by that agency, but this has not been accomplished by the end of the year. Mr. Himes personal physician had written to this office stating that he believed Mr. Himes should retire because of his present physical condition. We are not sure how this dilemma will eventually end but Mr. Himes is currently utilizing his sick and annual leave pending a change over to the roles of OWCP or some type of retirement. He is currently 69 years old and has worked for the refuge slightly more than five years.

Two Office of Aircraft Services representatives visited the nearby Henry County Airport on July 19, 1983, at the request of this office in order to certify planes and pilots of that airport for utilization by Tennessee Refuge. The two representatives stated they would return for a follow up visit to complete the certification process but at the end of the calendar year no action had been taken by OAS and this refuge remains without local convenient air service.

Factory roll bars are needed on several of our road graders and older crawler tractors. The Regional Office has stated that all refuge heavy equipment will be inspected for adequate rollover protection during the upcoming fiscal year.

Tennessee Refuge personnel were asked to assist in a search and rescue operation on August 2, 1983, in Kentucky Lake when a family of three were thrown from their boat. All three bodies were recovered within 24 hours from a location approximately 150 yards outside the refuge boundary.

A refuge safety meeting is held on the second Wednesday of each month and a safety oriented film is usually shown at each meeting. Soil Conservationist Eddie Reese is the safety committee chairman with Assistant Manager Rhodes and Biological Technician Dowdy also serving on the committee,

7. Technical Assistance. Refuge Manager Carrell Ryan attended a meeting at Paris Landing Inn on April 20, 1983, concerning the replacement of the present Scott Fitzhugh Bridge which crosses the Tennessee River at Paris Landing. Manager Ryan gave input into minimizing damage to wildlife values during this planning meeting,

The annual meeting with Tennessee Wildlife Resources Agency was held on September 6, 1983, at Reelfoot National Wildlife Refuge. The waterfowl forecast, the Tennessee Valley goose flock, waterfowl food problems, turkey transplanting, Reelfoot Lake sediment problems, Mississippi Valley goose flock and other topics were discussed at the meeting.

8. Other Items. The annual inventory of all accountable property was made during the year and no major problems were encountered in reconciling our list. Several items were earmarked as excess during this property check.

Refuge Supervisor Sam Drake visited Tennessee Refuge during the period of August 9-11, 1983. Mr. Drake visited all three units of the refuge while making his annual refuge inspection. Deputy Assistant Regional Director of Wildlife Resources Don Hankla visited Tennessee Refuge during August 31-September 2, 1983 for the annual programatic inspection.

GAO auditors Mary Cheston and Jack Pivowar of Washington, DC, made a visit to Tennessee Refuge on October 20, 1983, as part of a nationwide audit of refuges. We were told that we were one of approximately one hundred refuges that were being audited for economic uses and the compatability of multiple uses,

A refuge inspection was conducted by Refuge Supervisor Sam Drake on November 8 and 9, 1983. The administrative portion of the management at Tennessee Refuge was concentrated upon during this particular inspection.

#### F. HABITAT MANAGEMENT

1. General. Our most recent refuge land type inventory shows 3,581 acres as seasonally flooded basins, 85 acres in shallow fresh marshes, 8 acres as open fresh water, 23,551 acres as rivers (Kentucky Lake), 1,175 acres as annual green browse, 601 acres in perennial browse, 3,227 acres as hot foods (corn, soybeans, milo, buckwheat, etc.), 59 acres in other crops, 18,800 acres in forest, and 271 acres in administrative lands.

2. Wetlands. Flood waters played havoc on the dike system in Duck River Bottoms in early January 1983, with the Waverly Pump Station levee and the Lawrence Creek dike spillways taking the most damage. TVA opened the gates at the Duck River Pump Station on January 6, 1983, to help equalize the pressure within the bottoms. A total of \$10,000 in "flood damage funds" was received to rehabilitate those structures that sustained damage from the floods.

The Tennessee Valley Authority recently transferred to us the operation of setting and reading the water level guage at the Duck River Pump Station. A recording chart automatically logs the water levels for a seven day period. The refuge turns this chart over to TVA each week.

The refuge is fortunate in that the production of natural waterfowl foods was enhanced by the June flooding conditions and subsequent July drawdown. The Lawrence Creek area of the Duck River Unit produced large amounts of sedges, spike rush, wild millet, and panicum. Production of moist soil foods in the various bottom areas was unbelievable considering the long dry summer which occurred. A survey of our moist site areas showed good production in many locations. Even Busseltown Unit showed good natural food production on its moist soil sites.

A moist soil workshop was held at Tennessee Refuge on December 12 and 13, 1983, and was attended by approximately forty people. Personnel from nearby surrounding refuges were in attendance as well as representatives from Tennessee Wildlife Resources Agency, Tennessee Valley Authority, Kentucky Department of Fish and Wildlife Resources, and other interested agencies. December 12 was spent in the classroom at Camden, Tennessee, as Dr. Leigh Fredrickson of Gaylord Laboratory in Missouri and his assistants explained the basis of moist soil management. December 13 was spent in the field at Tennessee Refuge's Duck River Bottoms and also at Cross Creeks National Wildlife Refuge for a "hands on" look at the moist soil program at each of these two field stations.

The wetlands program at Tennessee Refuge is changing to reflect the Service's policy and philosophy of managing waterfowl by moist soil methodology wherever possible. Section I.1. will go into greater detail concerning the construction of ten low level impoundments in Duck River Bottoms where moist soil management will be actively implemented.

Beaver gave our wetlands program a boost in December when a colony of beaver built a dam across the mouth of Bennet's Creek at Big Sandy Unit. Flood waters subsequently backed up over a milo field and made an excellent feeding situation for the ducks.

The Corps of Engineers has now held Kentucky Lake at the 359' level until July 1 for four continuous years as opposed to the previous drawdown of June 15. The current drawdown is amuch more gradual decline in lake levels as compared to the earlier regime which took off the water rather quickly. Holding lake water longer and higher has complicated our farming program and the construction and rehabilitation projects within Duck River Bottoms.

3. Forests. Area Forester Clyde Stewart visited Tennessee Refuge on June 21, 1983, and looked at some of the timber on the Big Sandy Unit. Mr. Stewart has begun a revision of this refuge's timber management plan, as the current document is twenty one years old.

4. Croplands. The total refuge acreage under cultivation during 1983 was 4,758 acres. This was a decrease of 304 acres from the 1982 crop year. The decrease was due primarily to the termination of pumping in the lower Duck River Bottoms and the implementation of moist soil management in those areas where practical. The change in management was to



83-7-3. Low level dikes were constructed right alongside the edges of fields where coop farmers had planted row crops. (LR)



83-7-25. A total of 500 acres of browse wheat was seeded into standing soybeans. We were fortunate in getting the seed on right before a rain and the soybean leaf drop. A fine browse crop ensued. (RC)

provide a more natural habitat for waterfowl and other wildlife by using wetland management of the middle and lower elevation lands which would provide more natural foods and still allow a cooperative farming program on elevations above 359' level. The production of foods under this management system is primarily for diversity,

During 1983, cooperative farmers produced the majority of the station's waterfowl hot foods and a lesser portion of the green browse needs. The cooperative farmers planted 3,657 acres this year as compared to 4,991 acres just two years ago. The coop farmers planted 3,038 acres in row crops with the Service's share coming primarily as 519 acres of corn and 201 acres of milo. The 519 acres of corn going to the refuge produced a total of 18,095 bushels with 1,400 bushels of this amount being harvested for our waterfowl banding operation. The average yield of corn was just 35 bushels per acre as compared to 75 bushels per acre yield in 1982. The coop farmers harvested 309 acres of corn as their share of the crop.

Cooperative farmers also planted and harvested 1,696 acres of soybeans which yielded 32,941 bushels for an average yield of 19.4 bushels per acre, down from the 30 bushel yield in 1982. Although regional corn and soybean prices were up due to increased demands, these prices did not offset the enormous losses taken by the farmers due to low yields brought on by the drought. Most of the winter wheat was lost due to extreme winter and spring floods and only twelve acres were harvested as the Government's share.

The acreage cultivated as a Service operation during 1983 was 1,101 acres, down from 1,590 acres in 1982. The decrease in Service plantings was due to an across the board reduction in most types of browse plantings. Browse wheat dropped from 1,110 acres to 800 acres and buckwheat-millet mix from 474 acres to 215 acres. Approximately 500 acres of this wheat was overseeded onto soybean lands by airplane which germinated quite well. However, the buckwheat and buckwheat-millet blend planted earlier did not do well due to generally dry field conditions. Even 26 acres of Japanese millet did not do well and our hopes of harvesting this early crop and planting it back for waterfowl food did not exactly materialize as planned as this millet only made thirteen bushels per acre.

Overall, the 1983 croplands year was extremely discouraging. A wet planting season combined with a hot, dry summer and then followed by less than desirable harvest conditions made for a disastrous year for the cooperative farmer. This critical year will undoubtedly put several of our coop farmers out of business and negotiations for the 1984 croplands year should be more difficult.

New black and white aerial photographs have been received for refuge lands in Henry, Benton, and Decatur Counties. Aerial photos have also been ordered for Humphreys County which should arrive early in 1984. These new photos should aid in our croplands operations since we had been working with maps twenty "plus" years old.

5. Grasslands. The use of grasslands with resulting benefits to waterfowl as browse is a management tool used to accomplish our major objective. Most grassland at Tennessee Refuge is found on highly erodible soils,

primarily Class IVe and reclaimed Class VIe lands. These lands are generally not suitable for row crop production. Geese actually fed in "knee high" fescue, and browsed it into the ground. This is the first time this has been observed at Tennessee National .

Total acreage in grasslands at Tennessee Refuge remains fairly consistent year after year. Totals for 1983 include 448 acres of improved pasture, 25 acres of unimproved pasture, 26 acres of lespedeza, and 119 acres of fescue and clover. Most grasslands are presently used for haying or grazing. All grasslands are mowed one or more times annually for weed and brush control. Most areas are fertilized annually in amounts sufficient for long term maintenance of sod. Bermuda grass and fescue were used along some dikes and road ditches this year to aid in soil stabilization.

7. Grazing. Grazing is limited to permanent sod and is carried out only under a Cooperative Farming Agreement. The number of animal-use-months is limited to the eight month period of March through October and thus cattle are not present on pasture throughout most of the waterfowl season. This insures better utilization of the areas by waterfowl and the areas can be better maintained with less soil loss. Cattle utilized 473 acres of pasture land during 1983.

Waterfowl do benefit from the use of these grazing lands. Soil losses on marginal sloping lands are negligible, browse is provided, and open resting areas are provided. Additional crops accrue to the Service for the use of these grasslands by the cooperator. Twelve cooperators were involved with grazing agreements during 1983.

8. Haying. The hayland under agreement during 1983 is almost identical to that of a year ago. During the year, five cooperative farmers harvested 212 tons from 145 acres. Early yields from these haylands were reasonably good due to adequate rainfall in the spring. Most of the hayland was cut only once. Rolled hay proved to be at a premium in the fall due to the drought which hurt overall hay yields and literally dried up pastures.

Waterfowl benefit from crops accrued as the refuge's share for the cooperative farmer's hay harvested. Waterfowl also use the hayland areas for resting and eat the seed and browse not harvested. Johnsongrass along with general weed and brush control is evident due to the haying operations.

9. Fire Management. Regional Fire Coordinator Howard Poitevint chaired a meeting in Paris, Tennessee on February 8, 1983, looking toward a formal agreement with the State Division of Forestry. In attendance were all four West Tennessee Refuges plus representatives from the State Division of Forestry. A rough draft agreement was hammered out at this meeting but it was not until late in the year that all parties signed the final document. Refuges in Tennessee can now call upon the State Division of Forestry to assist in controlling fires on the refuge and the State will be reimbursed by the Service for their time and expenses on the fire.

The infamous "step test" was given to those refuge staff members who had received fire training and were designated to combat refuge fires. Three of the staff eventually passed the step test and everyone agreed it was slightly more difficult than it looked.

This station's fire management plan was completely rewritten and submitted during June 1983. This coincided with the five year updating schedule for fire management plans.

Approximately \$5,300 was ear marked this year for expenditures to upgrade our fire fighting capabilities. Purchased during 1983 were additional fire extinguishers, fire shelters, back pack pumpers, drip torches and a one hundred gallon slip-on pumper unit to go in the back of a pickup truck.

Two wildfires broke out on the refuge during the year. Approximately four acres burned at the Broadview area of Big Sandy Unit on August 23, 1983, but did relatively little damage. Although it was an extremely hot and dry period, the fire burned more like a control burn than a wildfire. Arson was suspected in this fire. A second fire broke out in the Opossum Creek area of Duck River Unit on September 11, 1983. Approximately twelve acres burned during this fire which was suspected of being accidentally started by a squirrel hunter. The refuge was also dry during this period but the fire never did become "hot". We were assisted on both occasions by the Tennessee Division of Forestry fire fighting crews.

10. Pest Control. The control of pest plants is one of the most difficult and expensive items associated with farming. We continue using and permitting cooperative farmers to use a variety of approved herbicides mainly on corn, soybeans, and milo. Most herbicides used are generally effective. The use of pesticides are limited and discouraged in some instances. A herbicide may be highly effective on a given area and a complete failure at another due to a wide variety of conditions. This could be due to method and time of application, moisture conditions, soil type, amount of chemical applied, variety and age of pest plant among others. We do not consider herbicides alone to be the entire answer to weed control. No one chemical, or combination of chemicals, is a cure all. We use and recommend uses of a number of herbicides, but they should be used to supplement other good farming practices such as proper crop rotation, good seedbed preparation, use of clean and viable seed, and adequate fertilization. No adverse residual effects from herbicide use has been noted to date.

The use of Atrazine alone, at the rate of two quarts per acre, proved effective in control of crabgrass, cocklebur, ragweed, and pigweed when used as a pre-emerge for corn and milo. The use of Lasso in combination with Atrazine at approved rates proved highly effective in controlling seedling Johnsongrass, fall panicum and foxtail. Atrazine was used alone on 140 acres of corn and 320 acres of milo. Lasso was used in combination with Atrazine on 702 acres of corn. All applications were made by cooperative farmers.

The use of Treflan as a pre-plant for soybeans on 1,580 acres was effective in controlling target pest plants. Treflan was applied at the rate of 1.0 to 1.25 quarts per acre. A slightly higher rate is needed in some instances to control mature Johnsongrass. No adverse residual effects have been noted to date.

Basagran, sprayed at an average rate of 0.65 quarts per acre in twenty gallons of water, has proven highly effective in control of broadleaves

such as cocklebur, ragweed, and Jimson weed in soybeans. Basagran was sprayed on 1,073 acres this period. Roundup was applied on 166 acres this period as compared to 1,008 acres the previous period. This was due to extremely drouthy conditions causing soybeans to be stunted. This shorty growth caused the use of wick bar to be very limited. This will probably reverse next year. The limited use of Roundup was effective when used on Johnsongrass.

Eradicane applied at a rate of seven pints material per acre was considered barely effective to ineffective,

No pesticides were used this period,

Mechanical mowing on pasture and haylands continued with good results evident. Two mowings are required annually on all grassland.

Refuge personnel Cook and Reese are certified as "Restricted Use Applicators".

11. Water Rights. The City of Waverly, Tennessee, continues to obtain their domestic water supply from the Duck River on the refuge. The Waverly Pump Station operates with very little noticeable impact to the refuge.

12. Wilderness and Special Areas. The year 1983 was definitely a period when attention was drawn to Mount Zion Church, a national historic site located on the Big Sandy Unit. An on-site meeting was held at the church on January 13, 1983, which included Regional Office Representatives Jim Cobb and Todd Rainwater, five former residents representing the church congregation, two representatives of the State Historical Commission, and refuge staff Carrell Ryan and Leon Rhodes. This initial meeting was to jointly take a look at the old structure (built about 1893) and determine what rehabilitation work could realistically be accomplished to help save the church. It was never anyone's intention to put it back in original mint condition but rather to upgrade, make safe, and slow down the recent deterioration process.

A second meeting was held with the church delegation when Regional Archaeologist Jim Cobb met with this local committee on June 16, 1983, at the Paris office and presented them with a draft agreement for rehabilitating Mount Zion Church. Basically, the document stated that the Service would generally rehabilitate the structure (at an estimated cost of \$15,000-20,000) and the Mount Zion Church committee would then maintain the building after this major maintenance was completed. The committee was rather receptive to the draft agreement presented by Mr. Cobb but made several recommendations for changes in the document.

Former residents and landowners of the old 23rd district (Big Sandy Peninsula) held their annual reunion at the Mount Zion Church and grounds on July 3, 1983, a holiday tradition they have kept since the mid-forties. It was at this reunion that the committee presented the draft agreement (to about 200 present) so that they could make comments, have input, and make any changes they saw necessary. Basically, the entire group was very much in favor of the agreement to preserve the building which was very much a part of their heritage.



83-1-15. Interest in preserving the old Mount Zion Church, a national historic site on the Big Sandy Unit, came into focus during 1983 as former adjacent landowners exerted pressure to rehabilitate the structure in some way. (LR)



83-1-26. Refuge Supervisor Sam Drake, Complex Manager Carrell Ryan, and Assistant Manager Randy Cook discuss what steps the Government should take in preserving the old church. (LR)

A followup meeting was held with the committee on August 18, 1983, when they presented to the Service their changes in the draft agreement. A final document (expected to be valid for 25 years) has not yet been made available for the church committee to sign. The Service is apparently waiting for these rehab monies to become available prior to a formal signing by both parties. This may not be a top priority since the church is basically used only one day a year.

The only natural area on the refuge is the 578 acre Britton Ford Research Natural Area. This is comprised of approximately 316 acres of wooded area on Britton Ford Peninsula and the entire Sulphur Well Island estimated at 262 acres.

#### G. WILDLIFE

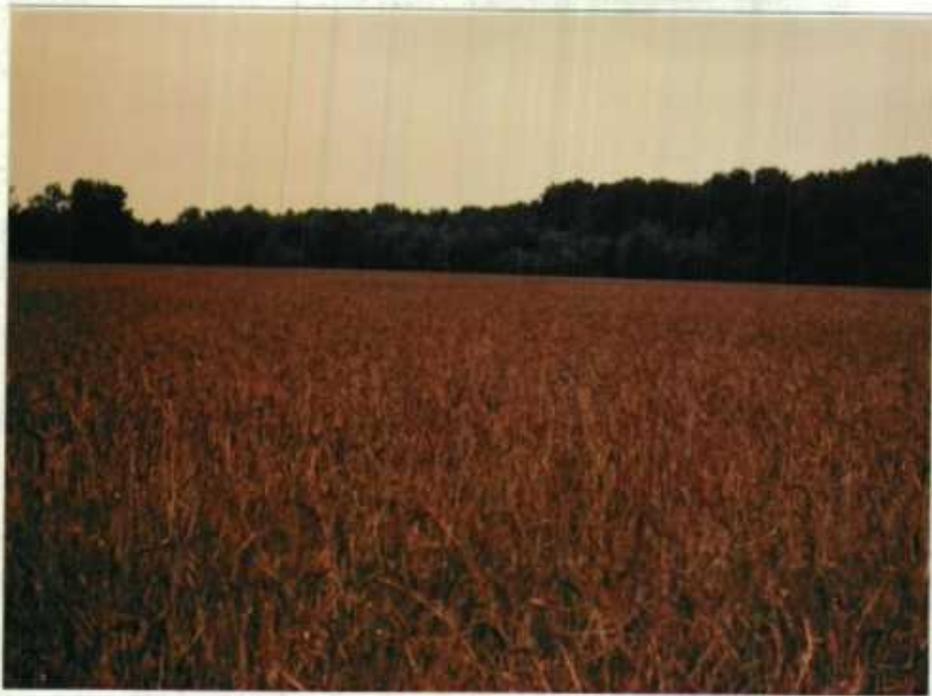
1. Wildlife Diversity. Our most recent bird list for Tennessee Refuge (compiled in 1979) lists 226 birds which can normally be found on the area. The list also notes eighteen other birds of accidental or casual occurrence and fifteen others which should occur on the refuge but have never been sighted. Our most unusual bird sighting of 1983 was a lone sandhill crane sighted at Duck River Unit during the week of December 12-16, 1983. A barnacle goose was also sighted in Duck River Bottoms on January 4, 1983, and stayed around for several days.

2. Endangered and/or Threatened Species. Tennessee Refuge took part in the nationwide bald eagle survey on January 4, 1983. An aerial inventory was made over the refuge and other nearby areas. The peak number of the 1982-83 season was observed at this time when twenty adult and 31 immature bald eagles were counted on the refuge. As a member of the Kentucky-Tennessee eagle management team, the third intensive eagle survey of the 1982-83 season was taken on February 18, 1983, but only nine bald eagles were seen on the refuge at that time. Bald eagles are normally counted each week in conjunction with our waterfowl surveys.

Not a single bald eagle could be found on Tennessee Refuge by mid-March. However, a pair did return for a short while in April but they did not stay long. The refuge was virtually void of bald eagles until September when a pair returned to the Duck River Bottoms.

The Kentucky-Tennessee Eagle Management Team met twice during the year to coordinate their activities. The first meeting at LBL was held on April 6, 1983, and centered on the results of the wintering season. The second meeting was conducted at Reelfoot Refuge and dealt primarily with upcoming inventory procedures, the recent bald eagle hatching success at Cross Creeks National Wildlife Refuge, and the various eagle hacking programs across the state.

The first of three concentrated eagle surveys for the Kentucky-Tennessee Eagle Management Team was made on December 15, 1983. This aerial survey revealed seven adult bald eagles and four immature bald eagles. Bald eagle populations continued to build until early December when a peak of thirty-two were counted on the refuge (twelve adult bald and twenty immature bald).



83-5-23. One of the best fields of natural wild millet was this 50 acre site in upper Lawrence Creek. (RC)



83-6-24. The mallard duck is by far the most plentiful species of waterfowl on the refuge. A total of 8,896,225 mallard use-says were recorded during CY-1983 at Tennessee Refuge. (CR)

Peregrine falcon sightings are rare on Tennessee Refuge and they have been seen infrequently in recent years. However, a pair of peregrines were noted in the Duck River Bottoms during mid-December and their identity confirmed by refuge personnel.

3. Waterfowl. Tennessee National Wildlife Refuge has a waterfowl objective of 23 million use-days per year. This objective is broken down as 3.5 million goose use-days and 19.5 million duck use-days. The following will show a seven year trend in the waterfowl use at this station and how it has fluctuated during that period of time.

<u>CY</u>	<u>GOOSE USE-DAYS</u>	<u>DUCK USE-DAYS</u>	<u>TOTAL USE-DAYS</u>
1977	4,589,832	20,301,342	24,891,174
1978	4,682,744	19,305,127	23,987,871
1979	4,861,757	18,861,734	23,723,491
1980	3,522,193	16,374,941	19,897,134
1981	3,133,894	11,687,250	14,821,144
1982	2,960,448	12,233,998	15,194,446
1983	3,562,993	14,522,757	18,085,750

Individual waterfowl usage for 1983 is as follows:

<u>Species</u>	<u>Use-Days</u>
Whistling Swan	30
White Fronted Goose	419
Snow Goose	20,010
Canada Goose	3,542,559
Barnacle Goose	5
Mallard	8,896,225
Black Duck	2,054,874
Gadwall	196,368
American Wigeon	614,033
Green Winged Teal	2,317
Blue Winged Teal	46,863
Shoveler	1,047
Pintail	254,379
Wood Duck	2,101,051
Redhead	465
Canvasback	54,632
Scaup	58,480
Ring Necked Duck	157,249
Common Goldeneye	5,605
Bufflehead	29,188
Ruddy Duck	1,565
Hooded Merganser	35,986
Common Merganser	9,936
Red Breasted Merganser	2,464
<b>TOTAL</b>	<b>18,085,750</b>

Waterfowl hunters described the 1982-83 hunting period as a mixed season. Some hunters had very good success while others had "slow" days in the blind. Duck and goose hunters continue to use the refuge boundary as the most opportunistic place to be. The 1983-84 waterfowl season started out very well as a colder than usual fall and winter combined with a poor food supply



83-5-24. Assistant Refuge Manager Randy Cook examines an excellent stand of wild millet and panicum in the Lawrence Creek area of the upper bottoms. (LR)



83-6-25. A total of 18,085,750 waterfowl use-days were recorded during CY-1983. This is an increase of nearly 3 million use-days over CY-1982. (CR)

which forced the birds to go looking for nourishment. The local waterfowlers had one of their best fall seasons ever. Complaints from waterfowl hunters were absolutely non-existent.

Two major waterfowl surveys were taken during the year. The mid-winter waterfowl survey was flown on January 4, 1983, when 44,534 geese and 158,903 ducks were counted on the refuge. The nationwide coordinated goose survey was flown on December 15, 1983, and 32,675 Canada geese, 33 snow geese, and 97 blue geese were counted on Tennessee Refuge.

The peak waterfowl numbers for all of 1983 came on January 1 when there were 50,729 geese and 190,115 ducks. However waterfowl numbers took an absolute nose dive during mid-February. In just two short weeks, Canada geese fell from 49,300 to 286 and ducks plummeted from 150,939 to 9,015. No one at this station could recall such a dramatic exodus. Our summer carrying capacity was reached by mid-March.

Swamp Creek, Sulphur Well Bay, and Bennett's Creek Bay were re-opened to fishing and boating on February 18, 1983, after the bulk of the waterfowl had left the area. These prime resting and feeding areas for waterfowl remained open until November 7, 1983, when they were again posted as "closed areas". The Busseltown dewatering area which is also posted as a closed area each year was on a nearly identical schedule.

Five of the seven wood duck boxes serving as demonstration models at Big Sandy Unit were active this spring. However, most of the estimated 3,500 wood ducks produced came from the Duck River Bottoms area. An estimated four Canada geese and 300 mallards were also produced on Tennessee Refuge.

Blue winged teal, several hundred of them, were present on the area throughout much of September as the migration passed through the Tennessee Valley. The first flock of fifty Canada geese arrived at the refuge during late September. Waterfowl figures continued to build throughout the fall as duck populations peaked in early December at 164,797 and goose populations peaked later in the month at 45,241.

Mallards and black ducks made up the bulk of the duck populations during the year. Blacks generally made up fifteen to twenty per cent of the entire duck population at Tennessee Refuge. Widgeon have been the biggest surprise the past two seasons as they have not nearly come up to their population levels of several years ago. Compare a peak 1983 widgeon population of 13,050 to a peak of more than 80,000 during the 1976-77 season.

Whistling swans have again made their appearance at Tennessee Refuge, the first in several years. Three were sighted at Duck River Unit on December 14 and two were noted at Busseltown Unit on December 27, 1983.

4. Marsh and Water Birds. A nest count was made at the Grassy Lake great blue heron rookery on April 12, 1983. There were an estimated 250 nests at the rookery, but all were not active. A few young were noted on the nests during this April inventory. The vitality of the rookery seems to be bouncing back as an estimated 160 great blue herons were estimated to have survived to the flight stage, up from the recorded low of 47 in 1977.



83-2-15. The great blue heron rookery at Grassy Lake has remained active over a number of years. During March of each year, the herons get nesting on their minds and congregate at this rookery within Duck River Bottoms. (RC)



83-2-11. Although the cypress trees in the rookery are not as visible as they once were, nesting appears to be on the increase. An estimated 160 young great blue herons were believed brought off to the flight stage. (RC)

Great blue herons continue to be the most numerous of the marsh and water birds on Tennessee Refuge. The great blues peaked at 2,400 birds during January 1983. We seem to get an increase in great blue herons each winter so we're apparently getting a migration from the North, origin unknown.

We're not sure where the fall population of cormorants came from but they certainly were conspicuous in the lower bottoms of Duck River Unit. An estimated 230 birds were counted at that location during early December.

5. Shorebirds, Gulls, Terns, and Allied Species. Shorebirds are often found in reasonable numbers on the mud flats such as Duck River Bottoms and Busselton Bottoms. Pace Point is another ideal location for shorebird use when Kentucky Lake levels are down. Nearly 280 miles of shoreline at Tennessee Refuge make it a favorable spot, primarily as Kentucky Lake is receding during the summer and fall.

The killdeer continues as the most abundant shorebird in the area. A peak population of near 1,500 was recorded during the year and 700 young were believed to have been brought to flight stage.

6. Raptors. The golden eagle presence at Tennessee Refuge continues to decline. A peak of five golden eagles were recorded in late January 1983, and only 195 use-days for the entire year. This compares to 2,015 use-days just five years ago in 1978. The decline is a mystery!

The red-tailed hawk remains the most plentiful of any raptor on Tennessee Refuge. A peak of 475 red-tailed hawks were estimated to be utilizing the refuge during mid-summer. Other numerous raptors at Tennessee Refuge include northern harriers, red-shouldered hawks, American kestrels, screech owls, and barred owls. The barred owl is definitely the most vociferous of the raptors as its hooting can be heard during most evenings on the refuge.

8. Game Mammals. Tennessee Wildlife Resources Agency is having an excellent season with the statewide deer herd and the current harvest rate. Harvest records for the past three years have increased from 33,615 in 1981, to 42,262 in 1982, and up again to 48,968 in 1983. The State is just a little unsure as to where the annual harvest will eventually peak out. Tennessee currently has a liberal archery season, special juvenile hunt, a muzzleloader hunt, special wildlife management area hunts, a split thirty day buck season with a bag limit of four, and a special antlerless season in some counties. See Section H.8, Hunting, for details of the various deer hunts on Tennessee Refuge during 1983.

Both squirrel and raccoon were hunted on the entire refuge during CY 83, a change from the previous year when only certain portions of the refuge were hunted. More will be said about these two hunts in Section H.8, Hunting. Other game mammals found on the refuge include groundhog, bobcat, gray fox, opossum, beaver, and coyote.

10. Other Resident Wildlife. The turkey population continues to do well on certain areas of the refuge. The most favorable areas for turkey during 1983 were Eagle Creek and Nix Landing. An estimated 70-80 birds are now using these areas of the refuge. Only an occasional turkey is seen on the Big Sandy Peninsula which once had the most flourishing population on the



83-7-4. The recently constructed dike will help contain waters in impoundment 9 which lies in the background. Crushed Camden chert gravel will top the road surface on this low level structure. (RC)



83-6-26. Canada goose use-days numbered 3,542,559 during CY-1983, very close to our target of  $3\frac{1}{2}$  million. A peak Canada goose population of 44,975 was recorded on December 23 for CY-1983. (CR)

entire refuge. More will be said about turkey under Section G.12. Wildlife Propagation and Stocking.

Bob-white quail had a production slump this season due primarily to the weather. An extremely wet spring combined with a long, hot, dry summer definitely caused some nesting problems.

11. Fisheries Resources. Commercial musseling remains very active on Kentucky Lake although the price of shell has dropped from the fifty to fifty five cents a pound of a year ago to the thirty five to forty cents per pound range during most of 1983. Most musselers use diving gear to gather the live mussels although a few still use brail boats. Some even walk or "toe" barefoot for the shells.

There appears to be no decline in the commercial fishing industry on Kentucky Lake as the price of catfish has remained high. Wholesale prices for white catfish in the rough are in the fifty five cents per pound range while it is difficult to buy it retail in the store dressed for less than \$1.60 per pound. If a commercial fisherman is fortunate enough to catch a female spoonbill with saleable roe, this "poor man's caviar" will regularly bring twenty to thirty dollars per pound.

The big four for the sportsman in Kentucky Lake continue to be crappie, bass, catfish and sauger. The 1983 season was the second year in a row when crappie fishing was exceptionally good in the area. Local fishermen continue to make crappie beds in the lake, a practice which consists of placing brush, wood slats, tires, or other debris beneath the water where fish can seek protection. Tennessee Wildlife Resources Agency has placed many of these "fish attractors" in Kentucky Lake and each is marked with a buoy identifying the location.

Tennessee Wildlife Resources Agency released approximately 400,000 fingerling rockfish on the refuge during 1982 to give the fisheries resource a boost with this sport fish. It will be several years before it is known whether this stocking was successful. Nearly all of the fingerling rockfish were released at Old Mill Landing on the Duck River Unit.

12. Wildlife Propagation and Stocking. During 1978, Tennessee Wildlife Resources Agency placed five gobblers and fifteen hens in the Eagle Creek area of the refuge. This population has really blossomed and now TWRA is using this population to trap and restock to other areas of Tennessee. A total of five gobblers and 22 hens were trapped in the Eagle Creek/Nix Landing area of the refuge and used to restock two other areas of the state during 1983.

15. Animal Control. Beaver continue to be a persistent problem on certain areas of this refuge year after year. Bennett's Creek has been a target of these seemingly tireless critters for several years now. We have tried backhoe, conibear traps, and other means to discourage the beaver but they appear to have as much, or more, patience than we do. The State (TWRA) has requested to trap beaver from the refuge for restocking to strip mine areas of East Tennessee during 1984 and this might aid in some of our problems.



83-2-22. The beaver can either be a friend or foe depending upon where he decides to back up water. Getting rid of unwanted beaver becomes a problem for even the most persistent staff member. (RC)



83-7-8. The shallow areas and mud flats of Duck River Bottoms provide excellent habitat for shorebirds during the late summer months. (RC)

Refuge Manager Carrell Ryan attended the beaver control workshop at Noxubee Refuge in Mississippi on May 18 and 19, 1983. One needs a little knowledge to outsmart the beaver. However, history tells us that the price of beaver pelts has been one of the few reasons when beaver have ever been controlled.

16. Marking and Banding. The 1983 banding period certainly had its frustrating moments. Flooding in early January caused us to pull three cannon nets in Duck River Bottoms and thereby miss some banding opportunities. The winter banding definitely came in spurts. Waterfowl picked up and left early this year and by the end of February all nets were pulled in for the season.

A waterfowl banding workshop was held February 1, 2, and 3, 1983, in southern Illinois, western Kentucky, and northwest Tennessee. The workshop was geared at providing local banders more expertise in the realm of waterfowl banding. Subjects covered included new trapping techniques, aging and sexing methodology, reporting procedures, etc. Biological Technician Carl Dowdy attended all three days of the workshop and five others members of the staff attended the final day.

Tennessee Refuge only reported seven neck collared Canada geese on the area during the year. This is down from nineteen reported the previous year.

July and August banding of wood ducks went rather smoothly. Most were captured by cannon net in the upper bottoms of Duck River. We were able to reach our quota of 440 by early September.

Statewide Banding Coordinator Ken Garner held a meeting in Paris, Tennessee, on November 9, 1983, to bring the four West Tennessee Refuges up to date on banding reporting periods and other changes in waterfowl banding. Also attending the meeting were Refuge Supervisor Sam Drake and Mississippi Valley Biologist Don Orr.

We again got our cannon net sites in operation during December 1983, with two sites at Duck River Unit, one site on the Big Sandy Unit, and one site at Busselton Unit. We immediately ran into problems with high water, freezing conditions, net sites that were overrun with ducks, and geese that refused to go to bait. However, we ended the year with a total of 2,284 waterfowl banded which included 475 Canada geese, 991 mallards, 230 black ducks and 588 wood ducks.

The following is a compilation of the total banding activity at this station:

Banding Record Data - As of December 31, 1983

<u>Species</u>	<u>BIRDS BANDED</u>		<u>RECOVERED (KILL RETURNS)</u>		
	<u>Banded 1983</u>	<u>Total Banded</u>	<u>1983</u>	<u>Cumulative Total</u>	<u>Percent of Total Banded</u>
Canada Goose	475	14,954	129	2,473	16.5
Hutchin's Goose	-	-	-	-	-
Blue Goose	-	37	-	4	10.8
Snow Goose	-	4	-	-	-
White-fronted Goose	-	1	-	-	-
Mallard	991	15,271	85	1,908	12.5
Mallard x Black	-	52	-	5	9.6

## Banding Record Data (continued)

<u>Species</u>	<u>BIRDS BANDED</u>		<u>RECOVERED (KILL RETURNS)</u>		
	<u>Banded 1983</u>	<u>Total Banded</u>	<u>1983</u>	<u>Cumulative Total</u>	<u>Percent of Total Banded</u>
Black Duck	230	5,206	26	607	11.7
Gadwall	-	4	-	-	-
Wigeon	-	397	-	47	11.8
Pintail	-	120	-	6	5.0
Mallard x Pintail	-	2	-	-	-
Green Winged Teal	-	10	-	2	20.0
Blue Winged Teal	-	440	-	12	2.7
Wood Duck	588	9,610	36	705	7.3
Ring Necked Duck	-	21	-	5	23.8
Scaup	-	3	-	1	33.3
Coot	-	9	-	-	-
Mourning Dove	-	2,954	1	167	5.7
TOTALS	2,284	49,103	277	5,942	12.1

CUMULATIVE DOVE AND DUCK RECOVERIES, (kill returns) BY STATE, PROVINCE OR COUNTRY - AFTER BANDING AT TENNESSEE REFUGE - AS OF DECEMBER 31, 1983.

<u>STATE, PROVINCE OR COUNTRY</u>	<u>NUMBER</u>
Alabama	77
Arizona	1
Arkansas	140
Colorado	3
Delaware	2
Florida	21
Georgia	18
Illinois	196
Indiana	62
Iowa	51
Kansas	4
Kentucky	106
Louisiana	213
Maine	1
Maryland	7
Michigan	133
Minnesota	188
Mississippi	161
Missouri	42
Montana	2
Nebraska	12
New Jersey	2
New York	6
North Carolina	14
North Dakota	103
Ohio	44
Oklahoma	2
Oregon	1
Pennsylvania	9

CUMULATIVE DOVE AND DUCK RECOVERIES, (kill returns) BY STATE, PROVINCE, OR COUNTRY - AFTER BANDING AT TENNESSEE REFUGE - AS OF DECEMBER 31, 1983.  
(continued)

<u>STATE, PROVINCE OR COUNTRY</u>	<u>NUMBER</u>
South Carolina	17
South Dakota	50
Tennessee	1,194
Texas	49
Virginia	13
Washington	1
Wisconsin	157
Wyoming	1
TOTAL U.S.	<u>3,103</u>
Alberta	12
British Columbia	2
Manitoba	94
Ontario	108
Quebec	13
Saskatchewan	107
TOTAL CANADA	<u>336</u>
Venezuela	2
Dominion Republic	1
TOTAL OTHER COUNTRIES	<u>3</u>
GRAND TOTAL	3,442

CUMULATIVE RECOVERIES (kill returns) BY YEAR - AFTER BANDING AT TENNESSEE REFUGE - AS OF DECEMBER 31, 1983. (GEESE, DUCKS, DOVES)

<u>YEAR</u>	<u>NUMBER OF RECOVERIES</u>	<u>PERCENT OF TOTAL RECOVERIES</u>
Same Year Banded	1,524	25.72
1st Year After Banded	1,537	25.94
2nd " " "	977	16.49
3rd " " "	604	10.19
4th " " "	380	6.41
5th " " "	300	5.06
6th " " "	203	3.43
7th " " "	122	2.06
8th " " "	88	1.49
9th " " "	74	1.25
10th " " "	44	.74
11th " " "	28	.47
12th " " "	14	.24
13th " " "	14	.24
14th " " "	7	.12
15th " " "	3	.05
16th " " "	2	.03
17th " " "	3	.05
21st " " "	1	.02
	<u>5,925</u>	<u>100.00</u>

CUMULATIVE GOOSE RECOVERIES (kill returns) BY STATE OR PROVINCE - AFTER  
BANDING AT TENNESSEE REFUGE - AS OF DECEMBER 31, 1983.

<u>STATE OR PROVINCE</u>	<u>NUMBER</u>
Alabama	4
Arizona	1
Arkansas	73
Colorado	1
Florida	1
Illinois	113
Indiana	77
Iowa	6
Kentucky	147
Maryland	17
Michigan	425
Minnesota	22
Mississippi	7
Missouri	15
Nebraska	2
New Jersey	1
New York	7
North Carolina	5
North Dakota	1
Ohio	201
Pennsylvania	111
South Carolina	7
Tennessee	244
Virginia	10
Washington	3
West Virginia	2
Wisconsin	166
Wyoming	1
TOTAL	<u>1,670</u>
Alberta	2
Manitoba	4
Ontario	674
Northwest Territories	97
Quebec	17
TOTAL	<u>794</u>

CUMULATIVE TOTAL OF BIRDS TRAPPED AT TENNESSEE NATIONAL WILDLIFE REFUGE WHICH WAS BANDED ELSEWHERE - AS OF DECEMBER 31, 1983.

The following is a tabulation of birds trapped at Tennessee Refuge that were previously banded elsewhere.

Agassiz NWR	2
Alabama Department of Conservation	6
Arkansas Game and Fish Department	1
Black Bay NWR	1
Big Lake NWR	2
Blackwater NWR	1
Bombay Hook NWR	1
Canadian National Resources Department, etc.	74
Crab Orchard	22
Cross Creeks NWR	52
Deslacs NWR	1
Ducks Unlimited	3
Florida Game and Fish	1
Hatchie NWR	1
Horican NWR	1
Illinois Department of Conservation	99
Indiana Department of Conservation	7
Iowa Department of Conservation	1
Iroquois NWR	2
J. Clark Saylor NWR	1
Kellogg Bird Sanctuary	12
Kentucky Fish and Wildlife Resources Commission	16
Kentucky Woodlands NWR	9
Lake Andes NWR	1
Lower Souris NWR	3
Mark Twain NWR	2
Maryland Department of Natural Resources	1
Michigan Department of Conservation	9
Minnesota Game and Fish Commission	8
Mississippi Game and Fish Commission	3
Montana Game and Fish Commission	1
Necedah NWR	4
New York Department of Conservation	2
North Carolina Resources Commission	1
Noxubee NWR	4
Ohio Department of Natural Resources	43
Ottawa NWR	43
Presquile NWR	4
Pungo NWR	1
Reelfoot NWR	1
Rice Lake NWR	3
St. Marks NWR	2
Sand Lake NWR	2
Santee NWR	5
Seney NWR	7
Shiwassee NWR	63
South Carolina Game and Fish Commission	1
Swan Lake NWR	7
Tamarac NWR	1

CUMULATIVE TOTAL OF BIRDS TRAPPED AT TENNESSEE NATIONAL WILDLIFE REFUGE WHICH WAS BANDED ELSEWHERE - AS OF DECEMBER 31, 1983 (continued).

Tennessee Wildlife Resources Agency	67
Upper Souris NWR	3
Virginia Commission of Game and Inland Fisheries	3
Wauby NWR	1
West Virginia Conservation Department	2
Wheeler NWR	50
Wisconsin Department of Conservation	10
Wyoming Department of Fish and Game	1
Game Management Agents and All Others	49
TOTAL	<u>750</u>

TRAPPED BIRDS - BANDED PREVIOUSLY AT TENNESSEE

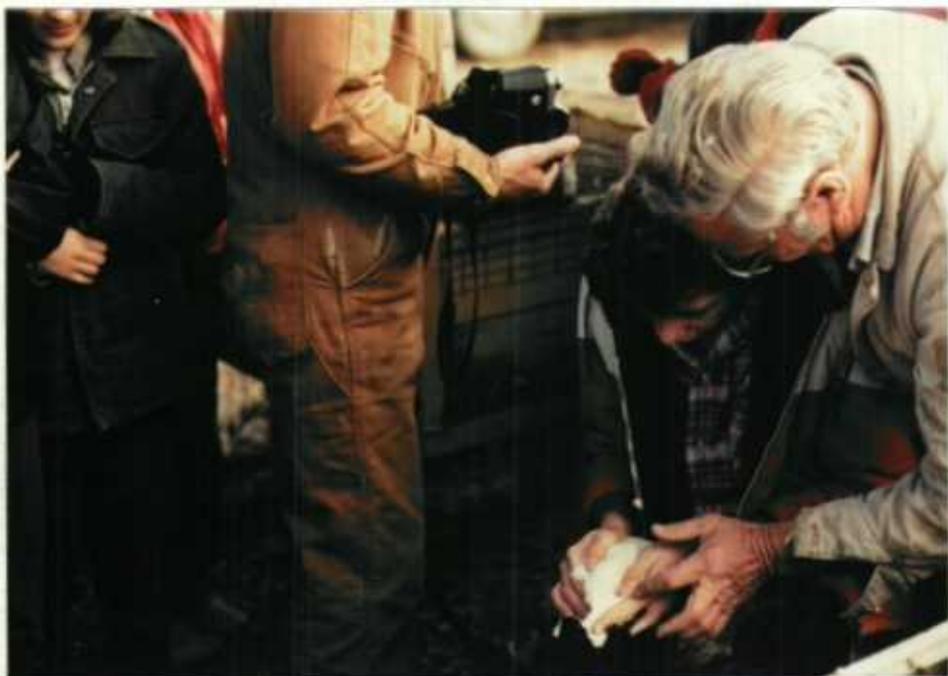
The table below itemizes the Tennessee Refuge banded birds that have been retrapped at Tennessee Refuge after a period of 90 or more days, during the past seventeen years. Numbers indicated are separate returns for individual bands and do not include repeats.

<u>YEAR RETRAPPED</u>	<u>NUMBER</u>
1965	16
1966	23
1967	73
1968	43
1969	23
1970	46
1971	68
1972	56
1973	23
1974	65
1975	29
1976	29
1977	45
1978	14
1979	11
1980	8
1981	17
1982	2
1983	1
TOTAL	<u>588</u>

17. Disease Prevention and Control. Assistant Managers Leon Rhodes and Randy Cook attended the disease workshop in Nashville, Tennessee on August 29, 1983. The workshop was sponsored by the Southeastern Wildlife Disease Laboratory and covered such topics as avian cholera, duck virus, enteritis, avian pox, lead poisoning, histomoniasis, botulism, hemorrhagic disease, etc. This workshop provided us with a timely reminder to be on the lookout for the various major wildlife diseases.



83-6-17. Nearby Briarwood School's 8th grade science class makes their annual visit to the refuge to observe our waterfowl banding operations. (LR)



83-6-19. Students get first hand experience as to what its like to age and sex Canada geese. Yes, there's more to banding than just clamping a band on its leg. (LR)

## H. PUBLIC USE

1. General. The Outdoor Recreation Planner position has been vacated at Tennessee Refuge since March 7, 1981, and to date the slot has not been filled. Other staff members have since taken up some of the responsibilities of this position.

Public use at Tennessee Refuge literally blossoms about March as the spring crappie season and fair weather come into prominence. However, litter control and the periodic maintaining of more than sixty lake access sites on the refuge increases dramatically as the Kentucky Lake magnetically draws people to it. Numerous negotiations are also performed each spring with adjacent refuge neighbors as they seek to take advantage of lands between themselves and the refuge waters of Kentucky Lake.

A wedding was performed at the Busseltown Unit on June 11, 1983, at a hilltop setting overlooking the Tennessee River. This was our first request for a wedding on the Busseltown area.

4. Interpretive Foot Trails. A draft leaflet has been drawn up for Chickasaw Nature Trail and this interpretive document should be printed in the near future. The trail was designated by then Interior Secretary James Watt on November 27, 1981, as a "National Recreation Trail" but utilization is far from its potential. The leaflet should help draw recognition to the trail and give it a boost.

5. Interpretive Tour Routes. The self guiding tour route at the Big Sandy Unit of Tennessee Refuge remains reasonably consistent year after year. Annual estimates on this interpretive tour route have ranged between 10,825 and 11,330 visits during the past four years. A leisurely afternoon drive to the Big Sandy Peninsula is very popular with the local folks.

6. Interpretive Exhibits/Demonstrations. The eighth grade science class from nearby Briarwood School in Camden, Tennessee, made their annual field trip to the Duck River Unit of Tennessee Refuge on February 4, 1983. Highlight of their trip is a "hands-on" banding demonstration of both ducks and geese. In addition to the banding demonstration, the students were given a tour of the refuge and current management practices were explained. Also on that same day, the wildlife class from the University of Tennessee at Martin, Tennessee, made their yearly visit to Tennessee Refuge for a demonstration on aging and sexing techniques of various waterfowl and a look at the refuge's waterfowl trapping methodology.

7. Other Interpretive Programs. Tennessee Refuge participated in career day activities at Henry County High School on February 24, 1983. Approximately 65 sophomores attended the session on wildlife management related vocations.

This refuge continued to present wildlife oriented programs to the three summer sessions at nearby Camp Hazlewood, the regional Girl Scout camp. Approximately one hundred girls attended each of the sessions which were held on June 22, July 6, and July 20, 1983.



83-1-12. Birdwatchers are frequent visitors to Tennessee Refuge especially during the winter months. Word of the barnacle goose at Duck River Unit really brought out the local birders. (LR)



83-6-3. December of 1983 was extremely cold and the entire Big Sandy River froze all the way to the mouth at Pace Point. However, the Tennessee River remained open. (LR)

A seventy-five minute program was presented to the Natural Resources class at the University of Tennessee (Martin) on November 22, 1983. Included in the program were purposes of the U.S. Fish and Wildlife Service, goals of the national wildlife refuge system, and career possibilities within the U.S. Fish and Wildlife Service.

Ten additional programs were presented to nearby school, civic, and garden clubs during the year. The recent wildlife week slide program "We Care About Eagles", was utilized extensively this year due to the appeal of the subject matter and excellent photography.

Six press releases were issued by this office during 1983 and covered such items as refuge hunts, the current waterfowl status, and other refuge events. The headquarters office responded to numerous telephone, walk-in, and written requests from the public.

A "Calendar of Wildlife Events" leaflet was received during 1983 and made available to refuge visitors. The leaflet highlights wildlife which are the most conspicuous during the different months of the year.

8. Hunting. Tennessee Wildlife Resources Agency officials Gary Cook and Harold Hurst met with the four West Tennessee Refuge Managers on March 1, 1983, and discussed refuge hunt proposals and changes for the upcoming season. The State was receptive to the changes which were suggested. Refuge Supervisor Sam Drake also attended the meeting. This office officially submitted the 1983 refuge hunt proposals to Tennessee Wildlife Resources Agency on April 11, 1983, which were subsequently published in their state proclamation shortly thereafter.

The revised and updated hunt brochure for Tennessee Refuge's 1983 hunting season was submitted for publishing in March but not received until August. The hunter response to the increased hunting opportunities on Tennessee Refuge was positive and we could have utilized the hunt brochure long before we received our supply.

A news release was issued in late July 1983, announcing the entirety of the hunts on Tennessee Refuge and the application procedures for each. August was set aside as the period when hunters could apply for the muzzleloader hunts and September was the period designated when the traditional hunters could apply for the gun/deer hunts. A total of 1,160 people applied for the 280 muzzleloader permits and the public drawing on September 9 went smoothly. More than 1,800 people applied for the 275 available gun hunt permits and the public drawing for these was held on October 7, 1983. Permits were mailed to the successful applicants on the day of the drawing.

A total of eight managed hunts were held on the refuge during 1983. The following is a brief summary on each hunt:

a. Britton Ford/Sulphur Well Muzzleloader Deer Hunt. This annual muzzleloader hunt on Britton Ford Peninsula and Sulphur Well Island took place on January 15, 1983. A total of 50 hunters spent 355 hours taking eighteen deer from this 750 acre area.

b. Refuge Wide Squirrel Hunt. The entire refuge was open to squirrel hunting in 1983 and the season lasted from August 27 to September 17.



83-1-30. Refuge Supervisor Sam Drake visited with all four west Tennessee Refuges on February 26, 1983 to discuss the upcoming hunt program and any changes necessary. The 1983 hunt proposals were presented to Tennessee Wildlife Resources Agency on March 1, 1983.



83-7-18. Public drawings for the various gun and muzzle-loader deer hunts were held in the refuge headquarters office on September 9 and October 7, 1983. The public drawings have definitely added credibility to our hunts over the years. (LR)

Although no permit was required, there was not an over abundance of hunters on the refuge due to other hunting opportunities throughout the area. Also, hunters rated the squirrel as "scarce" during the 1983 season. An estimated 450 hunters spent 1,350 hours in harvesting 675 squirrels.

c. Refuge Wide Raccoon Hunt. The real surprise this year was the interest shown in the raccoon hunt. We had intended that our raccoon hunt open with the statewide season but the State of Tennessee apparently changed their minds on the opening date. What we ended up with was a nine day raccoon hunt on the refuge which was a full month before Tennessee was to open the statewide season. There was a tremendous interest from the local raccoon hunters of West Tennessee in our hunt. It undoubtedly provided them with an outlet to run their dogs early and legally take a few 'coons. This office issued more than 600 raccoon permits and spent considerable time talking with "walk-ins" and telephone inquiries for the hunt. The dates for our 1983 raccoon hunt were October 7 through October 15. During that period, raccoon hunters made approximately 1,200 visits to the refuge in harvesting 360 raccoons. Each hunter spent approximately four hours on each trip.

d. Refuge Wide Archery Hunt. The first refuge archery hunt in many years was held on the entire area during the period September 24 through October 8, 1983. No special permit was required by the archers for this fifteen day season. An estimated 350 archers turned out on opening morning on the refuge. We estimate that 1,175 hunter trips were taken. Approximately 5,500 activity hours were spent in this category.

e. Duck River Bottoms Muzzleloader Deer Hunt. A total of 150 permits were available for this two day hunt which took place on October 15 and 16, 1983. Approximately 4,000 acres of land within the bottoms was open. Hunters checked their deer in through local TWRA check stations. Kill figures have not, as yet, been provided by TWRA.

f. Busseltown Unit Muzzleloader Deer Hunt. This was the second annual muzzleloader hunt for deer at Busseltown Unit and took place on October 15 and 16, 1983. A total of 75 permits were available for this 3,200 acre area. Hunters also used State check stations for the Busseltown hunt and an exact kill figure has not been provided by TWRA as of this writing.

g. Britton Ford/Sulphur Well Muzzleloader Deer Hunt. To avoid having a muzzleloader hunt so late in the season and conflicting with the waterfowl in the area, the yearly Britton Ford Peninsula/Sulphur Well Island hunt was moved up from late December or early January to the weekend of October 29 and 30, 1983. A total of 55 permits had been issued for this 750 acre area and the weather was excellent for hunting. An exact figure on this hunt has not been provided to us by the State. We expect it in a few days.



83-5-22. The wild millet shows up quite well in this transition zone on a moist soil area at Busseltown Unit. Average production of moist site natural foods was more than 850 pounds per acre. (RC)



83-6-27. Waterfowl hunters in the surrounding areas had above average success during November and December, 1983. We really didn't have more birds than usual but the harsh winter weather certainly made them act differently. (CR)

h. I-40 Gun/Deer Hunt. Although the I-40 hunt had traditionally been a muzzleloader hunt over the past several years, in 1983 it went the "weapon of choice", for most people of which was the high powered rifle. There were 150 permits issued for the I-40 area (the portion of Duck River Unit south of the interstate) with the division being 75 permits for either side of the Tennessee River. The hunt took place on this 2,100 acre area on October 29 and 30, 1983, under excellent weather circumstances. Kill figures are not available at this writing.

i. Big Sandy Gun/Deer Hunt. Our most longstanding deer hunt at Tennessee Refuge, the Big Sandy Peninsula gun hunt, was held on December 2, 3, and 4, 1983. Out of a possible 125 permit holders, an estimated 100 people participated. It rained all three days of the hunt which certainly made for less than desirable hunting conditions. Hunters used local State deer checking station to check in their deer. State will provide kill data shortly.

9. Fishing. Sport fishing opportunities on Kentucky Lake is definitely a key reason for the substantial usage on Tennessee Refuge. Our records reveal that there were more than 267,000 fishing visits to the refuge accounting for nearly a million hours of utilization in this activity. The months of April, May and June were the three most popular months to fish on the refuge and made up for more than half of all the fishing activity for the year. These three months pretty well mark the height of the crappie season which was above average in 1983. This makes two in a row now for good crappie seasons.

11. Wildlife Observation. Most wildlife observation at Tennessee Refuge comes by way of automobile or other land vehicle although boat and foot traffic account for a sizeable amount of this type activity. The 1983 public use report at this station shows that 73,400 refuge visitors spent 125,700 hours in wildlife/wildlands observation on the area.

Two "wildlife observation areas" were designated by Tennessee Wildlife Resources Agency during 1982, these being Pace Point and Duck River Bottoms. The statewide WOA system has been set up as key areas where the public can witness either abundant, critical, or unique wildlife populations at particular times of the year. The two designated areas certainly qualify in those categories. TWRA provided signing for these two WOA locations during the year.

12. Other Wildlife Oriented Recreation. Both camping and picnicking remain rather low key at Tennessee Refuge due to the limited facilities. The Sugar Tree Marina campground is the only facility where wildlife oriented camping is permitted. Some primitive camping is permitted to the Scouts of America at a designated site on Britton Ford Peninsula.

We are continuing to remove litter barrels from public use areas where the situation warrants. Where litter barrels attract litter rather than control it, we take out the barrel.

16. Other Non-Wildlife Oriented Recreation. One of the perplexing problems of 1983 was the issue concerning Mr. Ben Gaines of nearby Antioch community.



83-4-14. Unauthorized mowing, cutting, and trimming on refuge lands between adjacent neighbors and the refuge shoreline is a perpetual problem. Generally, several cases are made each year on this unpermitted activity. (RC)



83-4-37. The Youth Conservation Corps crew assisted the refuge a great deal by cutting back tree limbs and brush from the various roadways. (LR)

Mr. Gaines' deed from TVA had certain rights of ingress and egress over three right-of-way corridors and the issue was pushed as to what total rights and privileges he enjoyed on this parcel of land which is adjacent to, and through, the refuge.

During May 1983, Mr. Gaines applied for a 26a permit from TVA to install a boat dock on refuge lands and waters near Antioch. The Atlanta Regional Office disapproved of the project but pressure from TVA and political maneuverings from Mr. Gaines caused the project to get a second look. By September, Mr. Gaines had secured a Corps of Engineers permit and TVA was giving their firm support on his securing the boat dock that he wanted.

Upwards of two hundred residents in the Antioch community voiced their opposition to Mr. Gaines' activities because he had periodically voiced that he would close the upper loop road which leads to a public concrete boat launching ramp. The issue has been thrashed about extensively many times as to whether the loop road through the refuge and by the boat launching ramp is actually a county road and under the maintenance care of Henry County, or just a public road that has sprung up over the years. The nearby residents are very vociferous and don't want to lose lake access via the upper loop road to the Antioch boat ramp. It is also very difficult for nearby residents to understand these special corridor privileges which TVA bestowed to the owners of this tract of land at the time of the sale.

Regional Solicitor Cal Fallin and Realty Specialist Jerry Vits made a visit to the refuge on October 6, 1983, to look at the corridor situation at Antioch. It was thought that the Regional Solicitor should have a chance to look at the problem on site before any more opinions were made concerning what rights Mr. Gaines might have on these three corridors.

The continuing saga at Antioch had several ups and downs during the year but Mr. Gaines finally secured his 26a permit and this office was told to issue him a Special Use Permit for construction of a boat dock on refuge lands and waters. A change was eventually made on his 26a permit to reflect that he wanted to construct the boat dock at the end of his 100 foot wide corridor instead of the fifty foot wide corridor. Numerous hours were spent during 1983 studying, investigating, and trying to manage this issue—definitely an interesting year!

Non-wildlife oriented activities such as swimming, boating, and water skiing will no doubt continue to exist on Tennessee Refuge no matter what steps are taken to discourage such use. As long as our public use access areas remain open and waters are kept open into the refuge, then these activities will never completely be eliminated. A glimpse at any of the three attached refuge unit maps will show the uncontrolled and unlimited water access onto Tennessee Refuge.

17. Law Enforcement. The Tennessee River is the dividing line for law enforcement cases in Tennessee. Infractions encountered on the west side of the river on the refuge go through federal court in Jackson, Tennessee, and those cases made east of the river go through federal court in Nashville, Tennessee.

We had a spurt of abandoned duck blinds on the refuge during 1983. We believe that most broke loose from their anchorage and drifted onto the refuge.



83-5-12. A tornado or extremely high winds struck Sugar Tree Marina on August 6, 1983. Forty-six of the marina's slips were destroyed. This is the third time the marina has been damaged by tornados or winds. (LR)



83-5-16. Contracting Specialist Ruth Slette visited the refuge on August 10, 1983 to examine problems associated with the sale of Sugar Tree Marina. Refuge Supervisor Sam Drake and Complex Manager Carrell Ryan assisted with suggestions to the concession owner as to how best he could retrieve his investment. (LR)

A total of four were found during the year and every effort was made to locate the owner(s).

A survey was made during April of the Big Sandy River shoreline on the west side of the Big Sandy Unit. Numerous houses and weekend cottages have gone up adjacent to the refuge in this area and infractions have slowly crept onto refuge lands. Private structures found on Government lands included electric lines, water lines, flag poles, clothes lines, gardens, picnic tables, stair steps, buoys, wood piles, concrete ornaments, signs, etc. Adjacent landowners were contacted concerning these infractions.

Five staff members from Tennessee Refuge attended a one week law enforcement refresher training course at Glynco, Georgia, during the summer months. J. Randy Cook, Carl Dowdy, and Jerry Armstrong attended from May 30-June 3, 1983, and Leon Rhodes and Eddie McKissick attended from July 4-8, 1983. The refresher course was taught by Region 4 law enforcement personnel who did an excellent job. All five station employees requalified with the pistol when attending this one week training. A second requalifications session was held in Memphis, Tennessee, on October 14, 1983, and all five again requalified with their Service revolvers.

Tractor Operator William Terry Cherry attended the Federal Law Enforcement Training Center at Glynco, Georgia, from September 26 until December 5, 1983. He became the sixth person at the refuge to obtain law enforcement authority.

Apprehensions made during 1983 included violation of closed area, firearms on refuge, unconfined dogs on refuge, private structures on Government lands, unpermitted camping, possession of raptor parts, unlawful tree clearing, and unpermitted shoreline clearing operations. Both land and water patrols were conducted during the year as needed and our enforcement staff was definitely out on the three big warm weather holiday weekends-Memorial Day, Independence Day, and Labor Day. SAC Paul Gladdys worked with us on all of our cases which were either processed through federal court in Nashville or Jackson, Tennessee.

19. Concessions. Two marina concessions are located on Tennessee Refuge, Mansard Island Marina on the Big Sandy Unit and Sugar Tree Marina on the Duck River Unit. Both of these marinas provide services and supplies such as slip rental, boat and motor rental, launching facilities, gasoline/petroleum products, mooring and anchoring facilities, packaged food and drinks, camping, and picnic facilities.

Mansard Island Marina was put up for sale shortly after it received a ten year extension to its contract, by its owners Edmisson, Nance and Tate. This ten year renewal option is set to expire at midnight on January 31, 1993. A trio of buyers from Arizona (Parker, Davis and Rogers) were to have purchased the marina on June 21, 1983, but the deal fell through at the last minute, even after a new contract amendment had been drawn up and a current audit had been made. The marina was eventually sold to Chuck Woods of nearby Murray, Kentucky, who purchased the marina on September 27, 1983. The third audit of Mansard Island Marina during 1983 was then conducted on September 28.



83-7-27. An eleven yard earth pan was borrowed from Hatchie National Wildlife Refuge for use in the construction of the moist soil impoundments. (RC)



83-7-29. Bulldozers and draglines were the primary pieces of heavy equipment used in the force account construction of the various internal dikes within Duck River Bottoms. (RC)

The owner of Sugar Tree Marina (Billy Goff) also expressed a desire to sell his facility during the year. However, prospective buyers voiced concern over the fact that only four years remained on the second ten years of the marina contract and no assurance existed that the contract would be rebid. This problem eventually led to a congressional inquiry which prompted a visit by Contracting Specialist Ruth Slette on August 10, 1983. The difficulty of the problem was not dispelled at this time but options and avenues were discussed with Mr. Goff as to what recourse he might take since no more renewable clauses existed on his contract.

Would you believe that for a third time Sugar Tree Marina was struck by a tornado or tornado like winds on the afternoon of August 6, 1983. The incident virtually destroyed forty six slips at the installation.

## I. EQUIPMENT AND FACILITIES

1. New Construction. The one big item of new construction during 1983 was the initiation of the force account building of ten low level impoundments within Duck River Bottoms. By mid-summer, all of the necessary permits, requirements, and mandates had been met by this station and construction finally began. More manpower and effort was thrown into this one project than anything else we embarked upon during the year. We worked when conditions were a little on the wet side, when things were unbearably dry and dusty, and we even adjusted our schedules where more could be accomplished with the equipment on hand. We borrowed both man and machine from nearby refuges to assist with this important project.

Dike construction first began on impoundment Number 8 within the upper bottoms of Duck River Unit (see enclosed map). Later in the summer, work was shifted to Impoundments 1 and 2 because it was felt that work should be accomplished in this area whenever the water was low in the bottoms and a dry summer had made for those conditions. Construction equipment utilized during the dike building operation included a dragline, mobile crane, upwards of seven dozers, an earth pan, graders, and various other pieces of construction equipment. Approximately 22,000 feet of dike was built up during our first six months go at this project.

In conjunction with the Duck River construction project, road surfacing materials along with pipe and gate requirements were submitted to the Regional Office. Invitations to bid on these items were released by Contracting to prospective bidders in July. A \$49,600 contract was awarded by CGS to Kelly Trucking Company of Camden, Tennessee, for Camden chert gravel and a \$43,800 contract was awarded to Choctaw Construction Company of Memphis, Tennessee, for various sizes of pipes and gates for the ten impoundments.

Heavy rains, flood waters, and unfavorable working conditions finally forced us out of Duck River Bottoms during December. However, the crew was able to install two 48 inch gates and one 36 inch gate with adjoining pipe prior to exiting the bottoms.



83-6-1. A total of 22,000 feet of low level dikes were pushed up into place during 1983. All this work was accomplished by force account within Duck River Bottoms. (LR)



83-6-12. The ten new subimpoundments at the Duck River Unit will enhance our waterfowl management capability by allowing for increased moist soil food productivity in the area. (LR)

Work was initiated on enclosing two stalls of the seven stall pole barn at Duck River Unit where maintenance work could be performed on vehicles and equipment inside and away from the weather elements. Up until now, we have had no place to work on our big pieces of heavy equipment other than in the open air.

2. Rehabilitation. The Tennessee Refuge road system received periodic rehabilitation throughout 1983. Getting special attention were several sections of roadway including the one mile Britton Ford Peninsula road which received 1,270 tons of gravel, the one-half mile Nix Landing Road which received 500 tons of gravel, and the one mile Waverly Pump Station dike road, and the upper dike road received 2,400 tons of gravel to repair winter flood damage. Also receiving attention were the one mile access road leading to Gray's Bottoms at Busseltown Unit which took 550 tons of gravel and the half mile access road leading to upper Bottoms received 330 tons of gravel.

The winter and late spring floods necessitated a considerable amount of road repair including much of what has just been listed. More than 1,000 tons of additional gravel and fill material was used to repair flood damaged roads in addition to the amounts noted above. The two mile section of the Lawrence Creek dike road sustained considerable damage as flood waters swept through the area. Repairs were made to the Breeden Road Bridge which received erosion damage at each end abutment.

TVA engineers visited Tennessee Refuge on July 12, 1983, to check what damage had occurred to the main dike at Duck River Unit. TVA then made plans to repair the worst portions of the lower dike with rip-rap and other material.

Rehabilitation work on our refuge roadways was a continual task throughout the year. The dozens of miles of primary roadways were graded on a periodic basis for utilization by the public and others. Many roadside ditches and lateral drains were also reworked during the year.

3. Major Maintenance. Both of our Wabco road graders received a fresh coat of paint during the year. Also, our D-8 Caterpillar dozer, a Hough front end loader, and an eleven yard earth pan were painted at our shop.

Heavy equipment receiving major repairs included new fuel injectors for our Caterpillar 12 motor grader and one Wabco grader. The power unit on our D-8 Caterpillar dozer was completely rebuilt so that it would be able to utilize the cable operated pan. Track adjusters for Duck River's TD-15 dozer were reworked by International Harvester but this did not completely solve our track adjustment problem. The heads were pulled and reworked on both our 930 Case farm tractors, valves ground, and replacement injectors obtained.

Various air and oil filters were obtained from TVA as their Hartsville nuclear plant is being moth balled. We now have a stock supply of filters for many of our trucks and heavy equipment.

The TD-15 International Harvester dozer assigned to the Big Sandy Unit had its engine "let go" during April of 1983. The machine had only 823 hours on it, but after being taken to an authorized shop, the dealer found excessive

wear on all main bearings, rod bearings, crankshaft, camshaft, etc. The engine was looked at by a factory representative but he could not detect what caused the problem other than it did not come from abuse. Oil samples sent off did not detect anything conclusive. International Harvester finally agreed to pay for one half of the replacement parts but our total repair bill was still slightly more than \$3,000.

Excessive rainfall during April kept us near the sub-headquarters areas on many days and gave us a chance to catch up on maintenance of equipment. Many pieces of refuge equipment were serviced and completely gone over during this period. An automatic transmission in one of our Dodge pickups was completely rebuilt after the torque converter self destructed.

The A.B. Dick copy machine located at the refuge headquarters received extensive maintenance during the year. A new copy drum and transformer were installed in this unit and suddenly copies became much clearer.

A number of trees were trimmed around the Big Sandy sub-headquarters and along the public roadways. These overhanging limbs and branches were removed as a safety precaution for equipment operators and for the visiting public.

Working in Duck River Bottoms on the levee construction continued to take what seemed like a greater than average toll on our equipment. Ultimately, the Duck River TD-15 dozer required new track sprockets, rebuilt tracks, and complete new track tighteners during September. Then just at the time when we got this dozer back on its feet, the transmission and torque converter let go at a cost of over \$6,000. It seemed like heavy equipment breakdowns would plague us no matter how cautious we were. Other maintenance on heavy equipment included a blown head gasket on a D-7 dozer and a new idler bearing, steering clutches and fan for a TD-20 dozer.

Engine failure to our second TD-15 dozer eventually came in November and it was nearly identical to that of the first. Oil pressure dropped first and soon afterwards came the tell tale sound of a loose connecting rod. Once more it was back to the shop for another major repair.

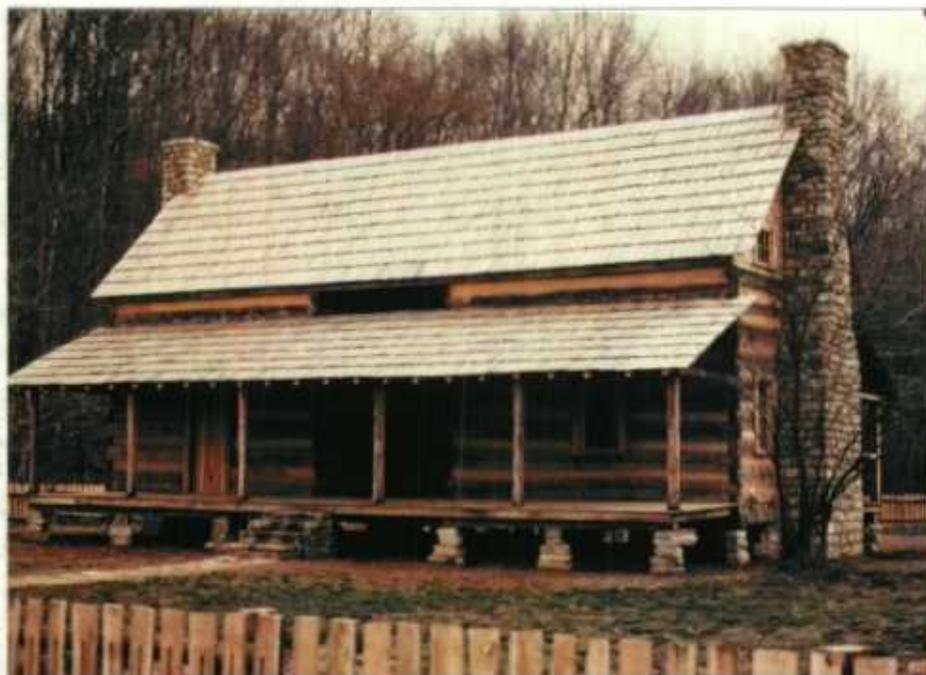
Many pieces of wooden siding were replaced on the aging shop building at Big Sandy Unit. This building was also completely painted during the year. Considerable time and care was spent on lawns and courtyards as the growing season required periodic mowing. Roadsides were bush-hogged regularly and trees and brush trimmed back.

Larry Schloamer, engineer for TVA, made an annual inspection of TVA's dike system around Duck River Bottoms on October 19, 1983. Mr. Schloamer also took a look at the current dike work that the Service has under construction in the bottoms and offered his suggestions and expertise.

4. Equipment Utilization and Replacement. Several pieces of equipment were borrowed during 1983, primarily to assist with the levee building project within Duck River Bottoms. We were able to secure on loan from Hatchie Refuge an eleven yard earth pan and a one-half yard mobile crane. From nearby Cross Creeks Refuge, we temporarily obtained a TD-15 and a TD-20 tracked dozer. All of the borrowed equipment was put to work moving thousands of tons of dirt within the bottoms.



83-3-34. The first refuge wedding in several years took place at Busseltown Unit on June 11, 1983. The colorful wedding overlooked Busseltown Bottoms and the Tennessee River. (LR)



83-1-33. The old Bussell House which was recently donated to T.V.A.'s Land Between the Lakes Recreation Area has been completely restored and made a part of their "1850 Homeplace", a living history interpretive farmstead. (LR)

A recently obtained and upgraded Wabco road grader was moved to Busseltown Unit to replace the aging Austin-Western grader at that location. It was nearly impossible to get parts on the old grader and the unit was declared as excess to our needs,

Two new vehicles were received during 1983. A 1983 Plymouth Reliant station wagon was received in April to replace an aging 1975 Plymouth wagon. A 1983 Ford Ranger pickup was also received to replace a 1977 Dodge pickup that had definitely seen better days. Both new units are getting considerably better mileage than the vehicles they replaced.

An excess plow, bush-hog mower, cropland tank sprayer, and sabre saw were picked up by GSA, Nashville, Tennessee, during the year. Also, three antiquated revolvers were sent to Anniston Army Depot in Alabama for disposal.

A John Deere 350 backhoe was loaned to Cross Creeks Refuge during the year. This wide tracked unit can walk to places where other machinery just can't go.

Tennessee Refuge was able to take advantage of excess equipment at other stations. We picked up two surplus GMC 671 engines at Mattamuskeet Refuge. We also picked up a new track and several rollers for a D-8 Caterpillar from Yazoo Refuge which was excess to their needs.

5. Communications Systems. Two General Electric mobile radios were obtained from Wildlife Assistance, Nashville, Tennessee, when these units were found excess to their needs. Tennessee Refuge used these two-way radios to upgrade our mobile communications system.

Thought is going into upgrading our telephone system in the headquarters office in Paris, Tennessee. We now have one line with five telephones which stays tied up most of the time. The telephone company says that the multi-line, multi-phone system that we need will cost nearly \$3,000. We have shelved this idea for awhile due to fiscal restraints.

6. Energy Conservation. As mentioned earlier in Section I.4, two sub-compact vehicles were purchased in 1983 which replaced larger vehicles. This will continue to be the trend at Tennessee Refuge where the replacement size unit will be the most fuel efficient model available for the job to be accomplished.

Our total fuel consumption at Tennessee Refuge was certainly reasonable during 1983, considering the enormity of the project in Duck River Bottoms and the total amount of large, mechanized equipment in use. The staff is still encouraged to share rides together whenever possible and make joint trips to the same locale. The telephone is used to save miles whenever feasible.

7. Other. The old "Bussell House" that was transferred from the Busseltown Unit to TVA's Land Between the Lakes recreation area in 1982 was finally restored and put back into service at their "1850 Homeplace" in April 1983. TVA did an excellent job of restoration on the old structure and the finished product is certainly eye catching.

J. OTHER ITEMS

1, Cooperative Programs, The Henry County Port on the Little Sulphur Creek at Tennessee Refuge continued to be a major topic again this year. The Port Authority is now pursuing the possibility of a grain terminal at the site of the present port and has granted permission to one local investment company to go ahead and draw up plans for a grain storage, loading, and shipping facility. A 26a permit was applied for by Henry County through the local TVA office and the Service was asked to comment on the project. The Service judged the project as incompatible with current refuge objectives. Although there is still considerable pressure from certain groups in the county, and from various political circles to accommodate an active grain port, it is likely that the current eagerness to have a working barge port on Tennessee Refuge with access to the Tennessee River will slowly fade,

Early in the year, an amendment to the Henry County Port was drafted by the Office of Realty when it was discovered that no "harbor limits" had been described in the original agreement. This office forwarded it to Henry County which passed it along to the County attorney for examination. After several inquiries, this office has yet to receive back the signed document or any response to it whatsoever.

Nineteen special use permits were issued to individuals or organizations during 1983. Fourteen of these permits were issued to cover privately maintained facilities such as boat docks and electric lines for individuals located in the Britton Ford and Killbrew Subdivision area on public lands. Special use permits were also issued to the Reelfoot Girl Scout Council, the West Tennessee Area Council Boy Scouts and the Elkhorn Community Club.

Tennessee Refuge participated in six cooperative programs of biological significance. These programs included the mid-winter waterfowl, survey, the annual eagle count, the reporting of neck collared and color marked birds, the regional gypsy moth survey, the experimental hardwood study plots, and the annual goose survey.

2, Items of Interest, Nearby Refuge Manager Sam Barton of Cross Creeks Refuge decided to hang it up after more than thirty years of Government service. Sam has always been a great neighbor to us and a highly respected friend as well. We will miss him. Five employees from Tennessee Refuge attended Sam's retirement party on April 13, 1983, at Dover, Tennessee.

Visitors to Tennessee Refuge during 1983 included:

<u>NAME</u>	<u>AFFILIATION</u>	<u>DATE</u>
Todd Rainwater	Atlanta R.O.	1-13-83
Jim Cobb	Atlanta R.O.	various visits
Nick Fielder	State Historical Commission	1-13-83
Dick Tune	State Historical Commission	1-13-83
Sam Drake	Atlanta R.O.	various visits

## Visitors to Tennessee Refuge (continued)

<u>NAME</u>	<u>AFFILIATION</u>	<u>DATE</u>
Charles Case	Sabine NWR	1-31-83
Charlie Herbert	Lacassine NWR	1-31-83
Don Orr	Atlanta R.O.	1-31-83
Howard Poitevint	Atlanta R.O.	2-8-83
Roy Ashley	Tenn. Div. of Forestry	2-8-83
Charlie Riddell	Tenn. Div. of Forestry	2-8-83
Harold Hurst	TWRA	3-1-83
Gary Cook	TWRA	3-1-83
Ed Organ	Atlanta R.O.	6-13-83
Clyde Stewart	Area Forester	6-21-83
Ray Whittemore	Reelfoot NWR	6-24-83
John Walker	OAS	7-19-83
William Bulger	OAS	7-19-83
Ruth Slette	Atlanta R.O.	8-11-83
Don Hankla	Atlanta R.O.	9-1-83
Jack Pivowar	GAO, Washington, DC	10-20-83
Mary Cheston	GAO, Washington, DC	10-20-83
Alex Montgomery	Atlanta R.O.	12-7-83
Don Pfitzer	Atlanta R.O.	12-7-83
Warren Parker	Asheville, NC, FWS	12-7-83
Frank Dukes	D'Arbone NWR	12-12-83
William Seitz	Ft. Collins, CO, FWS	12-12-83
Vicki Grafe	Cross Creeks NWR	various visits
Fabian Romero	Cross Creeks NWR	various visits
Jack Colwick	TWRA	various visits
J.C. Bryant	Hatchie NWR	various visits
Wendell Crews	Reelfoot NWR	various visits

3. Credits. Section F.10. Pest Control was written by Soil Conservationist Eddie Reese. All other portions of the narrative were written and compiled by Assistant Refuge Manager Leon Rhodes. The entire document was reviewed by Refuge Manager Carrell Ryan and typed by Refuge Clerk Dorothy Easley.

K. FEEDBACK

1. A crisis appears to be approaching in early '84 on our pieces of heavy equipment which do not have factory constructed and certified roll bars. Many of our older dozers, road graders, farm tractors, etc., have roll bars which were fabricated in our own shop. It would seem to be an unrealistic approach to virtually shut down our major force account construction operation within Duck River Bottoms but the prospect of this happening appears very strongly on the horizon. Most of our work is on "Flat-Even-Level" ground, where it would be difficult to turn a road grader over even with the aid of a dozer and cable. We trust that a common sense approach will prevail in this situation and that "overkill" does not cripple the system.
2. If the Service is really interested in banding black ducks and mallards, then it ought to consider accomplishing this operation during the regular waterfowl hunting season as our goose banding is accomplished; rather than identifying post season only, when most of the birds have departed. Many opportunities to capture and band black ducks and mallards are missed during the "in-season" because this is a goose only banding period. It is frustrating to see thousands of ducks come in and clean up the bait day after day when you are waiting for a goose shot. This station has had problems in recent years reaching its black duck quota primarily due to the post season restriction. In season banding would be much more effective and economical.
3. Hunting pressure around the perimeter of the refuge boundary continues to increase. Hunt clubs and individual hunters alike, tend to put blinds as close to the boundary as possible. This problem is further compounded by the Service's own baiting regulations whereby the refuge must be very careful not to manipulate any crops nearby to this hunting which could be construed as attracting birds to the refuge. It often seems as though we're no longer managing for waterfowl, but managing for folks. The 1983-84 waterfowl hunting season is the "best on record" for this part of the state. The kill data is still being compiled, but estimates place it at least 300 per cent better than the 1982-83 season. Weather, no doubt, helped move the birds about. Whatever the reason, every uncommitted piece of land adjoining the refuge is for sale. We cannot project how many new blinds we will see around the refuge in 1984-85... and at a time when we are talking "A-TVP-Plan" with the state.
4. The year 1985 will be a pivotal period for our shoreline policy on Kentucky Lake. On December 31, 1985, fourteen adjacent neighbors (primarily in Killibrew and Britton Ford Subdivision) are scheduled to have their special use permits terminated covering special privileges on refuge lands and waters such as boat docks, electric lines, storage facilities, etc. This decision and shoreline policy has approval from the Regional Office and Assistant Secretary Ray Arnett. We are hoping that everything progresses smoothly towards the termination date and that no last minute political maneuverings will cause a delay in the process of removing these special privileges from a select few. It is always frustrating to respond to a refuge neighbor that they cannot have a boat dock in refuge waters and then they look over and see some that are permitted. We will

still have the problem of Mr. Gaines' boat dock at Antioch if and when he decides to utilize his option to secure a special use permit for such a structure.

5. Moist soil plant production at Tennessee Refuge during 1983 was certainly the trump card that pulled us through what would otherwise have been a lean year. Corn and milo production were off more than seventy per cent and the food situation would really have been critical had it not been for the natural moist soil productivity. We noted waterfowl using moist site areas even when it looked like everything had been cleaned up. We have very high "hopes" for the future diversity and wildlife outputs at this station, and especially following completion of our moist soil development project. We have already noticed an increase in the numbers of black ducks. Our current figures reflect approximately one black duck to every four mallards...how much of this black duck use is attributed to moist soil management is yet to be determined.
6. We experienced considerable trouble with our "new" TD-15 dozers. Two complete engine and one transmission overhauls. The factory "Reps" say no abuse of equipment. The old D-7 and D-8 "Cats" just kept clogging along. The TD-15's went down with less than 1,000 hours operation. We hesitate to say we are "snake bitten", but we will sure have something to say about future orders if there are ever any. The TD-15's were purchased through BLHP funding, and if any future funding surfaces for equipment, it would be wise for the Service to evaluate the history of these units before jumping the gun and buying more. They do have ROPS and that's where the compliments stop.

*Morone mississippiensis* yellow bass

**CENTRARCHIDAE - SUNFISHES**

*Ambloplites rupestris* rock bass  
*Lepomis cyanellus* green sunfish  
*Lepomis gulosus* warmouth  
*Lepomis humilis* orangespotted sunfish  
*Lepomis macrochirus* bluegill  
*Lepomis marginatus* dollar sunfish  
*Lepomis megalotis* longear sunfish  
*Lepomis microlophus* redear sunfish  
*Lepomis punctatus* spotted sunfish  
*Micropterus dolomieu* smallmouth bass  
*Micropterus punctulatus* spotted bass  
*Micropterus salmoides* largemouth bass  
*Pomoxis annularis* white crappie  
*Pomoxis nigromaculatus* black crappie

**PERCIDAE - PERCHES**

*Etheostoma (catenotus) sp.* lollipop darter  
*Etheostoma asprigene* mud darter  
*Etheostoma caeruleum* rainbow darter  
*Etheostoma chlorosomum* bluntnose darter  
*Etheostoma duryi* blackside snubnose darter  
*Etheostoma flabellare* fantail darter  
*Etheostoma gracile* slough darter  
*Etheostoma kennicotti* stripetail darter  
*Etheostoma nigrum* johnny darter  
*Etheostoma parvipinne* goldstripe darter  
*Etheostoma proelare* cypress darter  
*Etheostoma squamiceps* spottail darter  
*Percina burtoni* blotchside logperch  
*Percina caprodes* log perch  
*Percina maculata* blackside darter  
*Percina ouachitae* Ouachita darter  
*Percina sciera* dusky darter  
*Percina shumardi* river darter  
*Stizostedion canadense* sauger  
*Stizostedion vitreum* walleye

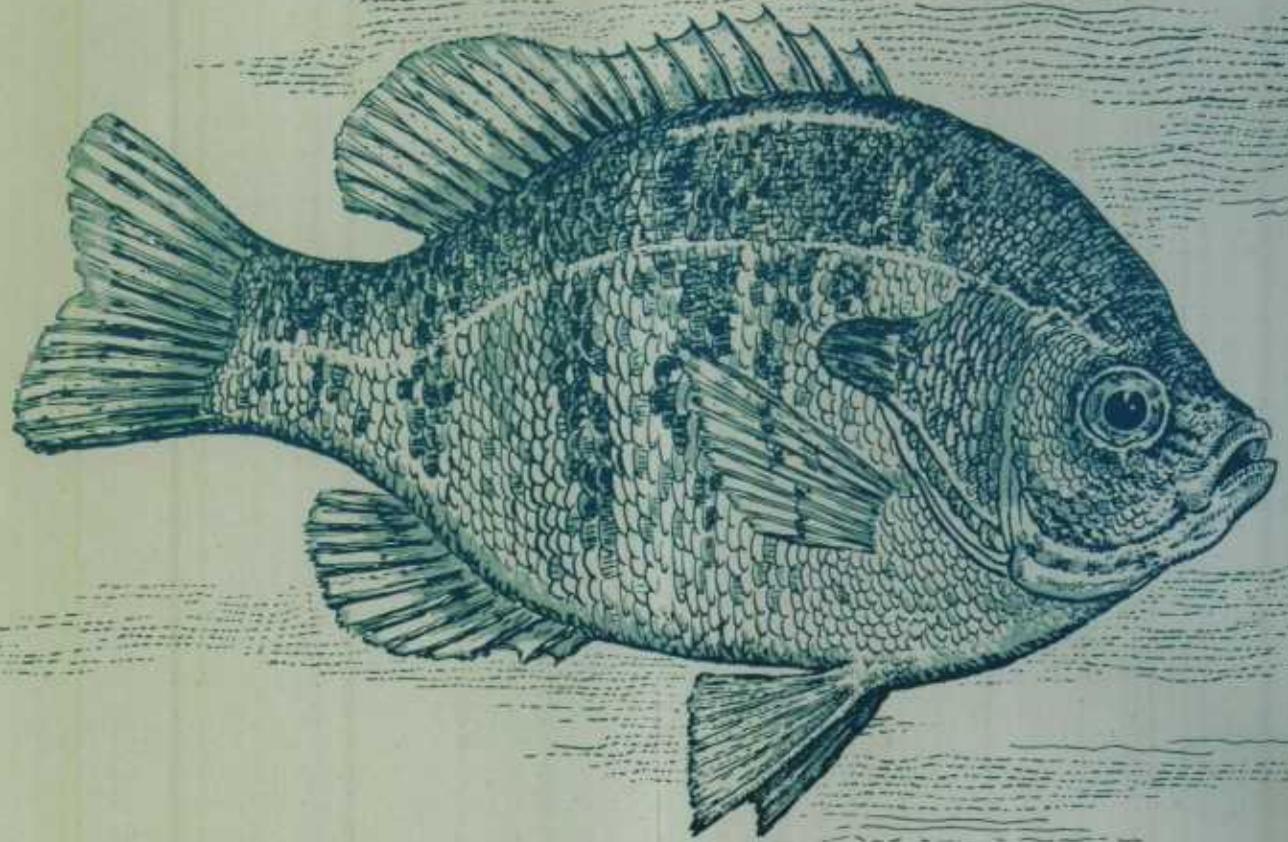
**SCIAENIDAE - DRUMS**

*Aplodinotus grunniens* freshwater drum

**COTTIDAE - SCULPINS**

*Cottus carolinae* banded sculpin

# FISHES



of the  
**TENNESSEE**  
National Wildlife Refuge

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

Tennessee National Wildlife Refuge, established in West Tennessee as a refuge for migratory waterfowl, comprises 51,358 acres in three disconnected units extending 65 river miles along the Tennessee River - Kentucky Lake. The Tennessee River serves as a spur route of the Mississippi Flyway and funnels about 200,000 ducks and 40,000 geese into the area each fall and winter. A variety of habitats including mixed hardwood stands, marsh, cultivated land, old fields, meadows and ponds provides cover and food for a rich diversity of wildlife.

Kentucky Lake is the most heavily utilized reservoir in Tennessee by sport fishermen and also supports a commercial fishery. In addition to the lake, gravel bottomed and clay bottomed streams arising in or passing through the refuge, sloughs and small swamps sustain many species of fish. Following is a species list derived from records compiled by student researchers, federal agencies, and from collections by refuge personnel. More exhaustive collecting would doubtlessly reveal additional species. Persons having information regarding species not listed herein are welcome to contact the Refuge Manager, Tennessee National Wildlife Refuge, P.O. Box 849, Paris, Tennessee 38242.

#### PETROMYZONTIDAE - LAMPREYS

*Ichthyomyzon castaneus* chestnut lamprey  
*Lampetra aepyptera* least brook lamprey

#### POLYODONTIDAE - PADDLEFISHES

*Polyodon spathula* paddlefish

#### LEPISOSTEIDAE - GARS

*Lepisosteus platostomus* shortnose gar  
*Lepisosteus osseus* longnose gar  
*Lepisosteus oculatus* spotted gar

#### AMIIDAE - BOWFINS

*Amia calva* bowfin

#### ANGUILLIDAE - FRESHWATER EELS

*Anguilla rostrata* American eel

#### CLUPEIDAE - HERRINGS

*Alosa chrysochloris* skipjack herring  
*Dorosoma cepedianum* gizzard shad  
*Dorosoma petenense* threadfin shad

#### HIODONTIDAE - MOONEYES

*Hiodon alosoides* goldeye  
*Hiodon tergisus* mooneye

#### UMBRIDAE - MUDMINNOWS

*Umbra limi* central mudminnow

#### ESOCIDAE - PIKES

*Esox americanus* grass pickerel  
*Esox masquinongy* muskellunge  
*Esox niger* chain pickerel

#### CYPRINIDAE - MINNOWS

*Campostoma anomalum* central stoneroller  
*Carassius auratus* goldfish  
*Clinostonus funduloides* rosieside dace  
*Cyprinus carpio* carp  
*Ericymba buccata* silverjaw minnow  
*Hybopsis aestivalis* speckled chub  
*Hybopsis amblops* bigeye chub  
*Hybopsis storeriana* silver chub  
*Notemigonus crysoleucas* golden shiner  
*Notropis ardens* rosefin shiner  
*Notropis atherinoides* emerald shiner  
*Notropis boops* bigeye shiner  
*Notropis buchanani* ghost shiner  
*Notropis chrysocephalus* striped shiner  
*Notropis cornutus* common shiner  
*Notropis emilliae* pugnose minnow  
*Notropis fumeus* ribbon shiner  
*Notropis spilopterus* spotfin shiner  
*Notropis umbratilis* redfin shiner  
*Notropis volucellus* mimic shiner  
*Notropis whipplei* steelcolor shiner  
*Phenacobius mirabilis* suckermouth minnow  
*Phoxinus erythrogaster* southern redbelly dace  
*Pimephales notatus* bluntnose minnow

*Pimephales vigilax* bullhead minnow  
*Rhinichthys atratulus* blacknose dace  
*Semotilus atromaculatus* creek chub

#### CATOSTOMIDAE - SUCKERS

*Carpionodes carpio* river carpsucker  
*Carpionodes cyprinus* quillback  
*Carpionodes velifer* highfin carpsucker  
*Erimyzon oblongus* creek chubsucker  
*Hypentelium nigricans* northern hog sucker  
*Ictiobus bubalus* smallmouth buffalo  
*Ictiobus cyprinellus* bigmouth buffalo  
*Ictiobus niger* black buffalo  
*Minytrema melanops* spotted sucker  
*Moxostoma anisurum* silver redhorse  
*Moxostoma duquesnei* black redhorse  
*Moxostoma erythrurum* golden redhorse  
*Moxostoma macrolepidotum* shorthead redhorse

#### ICTALURIDAE - FRESHWATER CATFISHES

*Ictalurus furcatus* blue catfish  
*Ictalurus melas* black bullhead  
*Ictalurus natalis* yellow bullhead  
*Ictalurus nebulosus* brown bullhead  
*Ictalurus punctatus* channel catfish  
*Noturus gyrinus* tadpole madtom  
*Noturus miurus* brindled madtom  
*Noturus nocturnus* freckled madtom  
*Pylodictis olivaris* flathead catfish

#### APHREDODERIDAE - PIRATE PERCHES

*Aphredoderus sayanus* pirate perch

#### CYPRINODONTIDAE - KILLIFISHES

*Fundulus catenatus* northern studfish  
*Fundulus olivaceus* blackspotted topminnow

#### POECILIIDAE - LIVEBEARERS

*Gambusia affinis* mosquitofish

#### ATHERINIDAE - SILVERSIDES

*Labidesthes sicculus* brook silverside

#### PERCICHTHYIDAE - TEMPERATE BASSES

*Morone chrysops* white bass

## NON-POISONOUS SNAKES

Few native animals are more disliked or more misunderstood than snakes. Most of them are not poisonous, and many are beneficial due to the number of rodents and insects they eat. The kingsnake is even well-known rattlesnake eater, since it is immune to their venom.

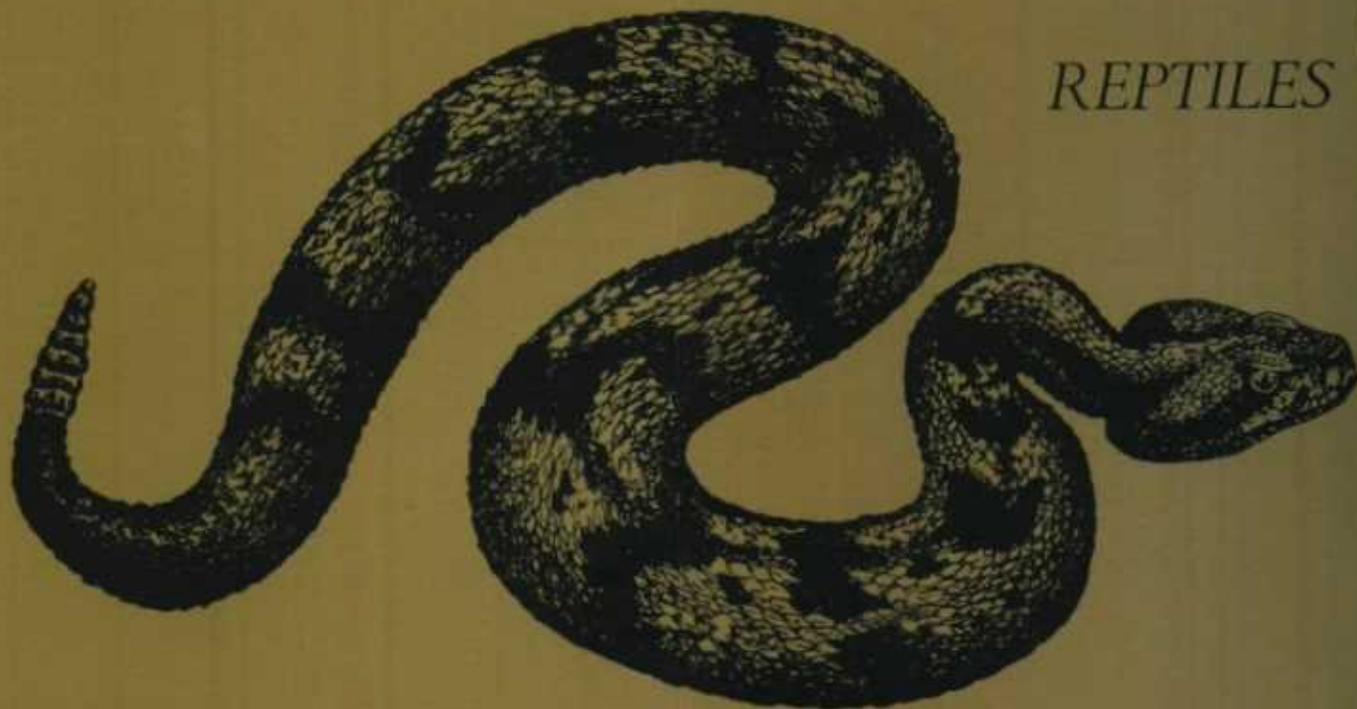
Western Earth Snake (*Virginia valeriae elegans*)  
Midland Brown Snake (*Storeria dekayi wrightorum*)  
Red-bellied Water Snake (*Natrix erythrogaster erythrogaster*)  
Yellow-bellied Water Snake (*Natrix erythrogaster flavigaster*)  
Broad-banded Water Snake (*Natrix fasciata confluens*)  
Midland Water Snake (*Natrix sipedon pleuralis*)  
Diamondback Water Snake (*Natrix rhombifera rhombifera*)  
Green Water Snake (*Natrix cyclopion cyclopion*)  
Queen Snake (*Natrix septemvittata*)  
Eastern Garter Snake (*Thamnophis sirtalis sirtalis*)  
Eastern Ribbon Snake (*Thamnophis sauritus sauritus*)  
Western Mud Snake (*Farancia abacura reinwardti*)  
Eastern Hognose Snake (*Heterodon platyrhincus*)  
Midwest Worm Snake (*Carphophis amoenus helenae*)  
Mississippi Ringneck Snake (*Diadophis punctatus stictogonys*)  
Southern Black Racer (*Coluber constrictor priapus*)  
Rough Green Snake (*Ophiodrys astivus*)  
Northern Pine Snake (*Pituophis melanoleucus melanoleucus*)  
Gray Rat Snake (*Elaphe obsoleta spiloides*)  
Black Rat Snake (*Elaphe obsoleta obsoleta*)  
Corn Snake (*Elaphe guttata guttata*)  
Scarlet Snake (*Cemophora coccinea*)  
Red Milk Snake (*Lampropeltis triangulum zypilla*)  
Prairie Kingsnake (*Lampropeltis calligaster calligaster*)  
Black Kingsnake (*Lampropeltis getulus niger*)  
Speckled Kingsnake (*Lampropeltis getulus holbrooki*)  
Southeastern Crowned Snake (*Tantilla coronata*)

## POISONOUS SNAKES

The poisonous snakes of Tennessee National Wildlife Refuge can be distinguished by their vertical pupils, triangular shaped head and the deep pit on each side of the head between their eye and nostril. These pits are extremely sensitive to heat, enabling pit vipers to locate and accurately strike warm blooded prey even in complete darkness. Poisonous snakes frequent areas where small mammals and birds are found; therefore, stay alert around rocky outcrops, fence rows, and farm areas.

Northern Copperhead (*Agkistrodon contortrix mokasen*)  
Southern Copperhead (*Agkistrodon contortrix contortrix*)  
Western Cottonmouth (*Agkistrodon piscivorus leucostoma*)  
Western Pygmy Rattlesnake (*Sistrurus miliaris streckeri*)  
Timber Rattlesnake (*Crotalus horridus horridus*)  
Canebrake Rattlesnake (*Crotalus horridus atricaudatus*)

# AMPHIBIANS AND REPTILES



Tennessee  
National Wildlife  
Refuge

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

Covering approximately 51,358 acres, Tennessee National Wildlife Refuge includes creeks, springs, woodlands and open fields. Its amphibian and reptile life is varied and interesting. These animals are most evident during the warmest months, since their body temperatures approximate that of their surroundings. As with all refuge wildlife, they are protected and must not be harmed, but should be appreciated for the vital roles they play in the balance of nature.



#### AMPHIBIANS

The first vertebrates to emerge on land 350 million years ago, amphibians have never completely adapted to a totally dry environment. Their eggs must be laid in water or in moist places since they lack protective shells. Many young are totally aquatic, while almost all adults are air breathers.

#### TOADS AND FROGS

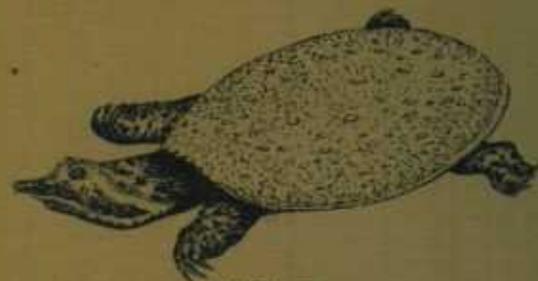
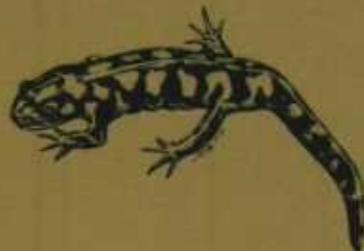
These are the most widely distributed of all amphibians. Most toads and frogs lay eggs that hatch into totally aquatic tadpoles. The transformation of these tadpoles into land-dwelling adults is called metamorphosis. During this stage of development, their gills are replaced by lungs and they develop legs and glands in their skin that secrete mucus. Most frogs are seldom found far from water or moist places because these mucus secretions are not fully effective in preventing loss of body moisture. Toads are more nearly terrestrial, remaining out of water for extended periods of time.

Eastern Spadefoot Toad (*Scaphiopus holbrooki holbrooki*)  
 American Toad (*Bufo americanus*)  
 Fowler's Toad (*Bufo woodhousei fowleri*)  
 Eastern Narrow-mouthed Toad (*Gastrophryne carolinensis*)  
 Northern Spring Peeper (*Hyla crucifer crucifer*)  
 Western Bird-voiced Treefrog (*Hyla avivoca avivoca*)  
 Gray Treefrog (*Hyla versicolor*)  
 Green Treefrog (*Hyla cinerea*)  
 Southern Cricket Frog (*Acris gryllus gryllus*)  
 Northern Cricket Frog (*Acris crepitans crepitans*)  
 Blanchard's Cricket Frog (*Acris crepitans blanchardi*)  
 Upland Chorus Frog (*Pseudacris triseriata feriarum*)  
 Pickerel Frog (*Rana palustris*)  
 Southern Leopard Frog (*Rana utricularia*)  
 Northern Crawfish Frog (*Rana areolata areolata*)  
 Green Frog (*Rana clamitans melanota*)  
 Bronze Frog (*Rana clamitans clamitans*)  
 Bullfrog (*Rana catesbeiana*)

#### NEWTs AND SALAMANDERS

These lizard-like amphibians range in size from 2" to 40". They have been greatly used by biologists in experiments because they have the unique ability to regenerate legs and limbs that have been broken off. Most hide by day under boards, logs or stones, and become active at night, in search of crayfish, worms, mollusks, small fish, eggs and aquatic insects to eat.

Spotted Salamander (*Ambystoma maculatum*)  
 Small-mouthed Salamander (*Ambystoma texanum*)  
 Marbled Salamander (*Ambystoma opacum*)  
 Mole Salamander (*Ambystoma talpoideum*)  
 Eastern Tiger Salamander (*Ambystoma tigrinum tigrinum*)  
 Northern Dusky Salamander (*Desmognathus fuscus fuscus*)  
 Zigzag Salamander (*Plethodon dorsalis dorsalis*)  
 Slimy Salamander (*Plethodon glutinosus glutinosus*)  
 Southern Red Salamander (*Pseudotriton ruber vioscai*)  
 Northern Red Salamander (*Pseudotriton ruber ruber*)  
 Three-lined Salamander (*Eurycea longicauda guttolineata*)  
 Long-tailed Salamander (*Eurycea longicauda longicauda*)  
 Southern Two-lined Salamander (*Eurycea bilineata cirrigera*)  
 Cave Salamander (*Eurycea lucifuga*)  
 Three-toed Amphiuma (*Amphiuma tridactylum*)  
 Hellbender (*Cryptobranchus alleganiensis alleganiensis*)  
 Mudpuppy (*Necturus maculosus*)  
 Western Lesser Siren (*Siren intermedia nettingi*)  
 Central Newt (*Notophthalmus viridescens louisianensis*)  
 Red-spotted Newt (*Notophthalmus viridescens viridescens*)



#### REPTILES

Reptiles are considered the first true land vertebrates because they do not depend on water in their breeding and they are able to live in dry places. Their skin is covered by dead scales that help them conserve body fluids. Reptiles breathe by means of lungs all their lives.

#### TURTLES

With their bodies enclosed in a shell, most turtles can withdraw their head, legs and tail for protection. In some species, the legs are covered with plates ("scutes") for added safety. Turtles have no teeth; instead their jaws are covered with a hooked beak. Most feed on snails, mollusks, fishes, plants and carrion.

Alligator Snapping Turtle (*Macrochelys temminckii*)  
 Common Snapping Turtle (*Chelydra serpentina serpentina*)  
 Stinkpot (*Sternotherus odoratus*)  
 Eastern Mud Turtle (*Kinosternon subrubrum subrubrum*)  
 Map Turtle (*Graptemys geographica*)  
 False Map Turtle (*Graptemys pseudogeographica*)  
 Southern Painted Turtle (*Chrysemys picta dorsalis*)  
 Slider (*Chrysemys concinna hieroglyphica*)  
 Missouri Slider (*Chrysemys floridana hoyi*)  
 Red-eared Turtle (*Chrysemys scripta elegans*)  
 Eastern Box Turtle (*Terrapene carolina carolina*)  
 Smooth Softshell (*Trionyx muticus*)  
 Eastern Spiny Softshell (*Trionyx spiniferus spiniferus*)

#### LIZARDS

Lizards for the most part, have well-developed legs, five toes on each foot and strong claws. Inconspicuous coloring enables them to feed by day on insects in bushes, trees and on the ground. Lizards are known to break off their tails when caught; this causes very little harm to the animal and often saves its life.

Northern Fence Lizard (*Sceloporus undulatus hyacinthinus*)  
 Ground Skink (*Leiolopisma laterale*)  
 Five-lined Skink (*Eumeces fasciatus*)  
 Broad-headed Skink (*Eumeces laticeps*)  
 Six-lined Racerunner (*Cnemidophorus sexlineatus sexlineatus*)  
 Eastern Slender Glass Lizard (*Ophisaurus attenuatus longicaudus*)

Pine Vole (*Pitymys pinetorum*)  
Southern Bog Lemming (*Synaptomys cooperi*)  
Beaver (*Castor canadensis*)  
Muskrat (*Ondatra zibethica*)

#### LAGOMORPHIA

Eastern Cottontail (*Sylvilagus floridanus*)  
Swamp Rabbit (*Sylvilagus aquaticus*)

#### ARTIODACTYLA

Whitetail Deer (*Odocoileus virginianus*)

#### WATCH FOR THESE

Keen Myotis (*Myotis keeni*)  
Gray Myotis (*Myotis grisescens*) Endangered  
Small-footed Myotis (*Myotis subulatus*)  
Indiana Myotis (*Myotis sodalis*) Endangered  
Black Rat (*Rattus rattus*)

#### NOTES

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

RF-42620-3

January 1980

# MAMMALS



Tennessee  
National Wildlife  
Refuge

Tennessee National Wildlife Refuge, established in west Tennessee as a wintering area for migratory waterfowl, comprises 51,358 acres in three disconnected units extending 65 miles along Kentucky Lake. Nearly half of the refuge is continuously covered by water. The remainder consists of fertile bottomland, marginal rangeland, seasonally flooded swamps and rolling hills covered with mixed hardwood forests. This varied topography provides habitat for many mammal species.

The following list of mammals includes those which have been observed on the refuge or have been found to exist in the immediate vicinity according to Burt & Gossenheider (A Field Guide to the Mammals, Houghton Mifflin Co., 1964), and records from the Biology Departments of the University of Tennessee at Martin, Tennessee and Memphis State University at Memphis, Tennessee.

#### MARSUPIALIA

Opossum (*Didelphis marsupialis*)

#### INSECTIVORA

Least Shrew (*Cryptotis parva*)

Shorttail Shrew (*Blarina brevicauda*)

Eastern Mole (*Scalopus aquaticus*)

#### CHIROPTERA

Little Brown Myotis (*Myotis lucifugus*)

Mississippi Myotis (*Myotis austroriparius*)

Evening Bat (*Nycticeius humeralis*)

Eastern Pipistrel (*Pipistrellus subflavus*)

Red Bat (*Lasiurus borealis*)

Hoary Bat (*Lasiurus cinereus*)

Silver-haired Bat (*Lasionycteris noctivagans*)

Eastern Big-eared Bat (*Plecotus rafinesquei*)

Big Brown Bat (*Eptesicus fuscus*)

#### CARNIVORA

Raccoon (*Procyon lotor*)

Longtail Weasel (*Mustela frenata*)

Mink (*Mustela vison*)

Striped Skunk (*Mephitis mephitis*)

Spotted Skunk (*Spilogale putorius*)

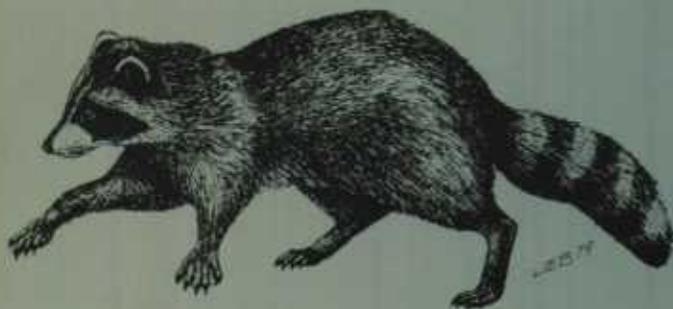
River Otter (*Lutra canadensis*)

Red Fox (*Vulpes fulva*)

Gray Fox (*Urocyon cinereoargenteus*)

Coyote (*Canis latrans*)

Bobcat (*Lynx rufus*)



#### RODENTIA

Woodchuck (*Marmota monax*)

Eastern Chipmunk (*Tamias striatus*)

Eastern Fox Squirrel (*Sciurus niger*)

Eastern Gray Squirrel (*Sciurus carolinensis*)

Southern Flying Squirrel (*Glaucomys volans*)

Eastern Harvest Mouse (*Reithrodontomys humulis*)

White-footed Mouse (*Peromyscus leucopus*)

Deer Mouse (*Peromyscus maniculatus*)

Golden Mouse (*Peromyscus nuttalli*)

Cotton Mouse (*Peromyscus gossypinus*)

Meadow Jumping Mouse (*Zapus hudsonius*)

House Mouse (*Mus musculus*)

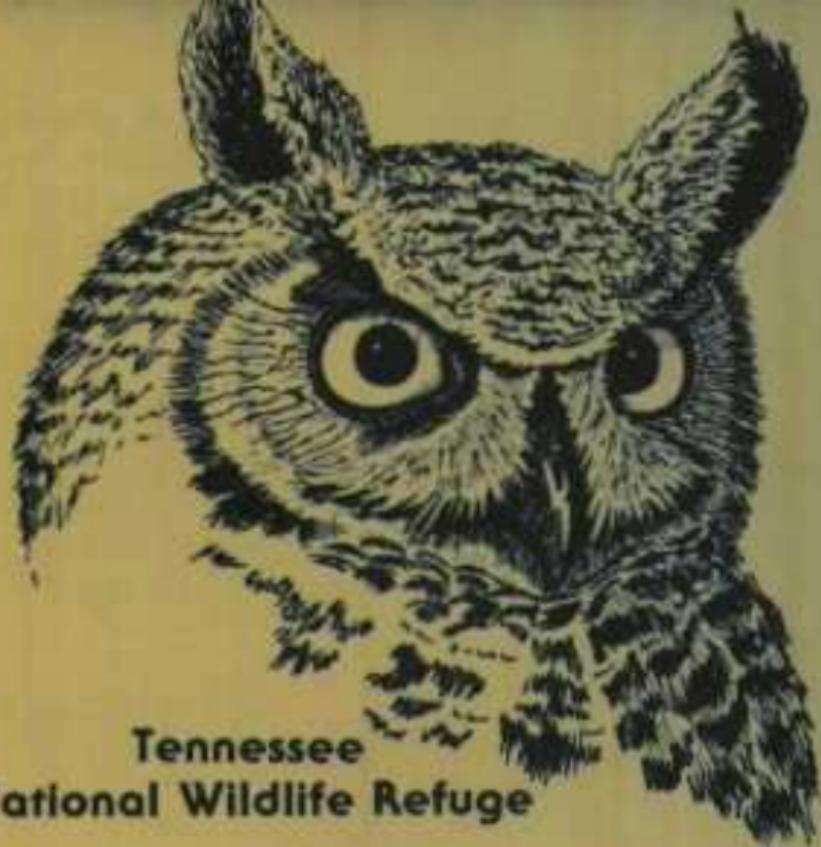
Hispid Cotton Rat (*Sigmodon hispidus*)

Rice Rat (*Oryzomys palustris*)

Eastern Woodrat (*Neotoma floridana*)

Norway Rat (*Rattus norvegicus*)

Prairie Vole (*Microtus ochrogaster*)



## Tennessee National Wildlife Refuge

### General Information

Loons • Grebes • Pelicans • Cormorants • Herons and  
Bitterns • Swans, Geese, and Ducks

Vultures • Hawks • Eagles • Osprey • Falcons • Rails,  
Gallinule and Coots • Plovers • Snipe and Sandpipers  
• Gulls and Terns

Doves • Cuckoos • Owls • Goatsuckers • Swifts •  
Hummingbirds • Kingfishers • Woodpeckers •  
Kingbirds • Flycatchers • Phoebe • Pewees • Larks •  
Swallows

Jays • Crows • Chickadees • Titmouse • Nuthatches •  
Creepers • Wrens • Mockingbirds and Thrashers •  
Thrushes and Bluebirds • Gnatcatchers • Kinglets •  
Pipits • Waxwings • Shrikes • Starlings • Vireos

Warblers • House Sparrows • Blackbirds and Orioles •  
Tanagers

Grosbeaks • Finches • Sparrows and Buntings • Rare

United States Department of the Interior  
Fish and Wildlife Service

Tennessee National Wildlife Refuge, containing 51,000 acres, is situated on TVA's Kentucky Lake in central-western Tennessee. The refuge has three units, all superimposed on lands and waters of the Tennessee Valley Authority. Established in 1945, the refuge is

Tennessee Refuge headquarters are in Paris, Tennessee. All three units — Big Sandy, Duck River, and Bussettown may be reached on all weather roads. Excellent birdwatching locations are found on all three units along improved refuge roads open to public travel.

This leaflet lists 226 species of birds that have been identified on Tennessee Refuge by refuge personnel and visiting birdwatchers. Seasonal abundance of each species is noted as follows:

<b>Sp</b> — Spring (March-May)	<b>a</b> — abundant
<b>S</b> — Summer (June-August)	<b>c</b> — common
<b>F</b> — Fall (September-November)	<b>u</b> — uncommon
<b>W</b> — Winter (December-February)	<b>o</b> — occasional
	<b>r</b> — rare

- Nests on Refuge
- Endangered Species

## General Information

Loons • Grebes • Pelicans • Cormorants • Herons and Bitterns • Swans, Geese, and Ducks

Vultures • Hawks • Eagles • Osprey • Falcons • Rails, Gallinule and Coots • Plovers • Snipe and Sandpipers • Gulls and Terns

Doves • Cuckoos • Owls • Goatsuckers • Swifts • Hummingbirds • Kingfishers • Woodpeckers • Kingbirds • Flycatchers • Phoebe • Pewees • Larks • Swallows

Jays • Crows • Chickadees • Titmouse • Nuthatches • Creepers • Wrens • Mockingbirds and Thrashers • Thrushes and Bluebirds • Gnatcatchers • Kinglets • Pipits • Waxwings • Shrikes • Starlings • Vireos

Warblers • House Sparrows • Blackbirds and Orioles • Tanagers

Grosbeaks • Finches • Sparrows and Buntings • Rare Birds

o	o	.....	Wood Ibis
u	u	.....	American Bittern
u	u	.....	Least Bittern
u	u	.....	Yellow-crowned Night Heron
u	u	.....	Black-crowned Night Heron
r	r	.....	Snowy Egret
o	c	.....	Great Egret
r	u	.....	Cattle Egret
	c	.....	Little Blue Heron
	c	.....	Green Heron
c	c	.....	Great Blue Heron
	u	.....	Anhinga
u	u	.....	Double-crested Cormorant
o	o	.....	White Pelican
c	c	u	Pied-billed Grebe
u	u	u	Horned Grebe
o	o	o	Common Loon

Sp S F W

United States Department of the Interior  
Fish and Wildlife Service

— Canada Goose	a	o	a	o
— White-fronted Goose			r	r
— Snow Goose	u		u	o
— • Mallard	a	o	a	o
— Black Duck	a	r	a	a
— Gadwall	c		c	c
— Pintail	o		o	o
— Green-winged Teal	c		c	c
— Blue-winged Teal	c	c	c	o
— Cinnamon Teal	r		r	
— American Wigeon	a		a	o
— Northern Shoveler	c		c	c
— • Wood Duck	c	c	c	c
— Redhead	u		u	u
— Ring-necked Duck	u		c	c
— Canvasback	u		u	u
— Lesser Scaup	c		c	c
— Common Goldeneye	u		u	u
— Bufflehead	c		c	c
— Oldsquaw	r		r	r
— Black Scoter			r	r
— White-winged Scoter	r		r	r
— Ruddy Duck	c		u	u
— Hooded Merganser	c	u	c	c
— Common Merganser	u		u	u
— Red-breasted Merganser	u		u	u

Loons • Grebes • Pelicans • Cormorants • Herons and  
Bitterns • Swans, Geese, and Ducks

Vultures • Hawks • Eagles • Osprey • Falcons • Rails,  
Gallinule and Coots • Plovers • Snipe and Sandpipers  
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Doves • Cuckoos • Owls • Goatsuckers • Swifts •  
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Pipits • Waxwings • Shrikes • Starlings • Vireos

Warblers • House Sparrows • Blackbirds and Orioles •  
Tanagers

Grosbeaks • Finches • Sparrows and Duntinos • Bore



— Semipalmated Plover .....	U	U	U	
— Killdeer .....	C	C	C	C
— American Golden Plover .....	O			
— Black Bellied Plover .....		O	O	
— American Woodcock .....	O		O	O
— Common Snipe .....	C		C	C
— Upland Sandpiper .....	r		r	
— Spotted Sandpiper .....	U	U	U	
— Solitary Sandpiper .....	C	C	C	
— Greater Yellowlegs .....	C	C	C	O
— Lesser Yellowlegs .....	C	C	C	r
— Pectoral Sandpiper .....	C	C	C	
— Least Sandpiper .....	C	C	C	
— Baird's Sandpiper .....		O	O	
— Semipalmated Sandpiper .....	C	C	C	
— Buff-breasted Sandpiper .....		O	O	
— Sanderling .....		O	O	
— Herring Gull .....	C		C	C
— Ring-billed Gull .....	O		O	O
— Franklin's Gull .....	r		r	
— Bonapart's Gull .....	r		r	
— Forster's Tern .....	O		O	
— Common Tern .....	O		O	
— Least Tern .....	C	C	C	
— Caspian Tern .....	O		O	
— Black Tern .....	O		O	

Vultures • Hawks • Eagles • Osprey • Falcons • Rails,  
Gallinule and Coots • Plovers • Snipe and Sandpipers  
• Gulls and Terns

Doves • Cuckoos • Owls • Goatsuckers • Swifts •  
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Warblers • House Sparrows • Blackbirds and Orioles •  
Tanagers

Grosbeaks • Finches • Sparrows and Buntings • Rare  
Birds

United States Department of the Interior  
 Fish and Wildlife Service

	Sp	S	F	W
___ Rock Dove .....	o	o	o	o
___ • Mourning Dove .....	o	o	o	o
___ • Yellow-billed Cuckoo .....	r	r	r	
___ • Black-billed Cuckoo .....	c	c	c	
___ • Barn Owl .....	r	r	r	r
___ • Screech Owl .....	u	u	u	u
___ • Great Horned owl .....	o	o	o	o
___ • Barred Owl .....	c	c	c	c
___ Short-eared Owl .....	r		r	r
___ • Chuck-will's-widow .....	c	c	c	
___ • Whip-poor-will .....	c	r	c	
___ • Common Nighthawk .....	c	c	c	
___ • Chimney Swift .....	c	c	c	
___ • Ruby-throated Hummingbird ...	c	c	c	
___ • Belted Kingfisher .....	c	c	c	o
___ • Common Fliedier .....	c	c	c	c
___ • Pileated Woodpecker .....	u	u	u	u
___ • Red-bellied Woodpecker .....	c	c	c	c
___ • Red-headed Woodpecker .....	u	u	u	u
___ • Yellow-bellied Sapsucker .....	c		c	c
___ • Hairy Woodpecker .....	u	u	u	u
___ • Downy Woodpecker .....	c	c	c	c
___ • Eastern Kingbird .....	c	c	c	
___ • Great Crested Flycatcher .....	c	c	c	

_____ • Acadian Flycatcher .....	U	U	U
_____ • Least Flycatcher .....		U	U
_____ • Eastern Wood Pewee .....	C	C	C
_____ • Horned Lark .....	O	O	O O
_____ • Tree Swallow .....	A		A
_____ • Bank Swallow .....	U	U	U
_____ • Rough-winged Swallow .....	C	C	C
_____ • Barn Swallow .....	C	C	C
_____ • Cliff Swallow .....	C	C	C
_____ • Purple Martin .....	C	C	



Doves • Cuckoos • Owls • Goatsuckers • Swifts •  
 Hummingbirds • Kingfishers • Woodpeckers •  
 Kingbirds • Flycatchers • Phoebes • Pewees • Larks •  
 Swallows

Jays • Crows • Chickadees • Titmouse • Nuthatches •  
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Warblers • House Sparrows • Blackbirds and Orioles •  
 Tanagers

Grosbeaks • Finches • Sparrows and Buntings • Rare  
 Birds

- ..... c c c c • Tufted Titmouse
- ..... c c c c • Carolina Chickadee
- ..... c c c c • Common Crow
- ..... c c c c • Blue Jay

Sp S F W



United States Department of the Interior  
Fish and Wildlife Service

* ____	Brown Creeper .....	o	o	o
____	House Wren .....	u	u	u
____	Winter Wren .....	u	u	u
____	• Bewick's Wren .....	u	u	u
____	• Carolina Wren .....	c	c	c
____	Long-billed Marsh Wren .....	o	o	r
____	Short-billed Marsh Wren .....	u	u	
____	• Mockingbird .....	c	c	c
____	• Gray Catbird .....	c	c	c
____	• Brown Thrasher .....	c	c	r
____	• American Robin .....	c	c	c
____	• Wood Thrush .....	c	c	c
____	Hermit Thrush .....	u	u	u
____	Swainson's Thrush .....	c	c	
____	Gray-cheeked Thrush .....	c	c	
____	Veery .....	u	u	
____	• Eastern Bluebird .....	c	c	c
____	• Blue-gray Gnatcatcher .....	c	c	c
____	Golden-crowned Kinglet .....	u	u	u
____	Ruby-crowned Kinglet .....	u	u	u
____	Water Pipit .....	u	u	u
____	Cedar Waxwing .....	c	c	c
____	• Loggerhead Shrike .....	c	c	c
____	• Starling .....	a	a	a
____	Solitary Vireo .....	u	u	
____	• White-eyed Vireo .....	c	c	c
____	Yellow-throated Vireo .....	u	u	
____	• Red-eyed Vireo .....	c	c	c
____	• Warbling Vireo .....	c	o	c

Jays • Crows • Chickadees • Titmouse • Nuthatches •  
 Creepers • Wrens • Mockingbirds and Thrashers •  
 Thrushes and Bluebirds • Gnatcatchers • Kinglets •  
 Pipits • Waxwings • Shrikes • Starlings • Vireos

Warblers • House Sparrows • Blackbirds and Orioles •  
 Tanagers

Grosbeaks • Finches • Sparrows and Buntings • Rare  
 Birds

Sp S F W



United States Department of the Interior  
Fish and Wildlife Service

___	Worm-eating Warbler	o		o	
___	Golden-winged Warbler	u		u	
___	Blue-winged Warbler	c		c	
___	Tennessee Warbler	c		c	
___	Oranged-crowned Warbler	r		r	
___	Nashville Warbler	c		c	
___	• Northern Parula Warbler	c	u	c	
___	Yellow Warbler	c		c	
___	Magnolia Warbler	u		u	
___	Cape May Warbler	u		u	
___	Yellow-rump Warbler	o		o	c
___	Black-throated Green Warbler	c		c	
___	Cerulean Warbler	u		u	
___	• Yellow-throated Warbler	c	u	c	
___	Blackburnian Warbler	c		c	
___	Chestnut-sided Warbler	u		u	
___	Bay-breasted Warbler	c		c	
___	Blackpoll Warbler	c		c	
___	Pine Warbler	u	o	u	
___	• Prairie Warbler	c	o	c	
___	Palm Warbler	c		c	
___	Ovenbird	u		u	
___	• Louisiana Water-Thrush	u	o	u	
___	• Kentucky Warbler	u	o	u	
___	• Yellowthroat	o	o	o	
___	• Yellow-breasted Chat	c	c	c	
___	• Hooded Warbler	c	u	c	
___	• American Redstart	c	c	c	
___	• House Sparrow	c	c	c	c
___	Dobolink	c		o	
___	• Eastern Meadowlark	c	c	c	c
___	• Red-winged Blackbird	c	c	c	c
___	• Orchard Oriole	c	c	c	
___	• Northern Oriole	u	o	u	
___	Rusty Blackbird	c		c	c
___	• Common Grackle	c	c	c	c
___	• Brown-headed Cowbird	c	c	c	c
___	Scarlet Tanager	u		u	
___	• Summer Tanager	c	c	c	

Warblers • House Sparrows • Blackbirds and Orioles •  
Tanagers

	Sp	S	F	W
• Cardinal	O	O	O	O
Rose-breasted Grosbeak	U		U	
• Indigo Bunting	U		U	U
Dickcissel	C	C	C	
Purple Finch	U		U	U
American Goldfinch	C	C	C	C
Rufous-sided Towhee	C	C	C	C
Savannah Sparrow	C		C	C
Grasshopper Sparrow	O	O	O	
Le Conte's Sparrow	O		O	O
Vesper Sparrow	U		U	U
Lark Sparrow	O		O	
Dark-eyed Junco	O		O	O
Tree Sparrow	O		O	O
• Chipping Sparrow	C	U	C	
• Field Sparrow	C		C	C
White-crowned Sparrow	U		U	U
White-throated Sparrow	C		C	C
Fox Sparrow	U		U	U
Lincoln's Sparrow	O		O	O
Swamp Sparrow	C		C	C
Song Sparrow	C		C	C

These species are of accidental or casual occurrence, and have been recorded only once or twice:

Red-necked Grebe  
 Brant  
 Barnacle Goose  
 Greater Scaup  
 Roseate Spoonbill  
 Sandhill Crane  
 Black Rail  
 Purple Gallinule  
 Whimbrell  
 Willet  
 Short-billed Dowitcher  
 Ruddy Turnstone  
 Red Knot  
 Dunlin  
 Laughing Gull  
 Caspian Tern  
 Snowy Owl  
 Ground Dove

Birdwatchers visiting Tennessee Refuge are asked to look for the following species that should occur on the refuge. If positive observations are made, notify the Refuge Manager, Box 849, Paris, Tennessee 38242.

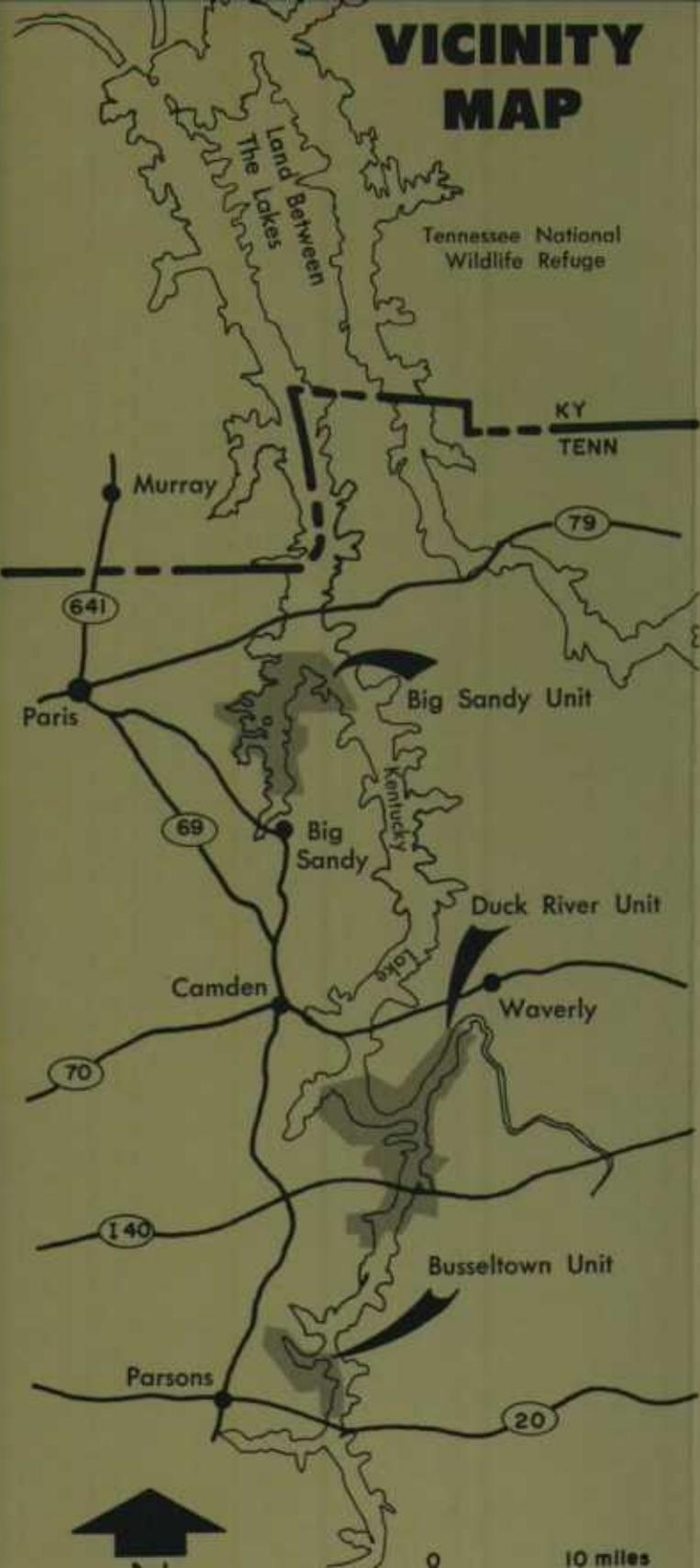
Least Grebe  
Silt Sandpiper  
Long-billed Dowitcher  
Saw-whet Owl  
Fish Crow  
Red-breasted Nuthatch  
Philadelphia Vireo  
Myrtle Warbler  
Northern Water-Thrush  
Wilson's Warbler  
Canada Warbler  
Brewer's Blackbird  
Blue Grosbeak  
Pine Siskin  
Henslow's Sparrow



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United States Department of the Interior  
Fish and Wildlife Service

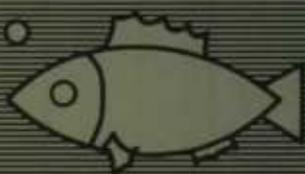
# VICINITY MAP



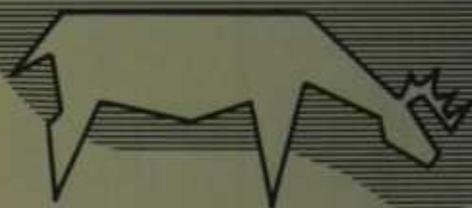
# TENNESSEE



# NATIONAL



# WILDLIFE



# REFUGE



Even the Civil War left its mark on the refuge. With the Tennessee River proving to be a strategic facility for shipping, both Union and Confederates often struggled for control of the route. River battles were frequent, and even today an occasional bunker can be found overlooking the river.

Landings for steamboats using the Tennessee River became prevalent in the late 1800's as cargo traffic increased. Some of these landings are still known today—Sycamore Landing, Cuba Landing, Nix Landing, and others.

### **Please Help Us**

Containers for disposing of your litter have been placed at various locations on the refuge. Please help us keep your wildlife refuge clean by either using these containers or by taking your litter with you.

Several areas of the refuge need special attention because of their particular wildlife value. Please respect the "closed area" signs where they exist.

Camping is prohibited except in designated campgrounds.

Firearms of any kind are prohibited.

Disturbing Indian mounds or collecting artifacts is not permitted.

For additional information about the refuge, contact:

Refuge Manager  
Tennessee National Wildlife Refuge  
P. O. Box 849  
Paris, Tennessee 38242  
Telephone 901-642-2091



UNITED STATES DEPARTMENT OF THE INTERIOR  
Fish and Wildlife Service  
Bureau of Sport Fisheries and Wildlife  
October 1973

RF 4 359000-1

Tennessee National Wildlife Refuge, managed by the Bureau of Sport Fisheries and Wildlife, was established in 1945 in cooperation with the Tennessee Valley Authority as a refuge for migratory waterfowl. The 51,347-acre area is superimposed on TVA land and waters along Kentucky Lake and consists of three separate operational units—Big Sandy, Duck River, and Busselton.

## Waterfowl

The Tennessee River functions as a "spur route" of the Mississippi Flyway and funnels approximately 200,000 ducks and 35,000 geese into the area each fall and winter during migration with the refuge serving as an important resting and feeding place.

Of the 21 species of ducks using the refuge, mallards are by far the most numerous, followed by American wigeons and wood ducks. Wood ducks are the only species that nest in any appreciable numbers.

Canada geese are the most common of three species of geese using the refuge followed by snows and white-fronted geese. Whistling swans are also occasionally seen.

## Wildlife Management

Since few natural foods are available in Kentucky Lake, a supplemental farming program is necessary in order to provide food for the thousands of visiting ducks and geese. More than 5,000 acres are farmed each year with corn, sorghum, millet, soybeans, buckwheat, winter wheat, and ryegrass being the most common crops.



The overall management of Tennessee Refuge is planned and administered in a way that will provide substantial habitat, food, and cover for the wide spectrum of resident wildlife—white-tailed deer, fox, bobcat, raccoon, opossum, rabbit, squirrel, beaver, mink, skunk, woodchuck, and turkey to name a few.

Another important management function on the refuge is a bird banding program. In addition to many mourning doves, approximately 1,000 Canada geese and 500 wood ducks are banded each year. Band returns provide much of the information needed to establish efficient management programs throughout the flyway. Birds banded here have been recovered from northern Manitoba and as far south as Venezuela.

The bald eagle, an endangered species, is given maximum protection. Concentrations of this bird occur in the Duck River bottoms during the winter months. Although fewer in number, the golden eagle is also found on the refuge as a winter visitor.

## Forest Management

Present forest management practices are designed to improve game populations of wild turkey, white-tailed deer, and waterfowl. Major timber species include beech, poplar, sweet gum, hickory, and white, red, chestnut, post, and cherrybark oak.

By proper timber management and sound silviculture practices, habitat and cover for wildlife can be improved as well as creating an aesthetically pleasing and favorable environment for public use.

Natural areas of timber will be preserved for the enjoyment and benefit of future generations. These uncut stands of mature timber will also be used for research, environmental education, general public enjoyment and as checks on progress being made in other areas of management.

## Public Use

**WILDLIFE OBSERVATIONS.** The fall flights of waterfowl at Tennessee Refuge bring many visitors to the area. Large

numbers of ducks and geese normally can be seen from automobiles in most areas.

Birdwatching is popular throughout the year. The refuge bird list contains 211 different species including marsh and waterbirds, shorebirds, herons, egrets, hawks, turkeys, and eagles. The only rookery of great blue herons in Tennessee is found on the refuge.

Leisurely drives throughout the refuge provide opportunities to view outstanding scenery and wildlife settings.

**FISHING.** Kentucky Lake has some of the most exciting fishing in the South and is definitely the heaviest used fishing lake in the State of Tennessee. Crappie and bass are the most frequently caught sport fish on the lake with large catches of crappie being common during the spring. The delicacy of Kentucky Lake catfish is famous throughout this part of the country.

Approximately 25,000 acres of Tennessee Refuge is located on Kentucky Lake and State fishing regulations apply to these areas.

**HUNTING.** Each year a managed bow hunt for deer is conducted on Britton Ford Peninsula and other designated portions of the refuge. Managed gun hunts are held only when the deer herd increases to the point that overpopulation is endangering both the herd and its habitat. Refuge permits are required for both hunts. Additional information is available from the refuge manager.

**CAMPING AND PICNICKING.** General public camping is available on the Duck River Unit at Sugartree Marina near the Birdsong exit of Interstate 40. Conservation-oriented youth groups may camp on selected areas under permit from the refuge manager.



There are no public picnicking facilities available. There are, however, many sites suited for this activity around the lakeshore.

**BOATING AND SKIING.** Motorboats, sailboats, and other types of watercraft flock to Kentucky Lake during the warm summer months. Boating and skiing normally do not interfere with refuge operations since they occur during the summer when there are no waterfowl present. Because of waterfowl concentrations, boats are prohibited from entering certain water portions of the refuge during the winter.

## History

Tennessee Refuge abounds with unique nuggets of history. Many years ago this was the land of the Chickasaw Indians. Today only traces are found of these early Indians who left behind their burial mounds and occasional arrowheads.

In 1821 a well was drilled while prospecting for salt beds. Drilled to a depth of 400 feet, it produced more than 10,000 gallons per hour of pure white sulphur water. Sulphur Well proved to be a tourist attraction and remained so until the area was flooded in 1944 by the Big



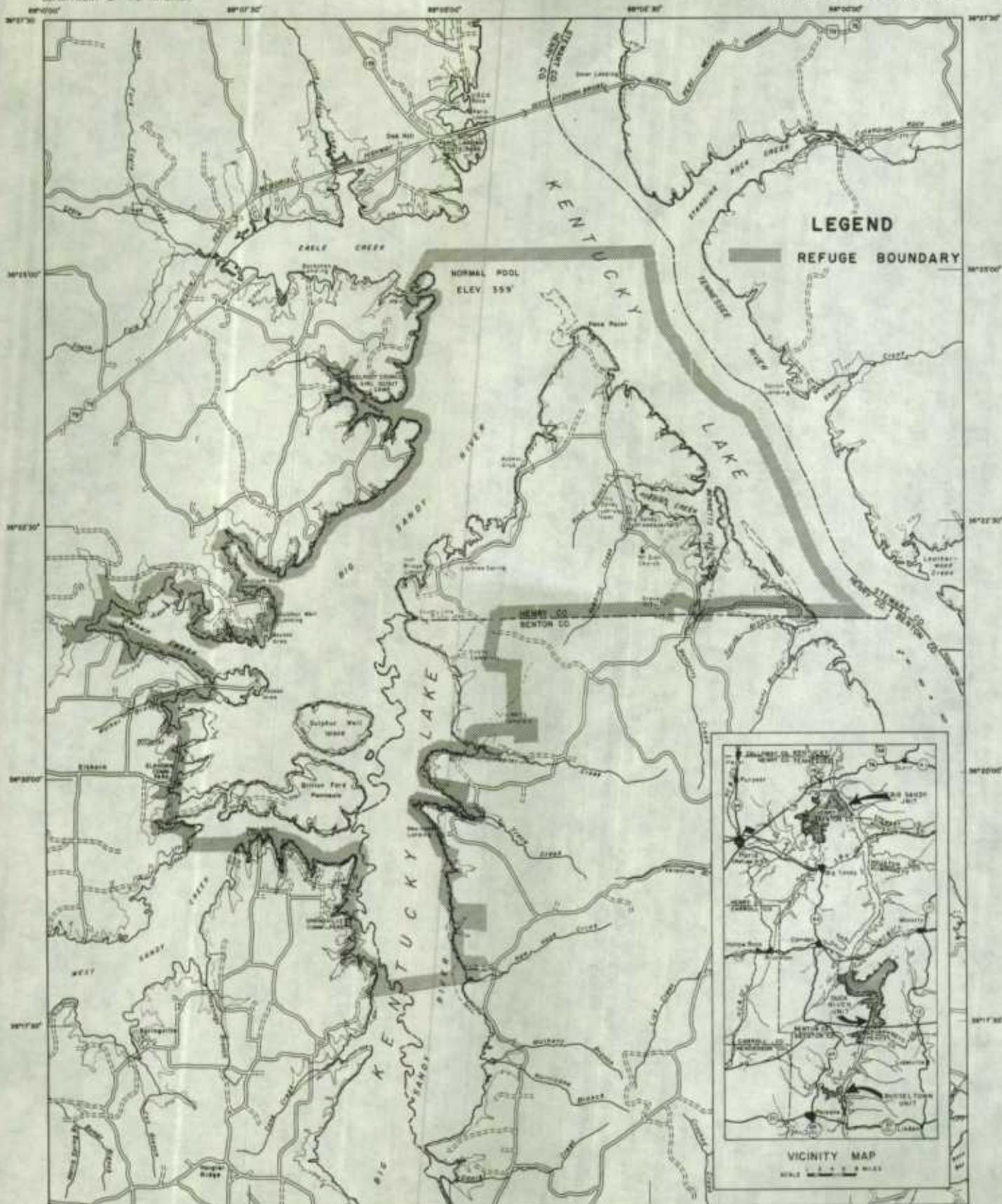
# TENNESSEE NATIONAL WILDLIFE REFUGE

## BIG SANDY UNIT

BENTON, DECATUR, HENRY, HUMPHREYS, AND PERRY COUNTIES, TENNESSEE

FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE

UNITED STATES  
DEPARTMENT OF THE INTERIOR



COMPILED IN THE BRANCH OF ENGINEERING  
FROM SURVEYS BY TENNESSEE VALLEY  
AUTHORITY.

ATLANTA, GEORGIA      FEBRUARY, 1964



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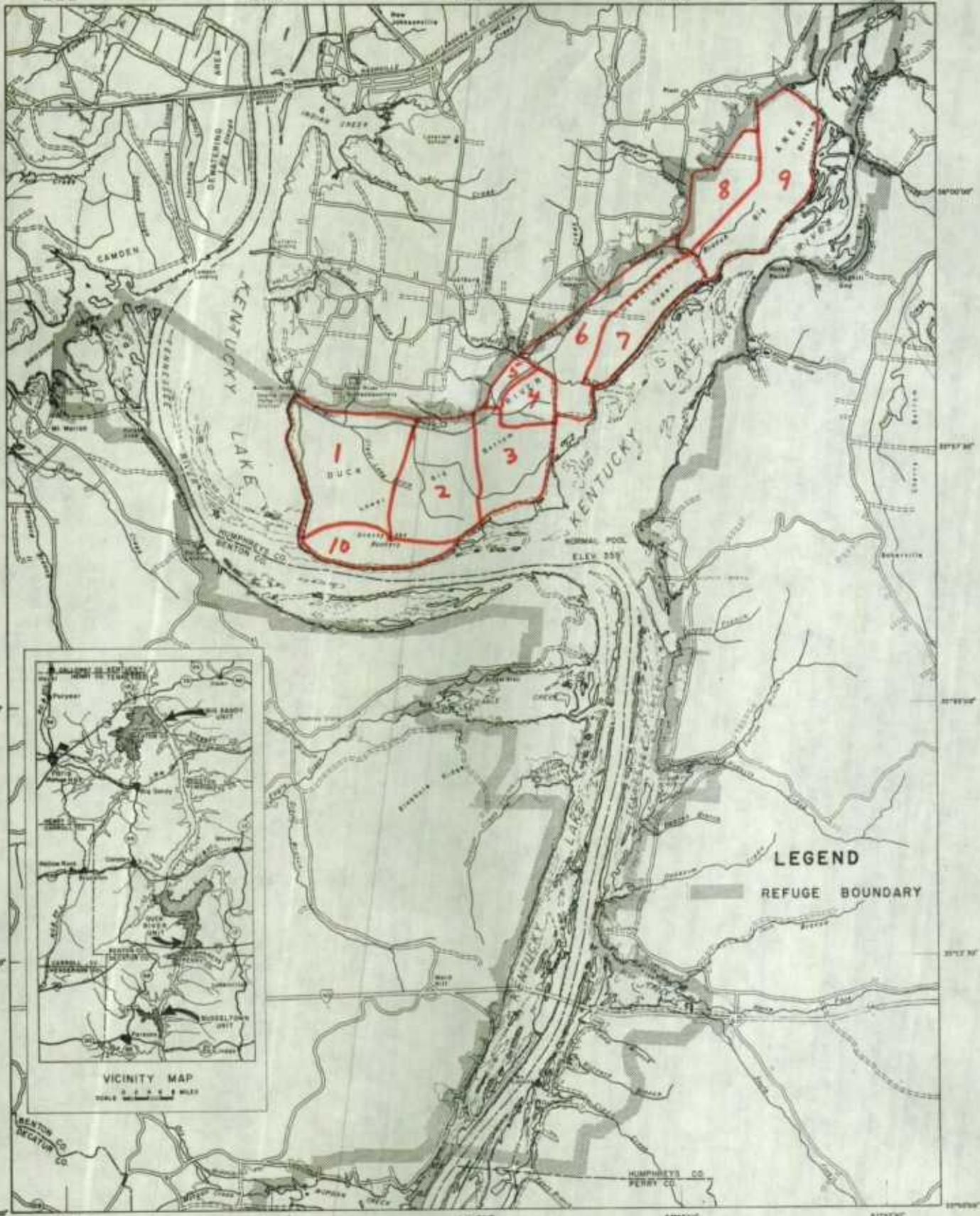
# TENNESSEE NATIONAL WILDLIFE REFUGE

DUCK RIVER UNIT

BENTON, DECATUR, HENRY, HUMPHREYS, AND PERRY COUNTIES, TENNESSEE

FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE

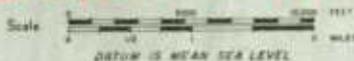
UNITED STATES  
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*Subimpoundments Under Construction*

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AUTHORITY

ATLANTA, GEORGIA      FEBRUARY, 1964



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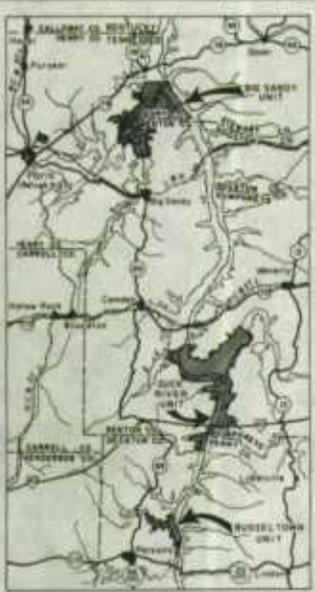
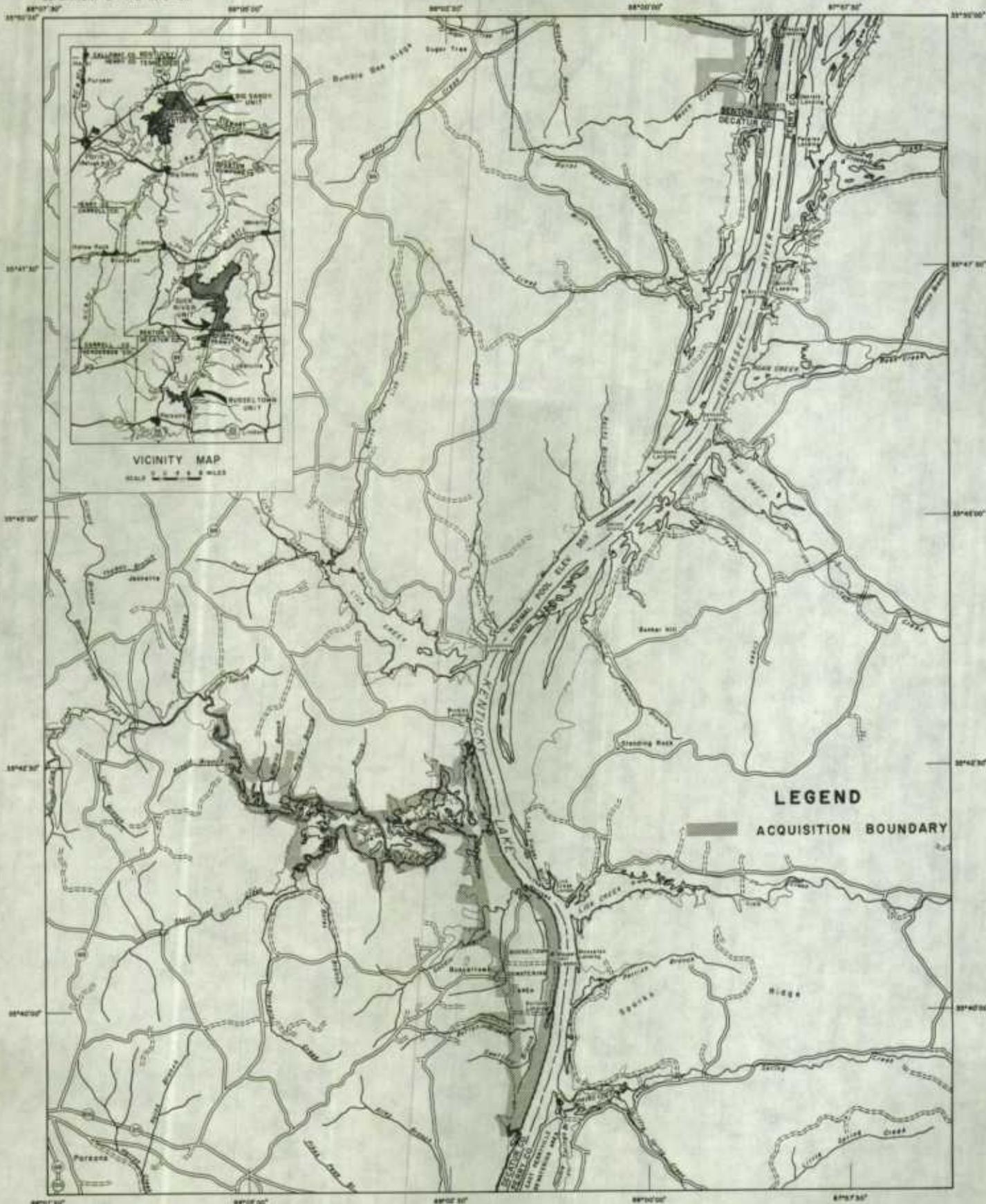
# TENNESSEE NATIONAL WILDLIFE REFUGE

BENTON, DECATUR, HENRY, HUMPHREYS, AND PERRY COUNTIES, TENNESSEE

BUSSELTOWN UNIT

UNITED STATES  
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE



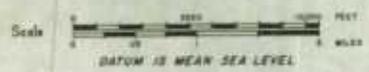
VICINITY MAP  
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## LEGEND

ACQUISITION BOUNDARY

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