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# CHEATHAM LAKE MASTER PLAN

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**US Army Corps  
of Engineers** ®  
Nashville District

**May 2018**

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CELRN-OP-R (1130)

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, Nashville District, 110 9<sup>th</sup>  
Ave South, Nashville, TN 37203

SUBJECT: Cheatham Lake Master Plan Revision

1. References:

a. ER 1130-2-550, Recreation Operations and Maintenance Policies

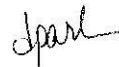
b. ER 1130-2-540, Environmental Stewardship Operations and Maintenance Guidance and Procedures

2. Recommend approval of the attached revision of the Master Plan for Cheatham Lake. The revision has been reviewed and conforms to current Corps policy. The updated Master Plan presents an appropriate and suitable plan for the operation and administration requirements for natural resources and park management.

Encls

1. CHR MP
2. CHR MP EA
3. CHR MP FONSI

Approval Recommended: \_\_\_\_\_



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District Commander

## U.S. Army Corps of Engineers, Cheatham Lake Master Plan Revision Commonly Used Acronyms and Abbreviations

AAR – After Action Review	EP – Engineering Pamphlet
AREC – Agriculture Research and Education Center	EPA – Environmental Protection Agency
ARPA – Archeological Resources Protection Act	EQ – Environmental Quality
ASA(CW) – Assistant Secretary of the Army for Civil Works	ER – Engineering Regulation
ATR - Agency Technical Review	ERDC – Engineering Research & Design Center
BMP - Best Management Practice	ESA – Endangered Species Act/ Environmentally Sensitive Area
CE-DASLER – Corps of Engineers Data Management & Analysis System for Lakes, Estuaries, and Rivers	FOIA – Freedom of Information Act
cfs – Cubic Feet per Second	FONSI - Finding of No Significant Impact
COL – Colonel	FRM – Flood Risk Management
CONUS – Continental United States	FY – Fiscal Year
COP – Community of Practice	GIS - Geographic Information Systems
CRM – Cumberland River Mile	GPS – Global Positioning System
CW – Civil Works	GOES – Geostationary Operational Environmental Satellite
CWA – Clean Water Act, 1977	H&H – Hydrology and Hydraulics
CWMS – Corps Water Management System	HABS – Harmful Algal Blooms
DA – Department of Army	HQUSACE – Headquarters, U. S. Army Corps of Engineers
DCP – Data Collection Platform	IWR – Institute for Water Resources
DCW – Director of Civil Works	LEED – Leadership in Energy and Environmental Design
DE – District Engineer/ Division Engineer	LRN – Nashville District
DM – Design Manual	LTC – Lieutenant Colonel
DO – Dissolved Oxygen	MFR – Memorandum for Record
DOD – Department of Defense	MGD – Millions of Gallons per Day
DQC – District Quality Control	MOU – Memorandum of Understanding
EA – Environmental Assessment	MP – Master Plan
EAB – Emerald Ash Borer	MRLC – Multi-Resolution Land Characteristics Consortium
EC – Engineering Circular	MSD – Marine Sanitation Device
EDW – Enterprise Data Warehouse	MSL/msl – Mean Sea Level (based on the National Geodetic Vertical Datum of 1929)
EIS – Environmental Impact Statement	MW – Megawatt
EM – Engineering Memorandum	
EO – Executive Order	
EOPs – Environmental Operating Principles	

NAGPRA – Native American Graves and Repatriation Act  
NEPA – National Environmental Policy Act  
NGVD29 – National Geodetic Vertical Datum of 1929  
NHPA – National Historic Preservation Act  
NLEB – Northern Long-eared Bat  
NRHP – National Register of Historic Places  
NRRS – National Recreation Reservation System  
NTE – Not to Exceed  
NVCS – National Vegetation Classification Standard  
NWI – National Wetlands Inventory  
NWS – National Weather Service  
O&M – Operations and Maintenance  
OC – Office of Counsel  
OMBIL – Operations & Maintenance Business Information Link  
OMP – Operational Management Plan  
PDT – Project Delivery Team  
PL – Public Law  
PM – Project Manager/Management  
PMP – Project Management Plan  
POC – Point of Contact  
Project – The lands and waters administered by the Corps of Engineers  
Q&A – Question and Answer  
QA/QC – Quality Assurance / Quality Control  
QMP – Quality Management Plan  
R&D – Research and Development  
REAL – Recreation Excellence at Army Lakes  
REAS – Recreation Economics Assessment System  
REC – Recreation  
REMIS – Real Estate Management Information System  
RMC – Risk Management Center  
SCORP – State Comprehensive Outdoor Recreation Plan

SHPO – State Historic Preservation Office  
SME – Subject Matter Expert  
SMP – Shoreline Management Plan  
SOP – Standard Operating Procedure  
SOW – Scope of Work  
STP – Sewer Treatment Plant  
T&ES – Threatened and Endangered Species  
TBA – To be Announced  
TBD – To be Determined  
TDEC – Tennessee Department of Environment and Conservation  
TDNA – Tennessee Department of Natural Areas  
TDOA – Tennessee Division of Archaeology  
TMDL – Total Maximum Daily Load  
TSU – Tennessee State University  
TVA – Tennessee Valley Authority  
TWRA – Tennessee Wildlife Resources Agency  
UAS – Unmanned Aerial Systems  
USACE – U. S. Army Corps of Engineers  
USC – United States Code  
USFWS – United States Fish and Wildlife Service  
WMA – Wildlife Management Area  
WQ – Water Quality  
WRDA/WRRDA – Water Resources Development Act

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## CHAPTER 1 - INTRODUCTION



Figure 1.1 - Cheatham Lock and Dam Project

### 1-01 Project Authorization

Cheatham Lock and Dam was authorized by the River and Harbor Act approved 24 July 1946 (House Document No. 761, 79th Congress, 2nd Session) to provide a navigable river channel on the Cumberland River. The project is part of a comprehensive plan for the development of the Cumberland River and its tributaries in Kentucky and Tennessee. Additional authorization on 19 June 1952 (Public Law 396, 82nd Congress, 2nd Session) provided for the production of hydroelectric power as a project function.

### 1-02 Project Purpose

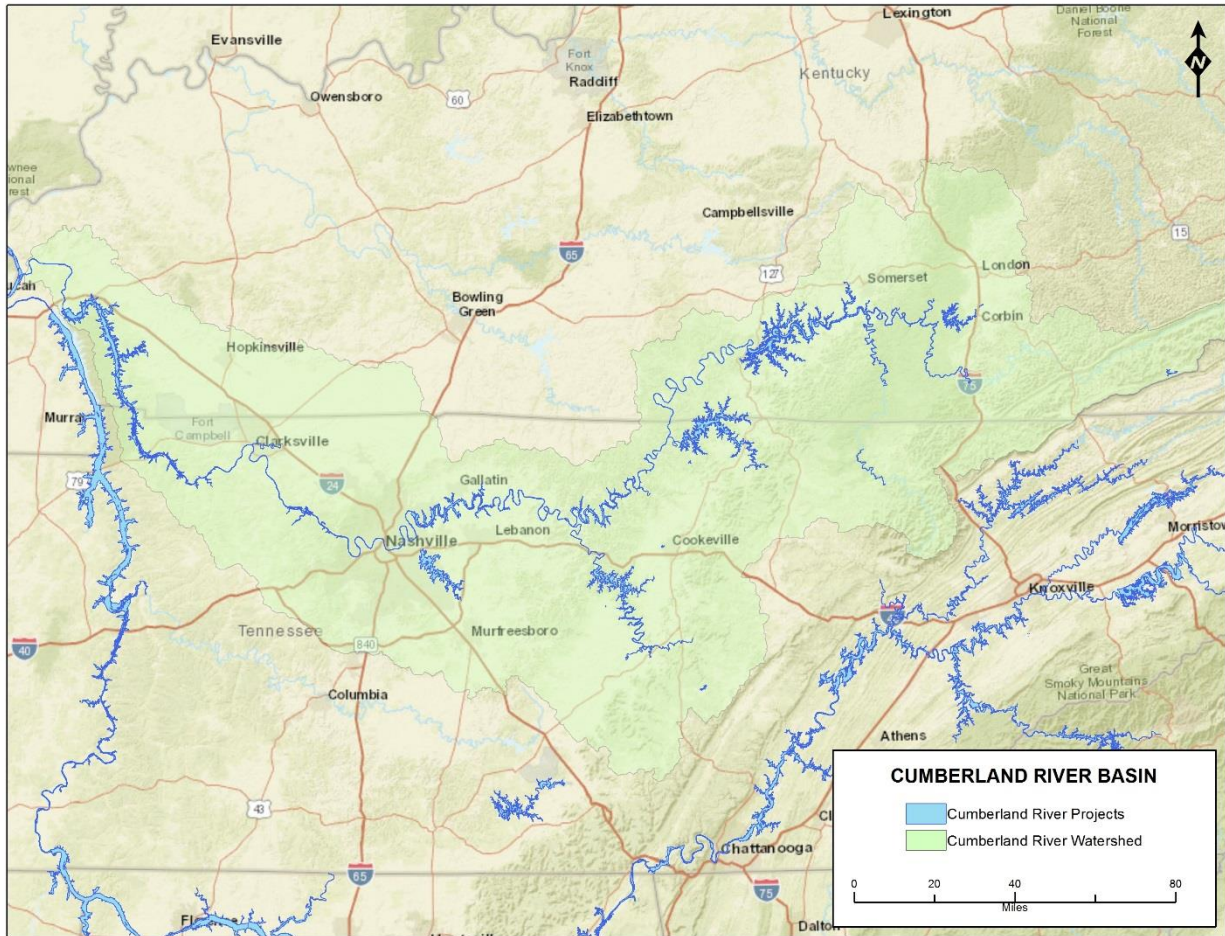
The original purpose of this water resources development project was to replace three smaller, aging locks built at the turn of the century: Lock A at Cumberland River Mile 150.6, Lock 1 at Mile 188.4, and Lock 2 at Mile 201.0. The lake is a “run-of-the-river” type that operates on normal stream flow along the historic path of the river. The Corps uses as much of the inflow as practical for hydropower generation. The dam was not constructed to provide a designated capacity for regulating floodwaters. Therefore, during periods of heavy rainfall and high stream flow, the spillway gates are opened to pass waters in excess of the capacity of hydropower turbines. Although recreation was not originally an authorized function of this project, the proximity of Cheatham to urban communities combined with increased demand for recreational facilities has

caused this purpose to be included in the operational policy formulated by the Corps of Engineers for this project. Moreover, Section 4 of the Flood Control Act of 1944 authorized the Chief of Engineers states, "...to construct, maintain, and operate public park and recreational facilities in reservoir areas under the control of the Secretary of the Army; and to permit construction, maintenance and operation of such facilities." In 1959 and again in 1962, the Chief of Engineers issued instructions on inclusion of recreation development at reservoirs as a project purpose under specific limitation. The Federal Water Project Recreation Act of 1965 (PL 89-72) established development of the recreational potential of Federal water resource projects as a full project purpose. Other secondary project purposes include fish and wildlife management and provision of a water supply for surrounding areas.

### **1-03 Purpose and Scope of the Master Plan**

This revised Master Plan replaces the 1983 Master Plan for Development and Management of Cheatham Lake. In accordance with Engineering Regulation (ER) 1130-2-550 and 1130-2-540, the Master Plan describes in detail how all project lands, waters, forests, and other resources will be conserved, enhanced, developed, managed, and used in the public interest through the life of the project. The plan includes recommendations for the optimum location and design of recreation facilities, taking into consideration a variety of elements such as the natural and cultural environment, projected recreation demand, and future operation and management capabilities. The Master Plan guides and articulates Corps responsibilities pursuant to federal laws to preserve, conserve, restore, maintain, manage and develop the project lands, waters, and associated resources. The Master Plan deals in concepts, not in details, of design or administration. Detailed management and administration functions are addressed in the Operational Management Plan (OMP), which implements the concepts of the Master Plan into operational actions. The Master Plan is developed and kept current for Civil Works Projects operated and maintained by the Corps and will include all land (fee, easements or other interests) originally acquired for the projects and any subsequent land (fee, easements or other interests) acquired to support the operations and authorized missions of the project. The Master Plan is not intended to address the specifics of regional water quality, shoreline management or water level management; these areas are covered in a project's shoreline management plan or water management plan.

## 1-04 Brief Watershed and Project Description



**Figure 1.2 - The Cumberland River Basin**

The Cumberland River is one of the major tributaries of the Ohio River. The source of the Cumberland River is located at the junction of the Poor and Clover Forks near the City of Harlan, Kentucky. From Harlan, the Cumberland River meanders southwesterly to the City of Nashville, Tennessee. From Nashville, the river flows in a northwesterly direction to Smithland, Kentucky, where it joins the Ohio River.

The Cumberland River Basin, depicted in Figure 1.2, contains 17,598 square miles of land and water area. The Cumberland River drops more than 800 vertical feet in its course from Harlan, Kentucky, to the Ohio River. There are five existing multipurpose projects on the main stem of the Cumberland River which include: Barkley, Cheatham, Old Hickory, Cordell Hull, and Wolf Creek (Lake Cumberland).

Cheatham Lock and Dam is located at Mile 148.6 on the Cumberland River in Cheatham County, Tennessee and is approximately 10 miles northwest of Ashland City. The Cheatham Lake Watershed is located in Middle Tennessee and includes parts of Cheatham, Davidson, Robertson, Rutherford, Sumner and Williamson counties. It is approximately 647 square miles and drains to the Cumberland River.

The 67.5 mile reservoir created by Cheatham Dam provides Nashville and Middle Tennessee with a stable water supply and access to the entire Mississippi River system and the Intracoastal Waterway and plays an integral part in various commodities being transported to the region by water. The entire project encompasses a total of 5,717 acres of fee property, 1,208 acres of flowage easement and 67.5 miles of riverbed. With a normal pool elevation of 385 feet mean sea level (MSL), Cheatham Lake has 320 shoreline miles. Land was acquired under a minimum acquisition policy, restricted to the acreage that would serve the operational and maintenance requirements of the project.

## **1-05 Brief History of the Project**

The origin of the name for Cheatham Lock and Dam is unknown. Possible namesakes are: Speaker of the Tennessee Senate Edwin S. Cheatham (1855 to 1861), Cheatham county settler J.R. Cheatham, or Confederate General Benjamin F. Cheatham. As with other projects, Cheatham Lock and Dam may have simply been named after its location of Cheatham County.

Construction started in April 1950, and the lock was opened to navigation in December 1952. Although the project was dedicated in 1954, the power plant did not start producing power until May 1958. The project became fully operational after the completion of the power plant's third generator unit in 1960.

The current record for highest water levels at Cheatham Lake occurred on May 3, 2010. The water elevation reached 404.15 MSL, which was 19.15 feet above the normal elevation of 385 MSL. See section 6-01 for more information on lake levels at Cheatham Lake.

## **1-06 List of Prior Design Manuals (DMs)**

Following passage of the Flood Control Act of 1944, the Corps of Engineers undertook preparation of Master Plans for Recreational Development at Corps Projects in compliance with Section 4 of that Act. In September 1958, a Master Plan for Recreation Development at Cheatham Lake was prepared and approved for implementation. A completed update was conducted in 1983. Since that time, portions of the Master Plan have been re-evaluated on a site-by-site basis in response to particular development needs or opportunities. Supplements have been prepared added to the



Master Plan addressing changes in land classifications and lease expansions, i.e. Riverfront Park and Lock 2.

## 1-06 Special Notes about Acreage Calculations

Different databases within the Corps, including the Operations Management Business Information Link (OMBIL), the Real Estate Management Information System (REMIS) and GIS mapping files, have different figures for acreages for the Cheatham Lake Project. This is due to available technology at the time of calculation. Some data references historic property deeds and not new calculations, or calculations have been based off different geographic projections resulting in different figures for the acreages around the lake. Since the impoundment of Cheatham Lake, mapping software and quality aerial imagery has become increasingly more accurate and useful. In order to facilitate accurate planning, the acreages derived from GIS software (when available) will be used for this Master Plan revision. All pool elevations in this document will be represented as feet above mean sea level (MSL) based on the National Geodetic Vertical Datum of 1929 (NGVD29).

## 1-07 Listing of Pertinent Project Information

This revision of the Master Plan is focused on management of land and water surface related to the Project purposes of outdoor recreation, environmental stewardship and natural and cultural resources. However, the following information about primary project facilities is provided to aid in understanding how all Project purposes are interrelated.

**Table 1.1 - Project Statistics**

<b>Landbase</b>	
Total Fee Property	5,717 acres
Total Easement Property	1,208 acres
Shoreline Miles	320 miles
<b>Pool</b>	
Backwater Length (Cheatham to Old Hickory)	67.5 miles
Maximum Pool Elevation	NA
Minimum Pool Elevation	382 feet AMSL
Normal Pool Elevation	385 feet AMSL
Total Storage Capacity (385 feet AMSL)	7,450 acres
<b>Cheatham Lock</b>	
Chamber Dimensions	110 feet X 800 feet

Normal Lift (385-359 feet AMSL)	26 feet
Chamber Volume	17,071,454 gallons
Lock Wall Elevation	393 feet AMSL
Average Tonnage of Commodities	8,280,000 tons
<b>Cheatham Dam</b>	
Type	Concrete-gravity
Height (above lowest foundation)	75 feet
Total Length	800 feet
Lock Section	feet
Spillway Section	480 feet
Gates	7 - Tainter
Gate Size (width X height)	27 feet X 60 feet
Discharge Capacity at Normal Pool (385 feet AMSL)	147,000 cfs
Earth Embankments	feet
<b>Cheatham Powerhouse</b>	
Number and Capacity of Units	3 @ 12,000 kw
Annual Energy Output	153,000 megawatt hours/year



## CHAPTER 2 - PROJECT SETTING AND FACTORS INFLUENCING MANAGEMENT AND DEVELOPMENT

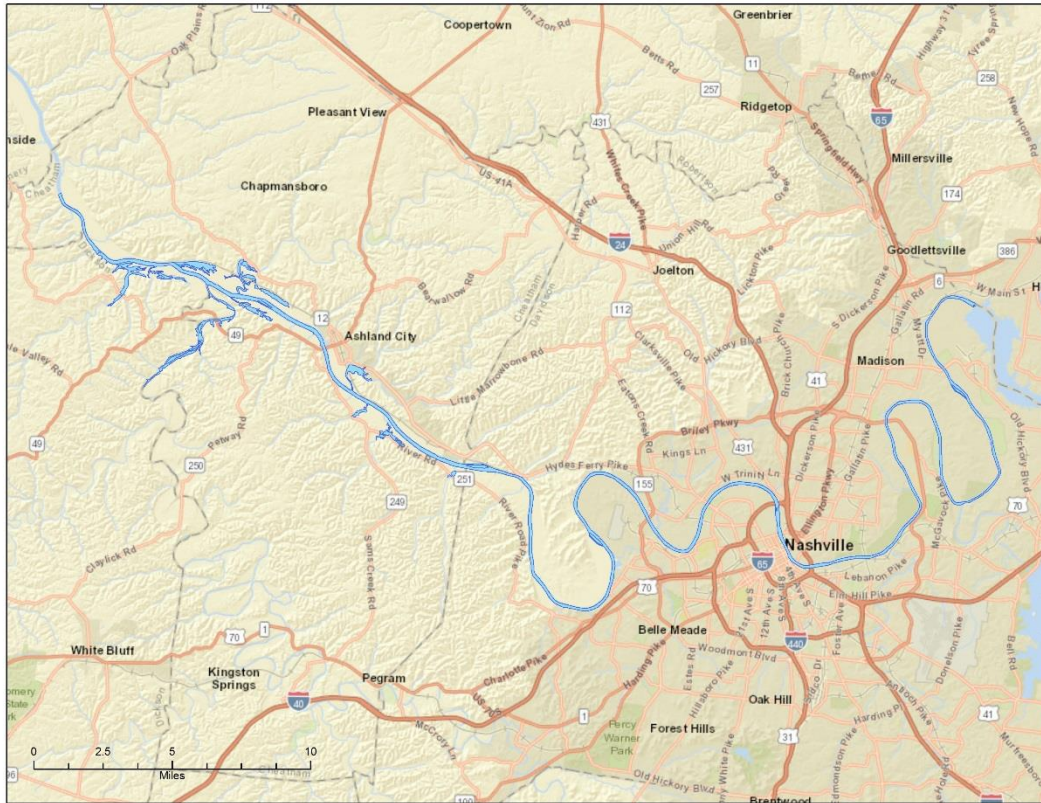


Figure 2.1 - Map of Cheatham Lake

### 2-01 Description of the Reservoir and Navigation Pool

Cheatham Lake is located in the Western Highland Rim and Central Basin Regions of the Central Highlands Physiographic Province of Tennessee. The terrain in the lake area ranges from broad floodplains to moderate to steep ridges. The lower portion of the lake flows through an area interspersed with farmland, hardwood forests, and residential development. Some industrial development, however, is present in the Town of Ashland City, Tennessee. The upper reaches of the lake meander through the heart of Nashville, Tennessee, a highly industrialized and urbanized center.

Cheatham Lake extends 67.5 miles up the Cumberland River from Cheatham Lock and Dam at Mile 148.7 to Old Hickory Lock and Dam at Mile 216.2. At Normal Pool Elevation 385 MSL, the lake has 320 miles of shoreline and 7,450 acres of surface area. Cheatham is a "run-of-the-river" multi-purpose water resource project. Unlike other Cumberland River projects, it does not have a designated flood storage capacity for regulating flood events.

Cheatham Lock and Dam was authorized by the River and Harbor Act of July 24, 1946, as a navigation project. Public Law 396 provided additional authorization in 1952 for hydroelectric power generating facilities as a project function.

Authorization for the construction and maintenance of public recreation facilities at Corps lakes is found in Section 4 of the Flood Control Act of 1944 and the Federal Water Project Recreation Act of 1965 (PL 89-72).

Subsequent federal laws have addressed water quality and fish and wildlife conservation at Corps lakes. The Federal Water Pollution Control Act Amendments of 1972, PL 92-500, affirm the objective to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Additionally, the Fish and Wildlife Coordination Act (FWCA) of 1959, PL 85-624, and PL 86-717 of September 1960 provide authority to evaluate, protect, and enhance fish and wildlife resources. Section 661 of the FWCA provides that fish and wildlife conservation shall receive equal consideration with other project purposes.

The land acquisition policy for Cheatham Lake was conservative in nature and limited acquisition to a guide taking line on the elevation 390 contour commencing at the dam and extending to the Cheatham-Davidson County line. This policy generally limited public land acquisition to a fairly narrow fringe around the lake. There are 2,667 acres of public lands above the normal pool elevation. Predominantly flowage easements were acquired in the upper portion of the lake, which is located in Davidson and Sumner Counties. A total of 1,209 acres of flowage easement was acquired.

## **2-02 Hydrology**

The entire reservoir system in the Cumberland River Basin operates in a coordinated manner to provide multiple benefits. Under normal operations, water in storage is utilized to improve river flows and ameliorate conditions at various key locations during the later summer and fall low flow season. Runoff is captured and stored at the storage projects where it is slowly released in a controlled fashion when downstream conditions allow.

The authorized power pool at Cheatham extends only three feet from elevation 382 to elevation 385. It is not unusual for daily hydropower operations to pass the equivalent of this entire volume of water as it is simultaneously replenished by releases from Old Hickory and J. Percy Priest Dams. Based on operating experience gained following completion of Cheatham, adjustment to the power operating range was needed to meet navigation depth requirements in the upper reaches of the pool. After a thorough study was completed in 1961, a slightly altered operating guide was instituted at Cheatham. During low and moderate flow periods, the headwater was allowed to

range between elevations 382.8 and 386.0 in order to assure adequate commercial navigation depths from Nashville upstream to the Old Hickory tailwater.

However, present day, Cheatham reservoir typically maintains a year-round pool which fluctuates from elevation 384.5 to 386.0. The Cheatham pool is operated in coordination with Old Hickory and J Percy Priest releases to maintain the water level in the Nashville harbor at or above elevation 385. To accomplish this, a one-foot tolerance above the power pool, up to elevation 386, is permitted in the Cheatham headwater. During periods of normal regulation, the water surface elevation behind the Cheatham Dam is maintained within the hydropower pool limits and all releases are made through the turbines as governed by the demand for power. Changes in generation are limited to one unit per hour, up or down, to benefit downstream navigation. These procedures are in effect as long as inflows to the project remain less than the discharge capacity of the turbines. When reservoir inflows exceed turbine capacity, and the lake tends to rise above the power pool, spillway releases are initiated to augment power discharges, and spill is increased as required to keep the lake from exceeding top of power pool until free flow is reached. Powerplant operators have the authority to initiate spillway releases from this pool. The Cheatham project has no flood control capability. In fact during high water events the tailwater rises to the point that it approaches the upper pool elevation. At this time all the tainter gates are raised clear of the water and the river is allowed to flow almost unimpeded through the project. There is only a minor swellhead of less than one foot caused by the presence of gate piers within the channel. Channel improvements below the dam during its construction precludes the head differential from increasing flood stages. This type of operation is fairly common among low head navigation dams, however, Cheatham is the only Corps of Engineers project in the Cumberland Basin at which such "open river" conditions occur. The reduction of head which occurs during flood events requires hydropower generation to cease. The low head makes operation of the turbines impossible and all water is passed through the project via the spillway gates. During these high flow events the pool level at Cheatham can rise several feet above the normal upper pool level of elevation 386. During the May 2010 flood the pool of record was set at elevation 404.15.

The total drainage area at Cheatham dam is 14,160 square miles of which 1,594 are uncontrolled. The large upstream storage reservoirs; Wolf Creek, Dale Hollow, Center Hill, and J Percy Priest contribute to the majority of inflows at Cheatham. Downstream of Cheatham is Barkley reservoir.

## **2-02.A Groundwater**

Within the Cheatham Lake project area, groundwater occurs in three distinctive types of aquifers, which are (1) the predominantly limestone bedrock, (2) the residuum which remains when the bedrock is weathered, and (3) the alluvium which is deposited along major stream valleys. The

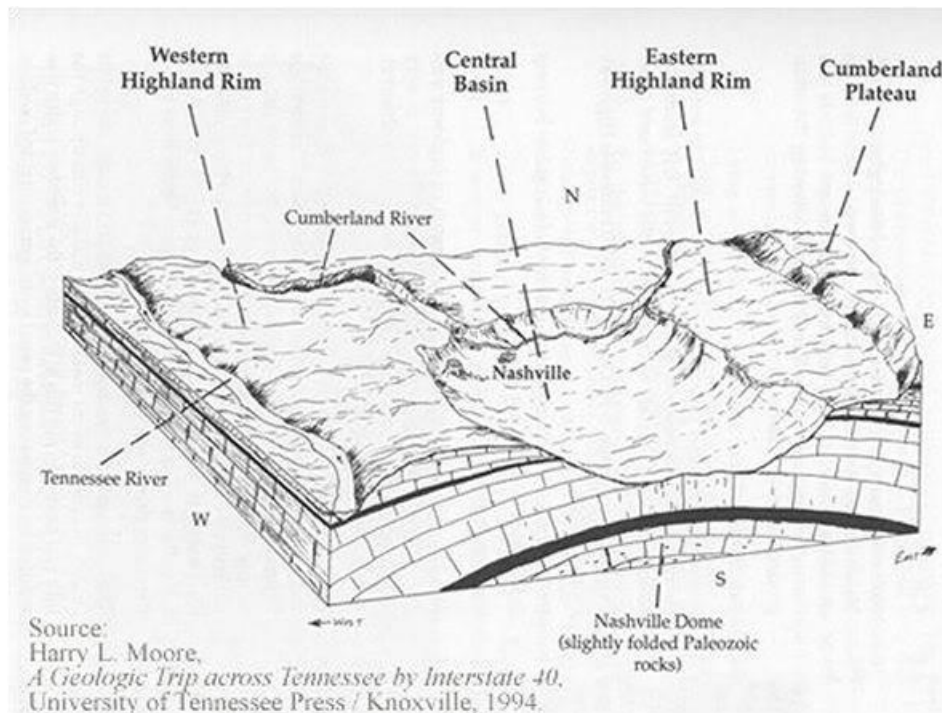
occurrence of these aquifers is generally related to the physiography of the area, see Figure 2.2 below.

In the Central Basin, the chief source of groundwater is the Ordovician carbonate bedrock that underlies the entire area. Groundwater in this aquifer occurs in solution cavities which are a result of the widening and/or deepening of joints and bedding planes in the rock. Within these solution openings, the groundwater moves from areas of recharge to points or zones of discharge, such as springs, streams, or pumping wells. Although the flow path of ground water must be along the hydraulic gradient, it may not always be in the direction of maximum apparent gradient since the direction of movement is controlled by the trend of solution openings.

Most of the solution openings occur at depths of less than 100 feet, and lateral solution channels along bedding planes are apparently more extensive than vertical openings along joints. Due to the development of solution openings along bedding planes, groundwater occurrence is somewhat influenced by the structure of the bedrock. Most groundwater movement and, therefore, "freshing" occurs within the first few hundred feet of land surface. Relative stagnation of groundwater can take place at greater depths and below impervious layers such as bentonite beds. Records of wells indicate that, at depths greater than 200 to 300 feet, water containing sulfates, gas-or petroleum related impurities, or excessive salinities may occur.

A water budget was developed for the Upper Stones River Basin, an area of the Central Basin that is southeast of the project area. An analysis of precipitation and streamflow data indicated that, during the 1964 water year, 47 inches of precipitation was discharged from the basin as 20 inches of streamflow and 27 inches of evapotranspiration. The 20 inches of streamflow consisted of 14 inches of overland flow and 6 inches of base flow. Therefore, in 1964, approximately 13% of the precipitation infiltrated to the main ground water system. The average seasonal fluctuation of the water level in wells was found to be approximately 16 feet. The alluvium, which occurs almost exclusively along the Cumberland River, consists of interbedded sand, gravel, silt, and clay, and may be up to 60 feet thick. The alluvial deposits transmit groundwater that is moving from recharge areas to discharge points along the stream.

In the Highland Rim physiographic province, groundwater is obtained from the calcareous Mississippian bedrock, and the largest volume of groundwater is stored in the overlying residuum. As in the Ordovician limestones of the Central Basin, groundwater moves along solution channels that are developed primarily along bedding planes, and, to a lesser extent, along vertical joints. A significant geohydrologic feature of the Highland Rim is the Chattanooga shale, which underlies the Mississippian limestones and is a relatively impermeable boundary to ground water flow. Where the Chattanooga shale crops out along the Highland Rim escarpment, seepage springs at the top of the unit are common. Wells that are finished in or directly above this shale layer may reproduce water that contains excessive iron or sulfate, a result of the solution of pyrite in the rock.



**Figure 2.2 - Aquifers**

Deep weathering of the Mississippian formations on top of the Highland Rim has created the residuum aquifer in this province. The residuum, a mixture of chert gravel, silt, and clay-sized silica, is best developed from the Fort Payne formation. This material is generally moderately permeable but may be highly permeable where vertical joints are present. The residuum overlies the calcareous bedrock throughout most of the Highland Rim and may be up to 100 feet thick. Groundwater generally moves downward through the residuum and into solution channels in the underlying bedrock aquifer.

Wells that tap the predominantly limestone bedrock aquifers throughout the project area are generally drilled to depths of 50 to 160 feet and yield 3 to 8 gallons per minute. For domestic wells, drilling is generally stopped when an adequate supply of water is reached, so that well yields may not be representative of the maximum groundwater capacity of an area. In addition, reported yields may be conservatively estimated. An inventory of the area indicates that well yields of 100 gallons per minute or more are obtainable from properly-sited wells through most of the Highland Rim and the inner section of the Central Basin. Yields of approximately 25 gallons per minute are possible in the outer Central Basin.

Groundwater in the residuum aquifer may be developed with drilled or dug wells, depending on the depth. Most wells in the residuum are 30 to 90 feet deep and reportedly yield 5 to 10 gallons per minute.

Groundwater quality is somewhat variable. In general, the chemical and physical characteristics are within established potable-water limits. In 1965 and 1967, the Tennessee Division of Water Resources conducted surveys of selected wells and springs within the area and determined that 85 percent of the wells and 95 percent of the springs produced water of potable and palatable quality. Local occurrences of ground water contamination by coliform bacteria were found and were attributed to domestic subsurface disposal systems. It should also be noted that shallow groundwater contamination can result from improper well construction. Other localized problems include hardness, and the presence of high iron, chloride, and hydrogen sulfide.

With respect to mineral content, it is generally true that the dissolved mineral content of the water is a function of the type of rock that the water flows through and the length of time it remains in the aquifer. Water derived from the residuum tends to be softer than that from the limestone because the residuum, being the relatively insoluble product of leached and weathered carbonate bedrock, can contribute less material to solution.

Groundwater is used most extensively in the rural sections of the area, where municipal supplies are not available. It is probable that, in the future, some areas that now have individual wells will be included in municipal water systems. However, groundwater will continue to be an important source of water in more remote locations.

Tennessee has an abundance of high quality and good quantity of ground water according to the TDEC, Tennessee Ground Water Monitoring and Management Ground Water 305(b) Report 2014. With localized exceptions, Tennessee's ground water is good quality as is evidenced by the number of public water systems utilizing ground water and the dozen or more bottled water facilities. Once thought to be immune from contamination, there is increasing awareness that ground water should be protected as a valuable resource. There have been a limited number of reported contamination incidences of public water systems across the state.

## **2-02.B Surface Water**

The Cumberland River forms the nucleus of the surface water system of the area of influence and drains almost all of the land within that area. The Harpeth River, the East and West Forks of the Stones River, and the Red River are the major tributaries of the Cumberland in the Mid-Cumberland region. Other major features of the system include Lake Barkley, Cheatham Lake, J. Percy Priest Lake, and Old Hickory Lake, all built impoundments.

Seasonal low streamflows occur in the study area as a result of insufficient storage capacity within the geologic formations and well-developed surface drainage. Accordingly, certain control measures

must be instituted where navigation is desirable. The Cumberland is a "controlled" river with a series of locks, dams, and levees insuring year-round regulation for navigation. Although the average flow of the Cumberland River below Cheatham Dam is about 23,000 cfs, it has varied from 700 cfs in 1955 to 240,000 cfs during the May 2010 flood.

The five major impoundments in the area provide flow regulation, flood protection, enhanced water quality, recreation, and power generation. Lake Barkley, Cheatham Lake and Old Hickory Lake are impoundments of the Cumberland River, and J. Percy Priest Lake is an impoundment of the Stones River. Together, the summertime conservation pools of these impoundments retain 982,223 acre-feet of water and provide 48,245 acres of water surface area. In addition, there are over 20,000 smaller ponds and lakes in the area that provide over 7,300 additional acres of water surface. Of these, only about 300 are greater than 5 acres in area.

There are approximately 2,700 miles of streams in the study area, including the major rivers described earlier, which are the primary sources of drinking water. The Cumberland River alone accounts for 85 percent of the region's drinking water. The area has 357 water intake points for public or semipublic water supply of which 281 are supplied by surface water and account for 98 percent of all water used in the area. Water used from these intake points is divided into three categories: municipal with approximately 34 percent withdrawal, agricultural with 9 percent, and industrial and commercial with 57 percent. Generally, it appears that the surface water in the area is sufficient in quantity and quality to meet the area's projected water supply needs.

Major rivers and small streams near cities also serve to convey wastewater effluents. Associated water quality in the Lower Cumberland River Basin varies widely depending on the particular water being considered. The surface waters all have a natural ability to support all designed stream uses, although some stream segments do not consistently achieve this quality. The streams support a wide variety of fish and other aquatic life, and provide for the growth and propagation of these species. Water contact recreation is a recognized use of all the streams in the basin, and all are classified for this use, except for limited segments below certain waste treatment outfalls.

A comprehensive assessment of water quality was conducted in the "Water Quality Management Plan for the Lower Cumberland River Basin," completed in October 1976. The most current water quality monitoring data were considered in identifying the significant problem areas in the basin. As illustrated in the report, the most severe problems are generally periodic violations of dissolved oxygen standards in the Stones River Basin and in the Cumberland River in the vicinity of Nashville. Also of concern are problems relating to eutrophication in J. Percy Priest Reservoir in the Stones River Basin.



## 2-03 Sedimentation and Shoreline Erosion

Cheatham Lake is a "run of the river" project located at Cumberland River Mile 148.7 in north central Tennessee. Project structures include a lock, spillway section, and a powerhouse. The lake extends upstream some 67.5 miles to Old Hickory Lock and Dam and contains 7,450 acres of water surface at normal upper pool elevation 385. Also, at this elevation, the lake has 320 miles of shoreline situated in Dickson, Cheatham, Davidson, and Sumner Counties. Portions of the reservoir (Cumberland River) are located in the Nashville Metropolitan area. Cheatham reservoir is located in an area of gently rolling hills and moderately mountainous terrain typical of scenic middle Tennessee. It is an area interspersed with open fields and picturesque bluffs. The upper reaches of the reservoir meander through the heart of Nashville, a highly urbanized area. The shoreline of the lake is irregular and characterized by numerous coves and inlets.

Sedimentation range lines were established for Cheatham reservoir at the time of construction. During the spring of 1995, the ten remaining sedimentation ranges on Cheatham Reservoir were resurveyed. The original sediment range network consisted of eleven ranges. The original survey was in 1966, with resurveys in 1971, 1985 and 1995. Due to the fact that Cheatham has a limited number of ranges, with none being on the main stem, it is impossible to do a complete report of the resurvey results. Incremental changes in volume and sediment deposition rates cannot be calculated from the minimal number of ranges available. Also, all of sediment ranges are located at bridges which does not provide an accurate representation of sediment deposition or scour in the entire reservoir. There has been a few areas below Old Hickory dam that have given the navigation industry a small problem, but when surveyed and determining the barge draft, it turns out to be the tow getting a little close to the channel line and those areas being rock. One area is CRM 215 just across from Mansker Creek. Another area is CRM 207 on the right descending bank which is a small shoal, but industry does not consider it an issue. CRM 212 is the same way, at low pool we might hear of a tow rubbing, but the draft turns out to be 10 feet 5 inches give or take.

Regarding the dredging of sedimentation, one of Nashville District's navigation missions is to maintain a 300 foot wide by 9 foot deep navigational (draft) channel for barge tow and related commercial traffic operations on the Cumberland River. This requires channel maintenance dredging in areas of shoaling within the commercial navigation channel. The navigation mission does not include dredging beyond the limits of the commercial channel.

Shoreline erosion control is encouraged at Cheatham Lake. The placement of quarry-run stone (referred to as riprap) is a common method used for erosion control, and vegetative bioengineering methods (such as brush layering, fiber mats, the planting of native aquatic or riparian species, etc.) are common methods for controlling erosion that may also benefit aquatic habitat conditions. The construction of retaining walls are discouraged, as they are more expensive to construct and



maintain, and they eliminate habitat for aquatic life. More information on Cheatham Lake's shoreline erosion control policy can be found in section 19b of the Shoreline Management Plan.

## **2-04 Water Quality**

Water quality in Cheatham Lake, which is ecologically more like a river, is always highly dependent upon the quality of upstream, regulated releases. Unregulated, local tributaries, many of which drain highly developed areas, can influence water quality of Cheatham Lake but their total inputs are usually small relative to the main stem Cumberland River. Water quality in Cheatham Lake is closely tied to the flow regime which is governed by dam releases. In turn, the quality of these releases is determined by factors such as nutrient enrichment, hydraulic retention time, and effects of temperature stratification. During warmer weather when seasonal flows in the upstream reservoir system are reduced, thermal stratification effects may result in lower dissolved oxygen (DO) concentrations in the turbine releases at Old Hickory Dam. On rare occasions it may be necessary to pass water through spillway releases to boost downstream DO levels. Having adequate DO in the Old Hickory tailwater/upper Cheatham Lake pool is critical to maintaining acceptable water quality due to higher loadings and oxygen demands incumbent downstream. The other regulated release is the Stones River, controlled by J. Percy Priest Dam. This storage project strongly stratifies and becomes anoxic in the hypolimnion precluding turbine discharges during most of the warm season. Dam discharges to maintain the pool elevation of J. Percy Priest in the warm season are usually limited to spillways and or the cone valve.

### **Water Quality for Public Health and Safety**

Water quality is a primary concern within the Cheatham pool; however, little can be done operationally at Cheatham Dam to affect the quality of water in the lake. Releases from Cheatham are spread as evenly as possible throughout the day and week during seasonally low flow months to minimize the impact of thermal effluents from TVA's Cumberland City Steam Plant which is located about 50 river miles downstream in Lake Barkley. Since Cheatham Dam has little or no ability to affect water quality in the Cheatham pool, water quality is determined largely by upstream discharges from two Corps dams (Old Hickory and J Percy Priest). Local inflows contribute pollutants in varying quantity to the pool. As of 2014 there were advisories posted for pathogens on several, small Cumberland River tributaries and for a short stretch of the Cumberland River main stem through Nashville. No fish consumption advisories are posted for the Cumberland River/Cheatham pool or any of its tributaries. In addition, no significant contaminants in reservoir bottom sediments have been observed in Cheatham sample collections since routine monitoring began in 1999.

The passage of water through Cheatham normally does very little to significantly affect water quality either in the reservoir or in project releases. Dissolved oxygen concentrations will typically gradually increase going downstream due primarily to algal production and atmospheric mixing. The lake is the shallowest and retention time is the shortest of the ten Cumberland Basin projects. Mean depth is only fourteen feet. Temperatures in the lake are usually well mixed vertically, with only short periods of intermittent stratification in the most downstream reaches. When the lake does stratify, the differential in temperature is quite small, usually less than three degrees Fahrenheit. Stratification typically occurs when releases from Old Hickory fall below 6,000 cfs. Destratification occurs quickly when flows increase. Hydraulic retention times are generally too short to develop significant longitudinal temperature variations.

Normal water retention time in Cheatham is usually less than ten days but can be as little as two days. Low flow periods can produce hydraulic residence values of as much as 15 to 20 days.

The biggest water quality problem is low DO during the summer months when Old Hickory releases have low DO concentrations. This is especially true when hydraulic residence times exceed 10-15 days. Even with several large sewage treatment plants discharging into the lake, particularly those for Metropolitan Nashville, the DO levels along with other measured water quality parameters usually remain relatively constant or slowly increase between Old Hickory and Cheatham Dams. The three largest point sources of organic pollution are Nashville Central Sewage Treatment Plant (STP) with a design flow of 98.7 million gallons per day (MGD), Whites Creek STP with 25 MGD and Dry Creek STP with 12.3 MGD.

Additional point sources include the combined (sanitary and stormwater) sewers in Nashville, which may produce bacteriological problems. These effluents along with the urban runoff produce a relatively high nutrient loading in the lake.

Reaeration occurs in the upper reaches of the lake from Old Hickory to Nashville. Nearer Cheatham Dam, DO stratification can occur even without temperature stratification and can produce bottom DO values between two to four mg/l lower than surface values. However, DO values do not normally dip below the Tennessee state standard of 5 mg/l.

A second water quality problem in the lake results from high iron and manganese concentrations in summer and fall releases from J. Percy Priest. Changes in Corps policy have helped to reduce this problem. Now, hydropower releases are not resumed in the fall until J. Percy Priest Lake destratifies completely. This typically happens by mid-November. Prior to that time releases are made through the spillways and or cone valve. Corps personnel monitor J. Percy Priest Lake and tailwater to track water quality conditions and minimize pollution concerns for downstream users. As a further mitigative measure, at least one hydropower unit is required to be generating at Old Hickory when turbine releases are being made from J. Percy Priest. Algae blooms in Old Hickory

Lake seasonally produce sporadic taste and odor problems for downstream municipal drinking water treatment plants. Close coordination between the Corps and Metro Nashville Water Services and other water users has lessened the impact of these taste and odor incidences. Multi-agency water quality monitoring combined with better, science based water control decisions help to reduce algal blooms and their impact on end users.

### **Biological Resources**

Cheatham Lake with its nearly constant flow regime tends to disrupt resident algal communities and inhibit the formation of blooms. Conditions in the portions of Cheatham Lake nearer Cheatham Dam and in some larger, impounded tributaries sometimes tend to produce water column hydraulic conditions that favor development of algal communities. In general the algal communities found in Cheatham Lake tend not to cause significant water quality problems. The active flow regime certainly helps to favor this condition and is vital to prevent issues.

Tributary streams to Cheatham Lake range from small, highly impacted urban drainages with their myriad of water quality issues to rural, high quality streams. Periodic monitoring of benthic macroinvertebrate communities in selected, wadeable tributaries has revealed that most streams support diverse benthic faunas consisting of the major phyla to be expected under good water quality and habitat conditions. Biometric values are generally good for occurrence of sensitive species of the insect orders Ephemeroptera, Trichoptera and Plecoptera, a widely recognized and useful measure of biological water quality. Biotic Index values, which take the assigned tolerance values of the organisms in the community and consolidate them into one number indicate conditions that are rated "Very Good". Biotic index valuation helps to provide a good quality "snapshot" of the entire benthic community.

Benthic macroinvertebrate communities have also been sampled at locations near Cheatham Dam where substrate conditions allow sample collection. This environment is radically different from the wadeable tributary streams. The benthic community near Cheatham Dam consists mostly of organisms that feed either through filtering organic material from the water or live off detritus. These organisms are generally more tolerant of lower DO and softer substrates (mud, silt) and often thrive where those conditions are present.

### **Water Quality Stations**

**Facilities.** The Cheatham Project has twenty-two actively sampled water quality stations for collection of physical, chemical, biological, and sediment contaminant data. There are ten main stem lake stations, six tributary embayment lake stations, four inflow stations, and the tailwater station. Water quality sampling by Nashville District Water Management is performed typically 2-3 times per year at Cheatham. Physical, Chemical, Chlorophyll-a, and Phytoplankton data are collected seasonally during the spring, summer, and fall.

Once every ten years Cheatham is sampled intensively five times in a year. Benthic macroinvertebrates are monitored once every three years at two lake and four inflow locations. Sediment contaminant samples are collected in the lake once every five years at eight different locations. In addition to field sampling by Water Management staff, there is also a water quality monitoring gauge in the reservoir just upstream of the dam that collects and transmits data every thirty minutes. Water Temperature is collected year round with Dissolved Oxygen, Specific Conductance, and pH typically collected from March through early November.

**Reporting.** Water Quality data that is collected manually in the field is stored in the CE-DASLER database. Typically, field data reports are prepared and sent to stakeholders immediately after the completion of every sampling trip. The automated water quality gauge transmits data via Data Collection Platform (DCP) and the Geostationary Operational Environmental Satellite (GOES) network to the Corps Water Management System (CWMS) database in the district office. Water Quality Physical, Chemical, and Biological data records span from about 1970 to present and can be accessed at the following websites:

<http://www.lrn.usace.army.mil/Missions/Water-Management/Water-Quality/>  
<https://water.usace.army.mil/>

**Maintenance.** The Nashville District Water Management Stream Gauging staff are responsible for the installation and maintenance of the water quality monitoring gauge.

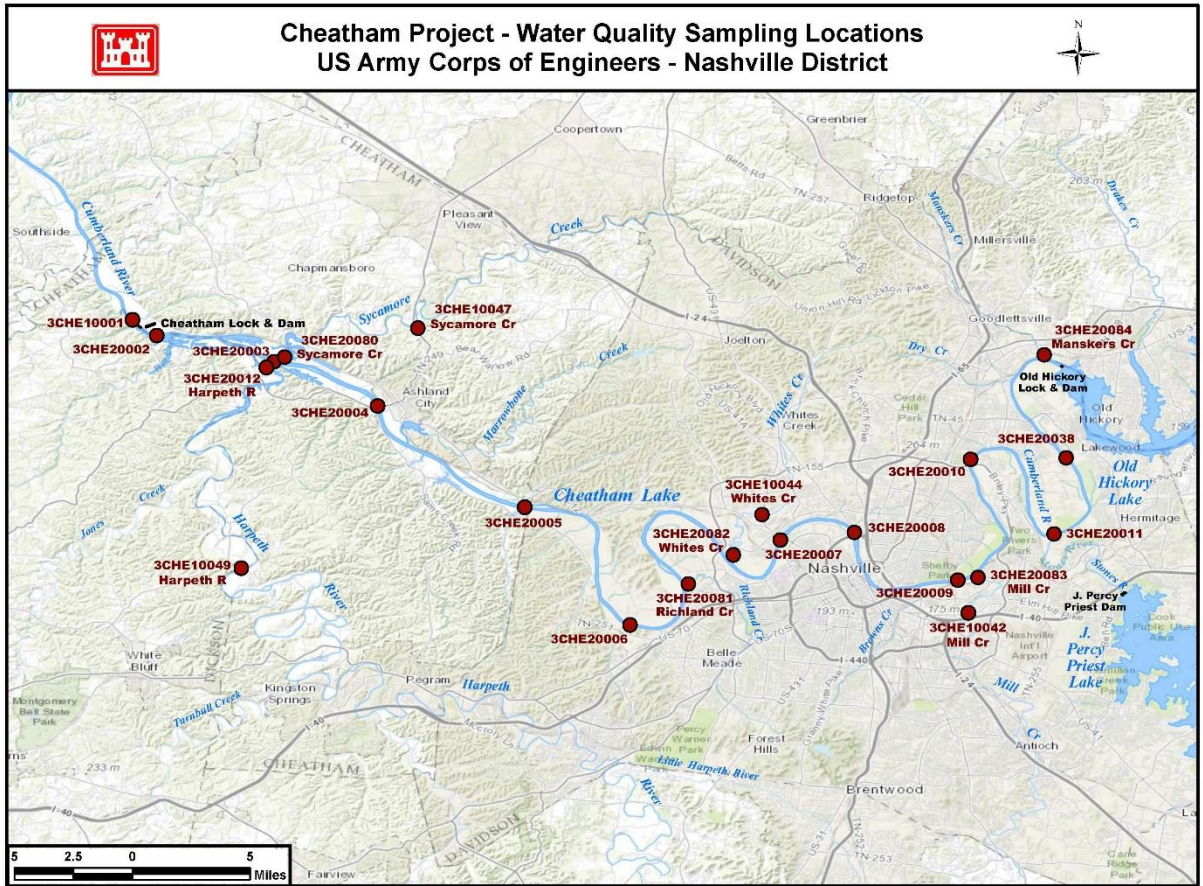


Figure 2.3 Water Quality Sampling Locations

**Table 2.1 - Water Quality Sampling and Monitoring Plan**

Cheatham Project - Water Quality Sampling and Monitoring Plan							
Station	Location	Water Quality Data Collection Type					
		Physical	Chemical	Chlorophyll-a	Phytoplankton	Benthic Macroinvertebrate	Sediment Contaminant
3CHE10001	Tailwater - Cumberland River Mile 148.3	X	X				
3CHE10042	Mill Creek Mile 3.3	X	X			X	
3CHE10044	Whites Creek Mile 4.2	X	X			X	
3CHE10047	Sycamore Creek Mile 8.6	X	X			X	
3CHE10049	Harpeth River Mile 16.5	X	X			X	
3CHE20002	Cumberland River Mile 149.1	X	X	X	X	X	X
3CHE20003	Cumberland River Mile 153.5	X					
3CHE20004	Cumberland River Mile 158.0	X					
3CHE20005	Cumberland River Mile 165.0	X	X	X	X		X
3CHE20006	Cumberland River Mile 172.5	X					
3CHE20007	Cumberland River Mile 185.8	X	X	X	X		
3CHE20008	Cumberland River Mile 188.5	X					
3CHE20009	Cumberland River Mile 194.0	X					
3CHE20010	Cumberland River Mile 200.2	X	X	X	X		
3CHE20011	Cumberland River Mile 206.0	X					
3CHE20012	Harpeth River Mile 1.0	X	X	X	X	X	X
3CHE20038	Cumberland River Mile 210.0	X					
3CHE20080	Sycamore Creek Mile 0.2						X
3CHE20081	Richland Creek Mile 0.2						X
3CHE20082	Whites Creek Mile 0.3						X
3CHE20083	Mill Creek Mile 0.3						X
3CHE20084	Manskers Creek Mile 0.2						X
Physical Data - Water Temperature, Dissolved Oxygen, Specific Conductance, pH							
Chemical Data - Nutrients, Metals, Solids, etc.							
Sediment Contaminant - Metals, Pesticides, PCBs, Organic Compounds							

## 2-05 Climate

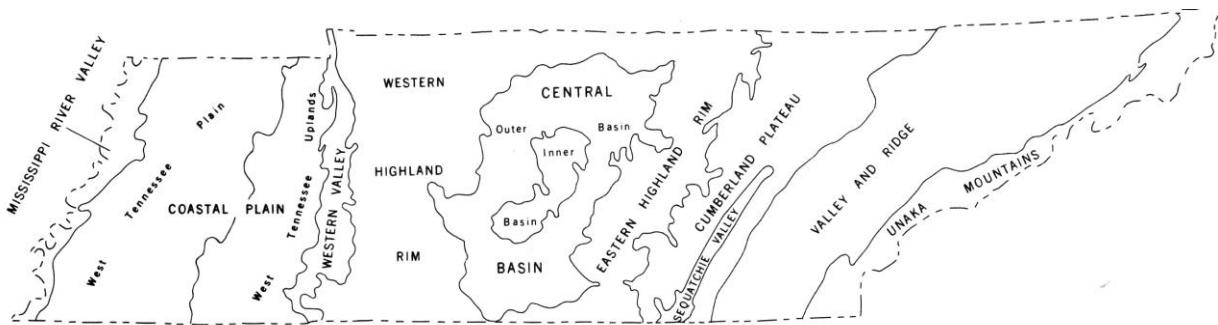
The climate of the Cheatham Lake area is moderate. Temperatures range from typical summer highs (July and August) of 89° F to winter lows of 27° F in January (U.S. Climate Data, 2017). A record high of 107° F was set in July 1952; the record low of minus 17° F was set in January 1985 (Intellicast, 2017). The average growing season is approximately 225 days, extending from April to October. Annual rainfall for the basin averages 48 inches with an additional 10 inches of snow per year (Tennessee Climatological Service, 2015). Relative humidity for the area ranges from 47% to 90% with a 69% average across the year (National Weather Service, 2017). The average hourly wind speed in Nashville experiences mildly seasonal variation over the course of the year. Winds predominantly blow from the south. The windier part of the year lasts for 208 days, from October 20 to May 16, with average wind speeds of more than 3.7 miles per hour. The windiest day of the year is February 25, with an average hourly wind speed of 4.8 miles per hour. The calmer time of

year lasts for 157 days, from May 16 to October 20. The calmest day of the year is July 28, with an average hourly wind speed of 2.6 miles per hour (Weather Spark, 2017).

## 2-06 Topography and Physical Geography

The Central Basin is an elliptical topographic depression 80 miles long and 55 miles wide, centered around the City of Murfreesboro. Encircling the Central Basin is an upland area called the Highland Rim. These regions are characterized by certain topographic features which reflect the underlying geology.

The Central Basin is subdivided into an inner and outer portion. The Inner Basin is located over the center of the Nashville Dome, an upward bulge in the underlying bedrock strata. Structural fractures in the bedrock have permitted rapid erosion by solution of the limestone. The topography of the Inner Basin is generally flat and low-lying with an average elevation of 500 feet. Cheatham Lake is located outside the Inner Basin but extends through the Outer Basin of the Central Basin physiographic region. This Outer Basin is underlain by less fractured, more resistant limestone bedrock, which forms a rolling to hilly topography. The average elevation in this area is 750 feet. The Highland Rim, the location of the major portion of the project is an old erosional plain (pine plain) which covered the mid-Tennessee area until recent times. Its topography is gently rolling with some flat areas cut by steep sided stream valleys. The transitional areas between the Highland Rim and the Central Basin form the most rugged terrain of the study area. The elevation of the Highland Rim averages about 1,000 feet.



**Figure 2.4 - Generalized Physiographic Map of Tennessee (Miller, 1972)**

Most of the shoreline area of Cheatham Lake is relatively flat, having slopes of 12 percent or less. This is particularly true in the upper reaches of Cheatham Lake. The slope in the lower reaches, the reservoir area, though relatively flat along the shoreline, varies from slight (0 to 12 percent slope) as one gets away from the shoreline area. There are, however, areas along the shoreline, characterized by moderate to steep wooded slopes.



## 2-07 Geology

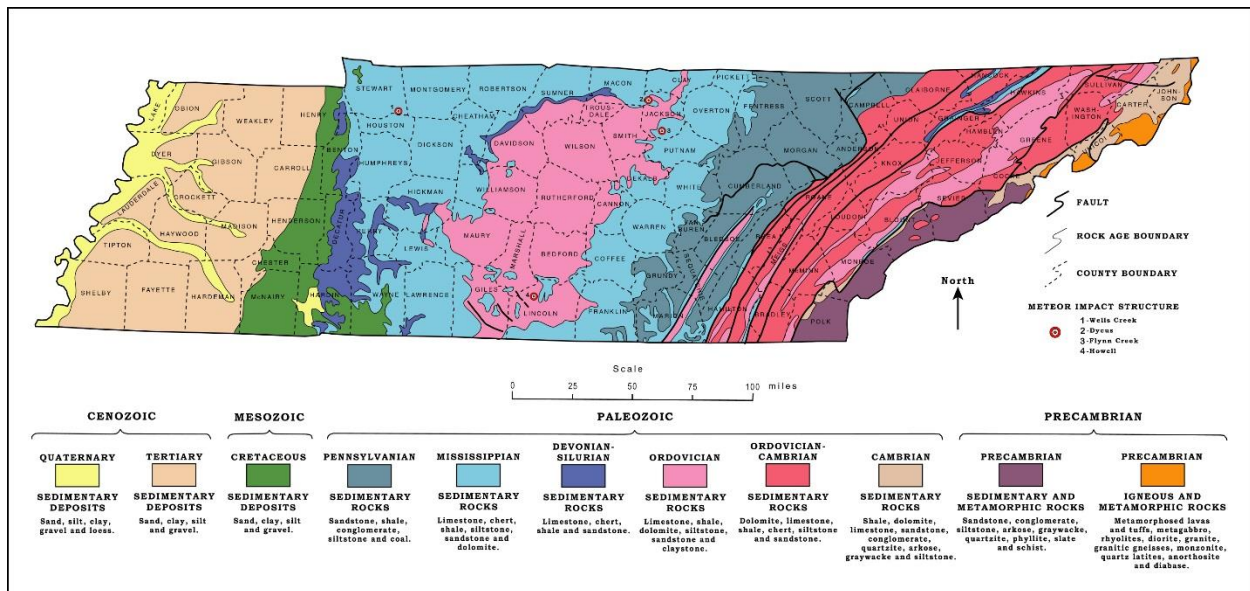


Figure 2.5 - Generalized Geologic Map of Tennessee  
(Dunigan, 2017)

The bedrock underlying the project area is a series of carbonate and associated sedimentary rocks. The prominent bedrock units of the Central Basin are the Stones River and Nashville Group. The upper reach of Cheatham Lake (the Outer Basin) is underlain mainly by the Hermitage and Bigby-Cannon formations of the Nashville Group. The Catheys, Inman, and Leipers formations, and Richmond Group, and the Silurian and Devonian formations are present mostly around the outer edge of the basin. The dominant lithology of the Hermitage formation is a silty limestone which weathers to a moderately deep, fairly permeable soil. In places, sinkholes from the underlying Carters formation have collapsed the Hermitage rocks. Enlarged joints and solution openings also occur locally. The Bigby-Cannon formation is predominantly a cross-bedded, medium to thick-bedded limestone. It produces a fairly thick, clayey, residual soil up to 35 feet deep. It also weathers to an irregular bedrock surface with enlarged joints that act as drainage points.

The Highland Rim is marked at its edge by outcrops of the Chattanooga Shale. This unit is a practically impermeable, carbonaceous shale, having a high concentration of iron sulfide (pyrite). It acts as a barrier to vertical ground water movement. Ground water below the shale does not recharge effectively and therefore is highly mineralized.

Underlying the Highland Rim are the Fort Payne, Warsaw, St. Louis, and St. Genevieve formations which are notably more siliceous than the bedrock underlying the Central Basin. The Fort Payne is known for its resistant, cherty composition. With a higher percentage of insoluble material, these



formations weather to a cherty, clayey residual soil generally greater than 25 feet thick. Where the Fort Payne is present as the underlying formation, the overlying Warsaw is deeply weathered, and over 100 feet of soil has developed. The residuum tends to be moderately to highly permeable. The following descriptions of the project area's exposed geological resources (arranged by periods, oldest to the youngest) are typical of the project area. Figure 2.6 shows a map of the Cheatham Lake area and locations of the geological resources.

**Ordovician Period.** Rocks of Ordovician age in Tennessee are sedimentary types. The Central Basin is underlain by Ordovician limestones (and some shales) that are typically flat lying or have a very gentle dip away from the Nashville dome. Sinkholes, resulting from erosion of the soluble limestone, are common.

1. **Hermitage Formation.** This formation is exposed in the lowest valleys below the Old Hickory Lock and Dam. The dominant limestone rocks have a highly insoluble content, are thin bedded, and include shale parings, phosphatic pellets, silt and chert. The thickness of this formation varies from 0 to 10 feet.
2. **Bigby-Cannon Limestone Formation.** This formation occurs along the valley walls that enclose the tailwaters of Cheatham Lake. The formation consists of three facies: The Cannon limestone, Dove-colored limestone, and Bigby limestone. These facies replace each other laterally and vertically. The formation ranges in thickness from 50 to 100 feet.

The Cannon limestone facies is medium-dark gray to brownish gray, microcrystalline to medium grained, thin to medium-bedded, and evenly bedded. The composite thickness is 10 to 30 feet, and the facies thickens as it extends southeastward.

The Dove-colored limestone facies is medium-light gray to light gray, cryptocrystalline, medium-bedded, cross-bedded, contains brown phosphate pellets, and weathers to brown phosphatic residuum. The facies thickens westward, and has a composite thickness of 20 to 30 feet.

The Bigby limestone facies is calcarenite, medium-light gray to brownish-gray, coarse-grained, medium-bedded, cross-bedded, contains brown phosphate pellets, and weathers to brown phosphatic residuum. The facies thickens westward, and has a composite thickness of 20 to 60 feet.

3. **Catheys and Leipers Formations.** These formations are lithologically similar, and can be separated only on the basis of farina differences. The majority of the project lands above normal pool and underlain by these two formations.

The Catheys formation varies in thickness from 50 to 200 feet and generally averages about 100

feet. The lithology varies, but the predominant rock types are bluish-gray, medium-grained, medium to thick-bedded limestone; fine to medium-grained argillaceous limestone; and fine-grained, nodular, argillaceous limestone. Where the Catheys is the surface formation, the overburden is very thin. Outcrops of the Catheys and overlying Leipers are characterized by shallow-rooted trees, such as cedar, and by thin residual yellow clays.

The Leipers directly overlies the Catheys within the project area. The contrast between the two formations is exceedingly difficult to determine. The lithology of the Leipers is very similar to that of the Catheys; however, the Leipers is more phosphatic. The average thickness of the Leipers formation is about 75 feet.

**Devonian Period.** The Devonian Period in Tennessee is represented by cherts, limestones, and shales. The only Devonian formation that occurs near the project is the Chattanooga shale, a very distinctive black bituminous rock considered to be both Devonian and Mississippian in age.

1. **Chattanooga Shale Formation.** This shale formation is carbonaceous, grayish-black, very thinly laminated, fissile, and is underlain by a thin layer of sandstone. The formation is about 20 feet thick.

**Mississippian Period.** Mississippian rocks consist of limestones, cherts, shales, and sandstone. The most extensive outcrop areas are located in the Highland Rim and along prominent hills extending into the Central Basin. The strata are generally horizontal or have a very gentle dip, and sinkhole topography is characteristic.

1. **Fort Payne Formation.** The Fort Payne is exposed extensively in the western Highland Rim and caps erosional remnants of the Rim within the Central Basin. The remnants are due to the high resistance to erosion of the Fort Payne. This thickness of the Fort Payne ranges from 200 to 300 feet.
2. **Warsaw Limestone Formation.** The Warsaw is widely distributed over the Highland Rim area, but exposures are not extensive owing to the thick residuum. The average thickness of the formation is 80 to 100 feet.

The lithology of the Warsaw is quite similar to that of the Fort Payne, except that limestone facies are more extensive. In addition to coarse-crystalline limestone, several beds of fine to medium-grained limestone are present. Bedding is medium to very thick, generally even-bedded, but some cross-bedding is present.

3. **St. Louis Limestone Formation.** The St. Louis Limestone is the surface formation found over vast portions of the Highland Rim area. Its average thickness is 180 to 200 feet. Limestone

exposures are limited, as in the case of the Warsaw. The St. Louis on the western Highland Rim has a thick residuum of silt and clay with chert fragments. Karst topography is a very common phenomenon in many areas.

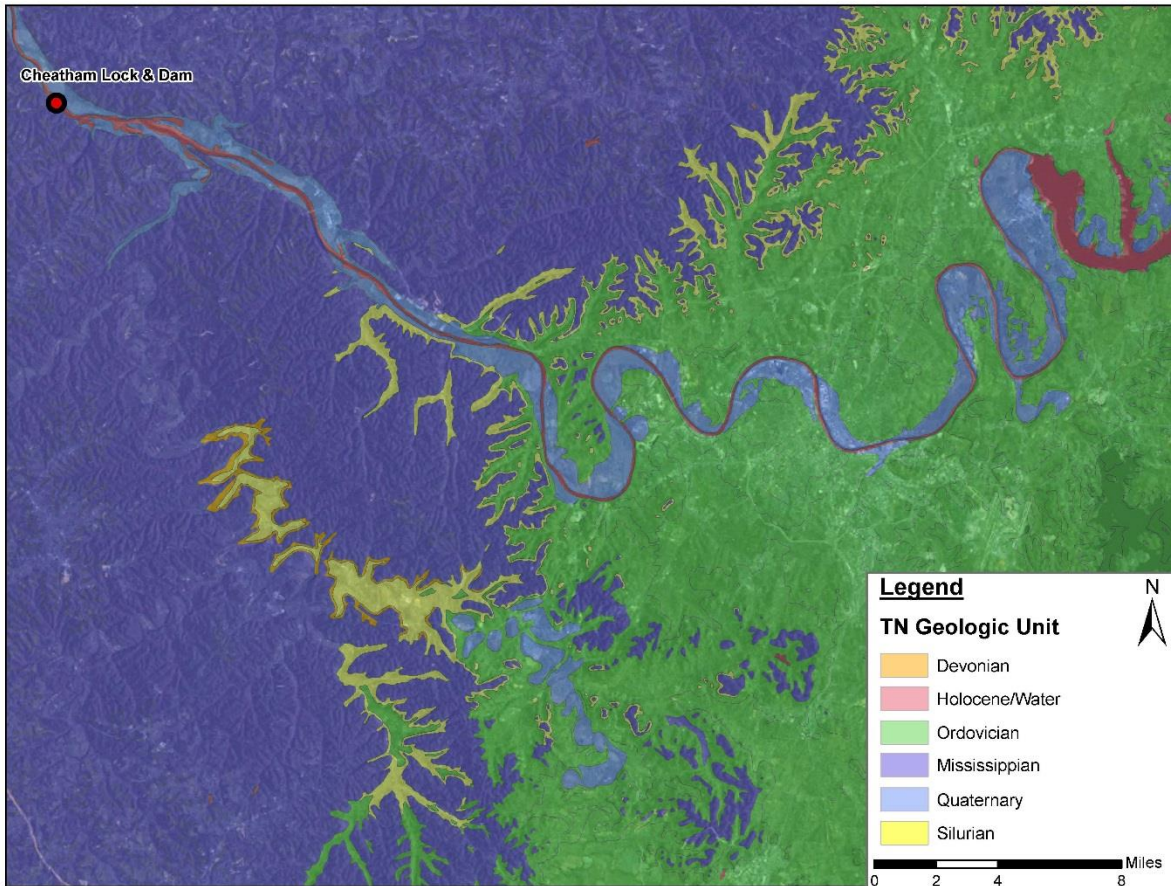


Figure 2.6 - Geologic Map of Cheatham Lock and Dam and Surrounding Area

## 2-08 Soils

Soil is formed by weathering processes acting on materials deposited or accumulated by geologic activity. The important factors in soil formation are parent materials, climate, geological organisms (particularly vegetation), topography, and time.

The soils of the project area have developed from two general kinds of parent material; the more predominant soils are residuum formed by weathering of sedimentary rocks in place. The other soils consist of the weathering products of accumulations of sand, silt, clay, and rock fragments transported by water wind, or gravity.

The project's soils exhibit considerable variation from one point to another as a result of the diverse, geologic and topographic formations that characterize the area. Only the basic soil characteristics will be discussed in this plan in order to give the reader an overview of the resource. The General Soil Map does not provide explicit information at any particular location, so it is not usable for detailed planning. Specific information at any location may be obtained through on-site investigation or reference to the US Department of Agriculture – Natural Resource Conservation Service (USDA-NRCS) soil survey resources or other available detailed studies.

Soil associations within soil areas for the project area are mapped in Figure 2.7 and identified in the Legend. Select soil characteristics within each association are described in Table 2.2. A soil association is a distinctive pattern of soils in defined proportions that is related to a particular landscape. It typically consists of one or more major soils and at least one minor soil.

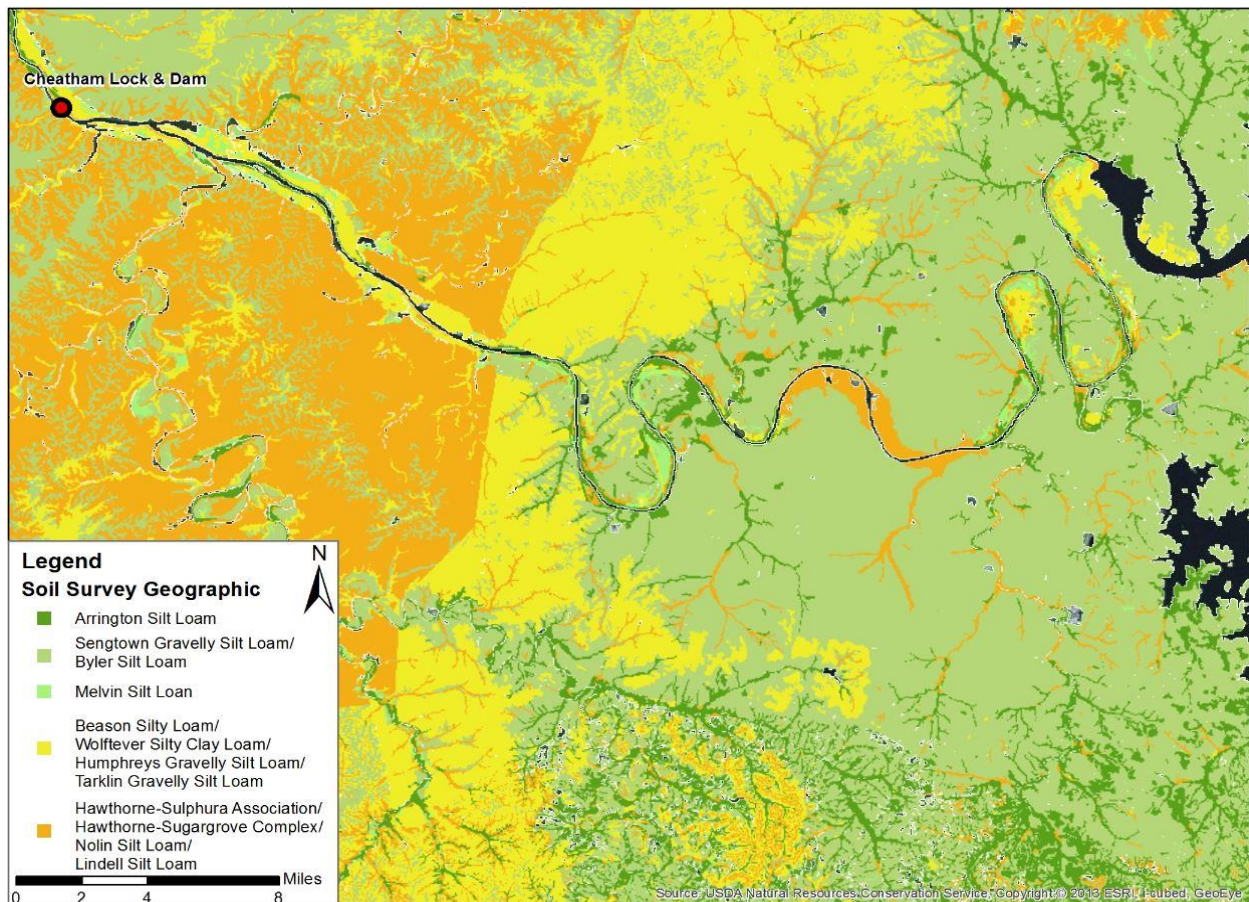


Figure 2.7 - General Soil Map

Arrington silt loam soil is situated in long narrow strips along the flood plains of the Cumberland and Harpeth Rivers. This soil can be used for certain types of agriculture and is well suited to hay and pasture. These soil areas are generally not well suited to most residential or commercial uses.



The risk of flooding severely limits the construction of structures, roads, and sanitary systems in these areas.

Sengtown gravelly silt loam soil can be found along the side slopes of upland areas. Individual soil areas generally range from 5 to 250 acres in size. The soil can support some types of agriculture but often the extreme slopes make these areas uncondusive to farming. The high clay content, slope, and acidic nature of these soils makes them generally unsuitable to most urban uses. Byler silt loam soil is found on stream terraces along the Cumberland and Harpeth Rivers. The soil is suited for agriculture and is often used for row crops, hay and pasture. The soil is poorly suited to urban use. The slow permeability in the fragipan and the perched seasonal high water table limit the construction of septic systems. Low strength, wetness, high clay content and acidity are also limiting factors for urban development.

Melvin silt loam exist on the flood plains along the Cumberland and Harpeth Rivers. This soil possesses low strength and is susceptible to frequent flooding and wetness. These factors combine to make this soil useless for most agricultural or urban development.

Beason silt loam is found on the stream terraces along the Cumberland and Harpeth Rivers. In most areas this soil is used for pasture or as woodland. In a few areas it is used for crops, mainly sorghum and soybeans. The soil is not suited to most urban uses. Slow permeability, low strength, wetness, and flooding limit these areas for development. Wolftever silty clay loams are found on the low stream terraces along the Cumberland and Harpeth Rivers. Agriculturally, this soil is suitable to hay and pasture. Flooding, wetness, restricted permeability and low strength combine to make these soil areas unhostipable to urban development. Humphreys gravelly silt loam is found along the foot slopes and stream terraces in small areas ranging from 5 to 25 acres in size. This soil is suitable for most forms of agriculture but the relative small size of the soil areas can restrict utility. These soils are moderately suited to urban development, limited by a seasonal high water table and the acidic nature of the soil. Tarklin gravelly silt loam is found in areas of 5 to 50 acres in size along the stream terraces of the Cumberland and Harpeth Rivers. This soil is well suited for woodland, hay and pasture. Slow permeability in the fragipan, perched seasonal high water table, wetness, and acidity are all limiting factors for development in these areas.

Hawthorne-Sulphura association soils lie on the side slopes of highly dissected uplands in areas ranging from 25 to 400 acres in size. Limited water capacity, steep slopes, and rockiness combine to make these soil areas poorly suited to agricultural. These soils are also less than ideal for urban development due to the steep slopes, rockiness, and depth to bedrock. Hawthorne-Sugargrove complex soil can be found along the rolling ridgetops in the project area. These soils are poorly suited for crops but can support drought resistant woodland tree species. Steep slopes and depth to bedrock make these soil areas unsuitable for residential or commercial construction. Nolin silt loam is found on flood plains and at the bottom of large sinkholes within the project area. This soil

is suitable for cropland, woodland and pastureland. However, acidity and frequent flooding limit the usefulness of the soil for urban development. Lindell silt loam soil areas lie along the flood plains of the project area. These areas are well suited for agriculture when measures are taken to account for frequent flooding. Flooding and seasonal wetness make these areas impractical for most residential or commercial uses.

**Table 2.2 - General Soil Table**  
(Natural Resources Conservation Service Soil Survey, 2017)

GENERAL SOIL ASSOCIATIONS							
CHEATHAM LAKE PROJECT							
					RECREATIONAL LIMITATIONS		
	DOMINANT SLOPE	DEPTH TO ROCK	PERMEABILITY	SHRINK/SWELL	Intensive	Little	
DOMINANT SOIL TYPES	(percent)	(inches)	(inches/hour)	POTENTIAL	Development	Development	
Arrington Silt Loam	0 - 8	> 60	0.6 - 2.0	Low	Slight-Severe: F,S	Slight	
Sengtown Gravelly Silt Loam	2 - 60	> 60	0.6 - 2.0	Low-Moderate	Severe: S	Severe: S	
Byler Silt Loam	2 - 12	> 60	0.06 - 2.0	Low-Moderate	Moderate-Severe: S,W	Severe: E	
Melvin Silt Loam	0 - 2	> 60	0.6 - 2.0	Low	Severe: F,W	Severe: W	
Beason Silty Loam	0 - 3	> 60	0.2 - 2.0	Low	Moderate-Severe: F,W	Moderate: W	
Wolftever Silty Clay Loam	0 - 12	> 60	0.2 - 2.0	Low-Moderate	Moderate-Severe: F,S	Slight-Severe: E	
Humphreys Gravelly Silt Loam	2 - 12	> 60	2.0 - 6.0	Low	Moderate-Severe: R,S	Slight	
Tarklin Gravelly Silt Loam	2 - 12	> 60	0.06 - 6.0	Low	Moderate-Severe: R,S,W	Moderate: W	
Hawthorne-Sulphura association	20 - 60	22	0.0 - 2.0	Low	Severe: R,S	Severe: S	
Hawthorne-Sugargrove complex	5 - 12	20	0.0 - 6.0	Low	Moderate-Severe: R,S	Moderate-Severe: S	
Nolin Silt Loam	0 - 2	> 60	0.6 - 2.0	Low	Slight-Severe: F	Severe: E	
Lindell Silt Loam	0 - 3	> 60	0.6 - 2.0	Low	Moderate-Severe: F,R,W	Slight	

The footnotes used in Table 2.2 refer to the following:

**Recreational Limitations:**

**Recreational Uses, Intensive Development.** These sites include playgrounds, picnic areas, athletic fields, and other recreational areas subject to heavy foot traffic, and are usually two acres or larger in size. There has been some effort to develop these sites for considerable use. The desired soil properties are nearly level surfaces, good drainage, freedom from flooding during periods of use, soil texture and strength to provide a firm surface, freedom from stones and rock outcrops, and capability to produce good growth of desirable kinds of vegetation.

**Recreational Uses, Little Development.** These sites include areas for hunting, hiking, nature study, bridle paths, and similar uses. There is usually little or no vehicular traffic in these sites, and little development of the area as the intention is to maintain them in their natural state. Desirable soils have properties that provide a suitable environment for animals, birds, and plant life, and produce natural scenic vegetation.

**Definitions of Rating Terms:**

**Slight (good suitability).** This area is relatively free of limitations, or has limitations that are easy to overcome.

**Moderate (fair suitability).** The limitations can be overcome with good management and careful design.

**Severe (poor suitability).** The limitations are serious and difficult to overcome.

**Soil Characteristics Affecting Limitations:**

**E** - Erodes Easily

**S** - Steep

**F** - Flooding

**W** - Wetness

**R** - Rockiness permeability

## **2-08.A Fish and Wildlife Resources**

### **2-08.A.1 Terrestrial Fauna**

Cheatham Lake provides a suitable environment for a variety of birds, amphibians, and mammals. Much of the land surrounding the reservoir is characterized by a thin strip along the shoreline due to the land acquisition policy at the time. Although this limited amount of land offers little potential for wildlife management, it helps provide a diversity of habitat for small, non-game species. Larger



tracts of land, such as the Cheatham Lake Wildlife Management Area, provides additional habitat for feeding, nesting, and cover.

The Tennessee Wildlife Resource Agency (TWRA) has primary jurisdiction for wildlife management on public lands at Cheatham Lake. In order to implement state management practices on USACE property, approximately 5,298 acres of land and water are licensed to TWRA for the purpose of implementing, operating, and managing a wildlife program. Areas included in the lease are two refuges: Pardue Pond and Dyson Ditch. Descriptions of each of these areas are included in the 2004 Operational Management Plan, Part I, Chapter 5.

These lands provide excellent habitat for a variety of wildlife species and excellent hunting and wildlife observation opportunities for people. Major game mammals found in the project area include: white-tailed deer, opossum, raccoon, muskrat, eastern gray squirrel, fox squirrel, and eastern cottontail rabbit. The major game birds in the area include the bobwhite quail, mourning dove, Canada goose, wood duck, and mallard duck. Species to be managed will include small upland game, waterfowl, deer, and a variety of non-game species. A complete list and discussion of the wildlife species that inhabit the project area is included in the 2004 Operational Management Plan, Part I, Chapter 5.

### **2-08.A.2 Aquatic Fauna**

A total of 74 fish species and two hybrids have been found in Cheatham Lake. These species are divided into three categories: rough fish, game fish, and forage fish. The most targeted game fish species providing the sport fishery are largemouth bass and white and black crappies.

Within Cheatham Lake, the black basses (largemouth bass, smallmouth, and spotted bass), temperate basses (white and black), crappie (white and black), and sauger are the most targeted sportfish species. Smallmouth bass are common in the Cheatham Reservoir. The TWRA maintains the striped bass fishery with annual hatchery stockings. The rough fish include the catfish (blue, channel, and flathead), bullheads (brown, black, and yellow), carp (common, bighead and silver), buffalo (smallmouth, bigmouth, and black), drum, gar (spotted, shortnose, and longnose), bowfin, redhorse (river, black, and golden), carpsuckers, and paddlefish. The dominant forage fishes include gizzard and threadfin shad and skipjack herring located in the riverine of Cheatham Reservoir.

## 2-08.B Vegetative Resources

The vegetative cover that occurs on the project represents an element in the natural beauty of the landscape. Site planning of all recreational areas at the project will capitalize on the screening and buffering attributes of vegetative cover while also providing an attractive and diverse environment. The following discussion includes descriptions of past land use and current vegetation conditions on project lands at Cheatham Lake.

**Table 2.3 - Current Vegetation Composition at Cheatham Lake**

Vegetation Type	Percent of Project Lands
Non-Vegetated	27%
Herb Dominated	45%
Shrub Dominated	1%
Tree Dominated – Closed Canopy	15%
Tree Dominated – Open Canopy	12%

The existing vegetative pattern is primarily a product of human alteration of the land as opposed to natural succession. The vegetative pattern is the result of previous timber harvests, farming, and livestock grazing. The Shoreline Management Plan and the Forest Management Plan (found in Part 1 of the Operational Management Plan), are designed to improve or maintain the vegetation surrounding Cheatham Lake.

**Forest Types at Cheatham Lake.** Four general forest types have been identified within the project boundaries as discussed below and seen in Figure 2.8.

- 1. Oak-Hickory Type.** The oak-hickory type tends to be "dominant" in central Tennessee in that the representative species associated with this type have the ability to spread into and maintain dominance over other forest types in the area. In general, the oak hickory forest type occurs on all types of terrain throughout the project; from well drained, thin soiled slopes to dry ridges. The exact composition of a particular stand is determined by a variety of related environmental factors such as aspect, depth to bedrock, and soil characteristics. Dominant canopy species which characterize this forest type include northern red oak, white oak, chestnut oak, southern red oak, post oak, black oak, mockernut hickory, black walnut, shagbark hickory, pignut hickory, yellow poplar, white ash, and American beech. The understory vegetation consists primarily of viburnum, huckleberry, dogwood, redbud, black cherry, persimmon, and sassafras.
- 2. Eastern Red Cedar Type.** Next to the oak-hickory forest type, the eastern red cedar type is the most prevalent plant community on the project. The eastern red cedar forest type is prevalent on old fields and rocky areas that are too poor to support other forms of vegetation. Red cedar may occur in pure stands or it may include other woody and herbaceous plant species such as

broom sedge, honeysuckle and eastern redbud.

3. **Mixed Mesophytic.** Mixed mesophytic is a climax forest type that favors moist coves, lower slopes, flats, and hollows where the soils are deep, fertile, and moist. Species occurring within this type include American beech, various oaks and hickories, sugar maple, red maple, and box elder. Common understory species include pawpaw, sourwood, redbud, and dogwood.
4. **Cove Hardwood Type.** The cove hardwood forest type requires deep, fertile, moist soils that are found on lower slopes, creek bottoms, coves, and flats within the project. This type of habitat is generally limited to the heads of small creeks and streams that flow into the lake.
5. **Open Lands.** Almost all of the open lands at Cheatham Lake are the result of clearing for agricultural practices. Most open land on the Upper Section of the project is licensed to the Tennessee Wildlife Resources Agency for wildlife enhancement activities.

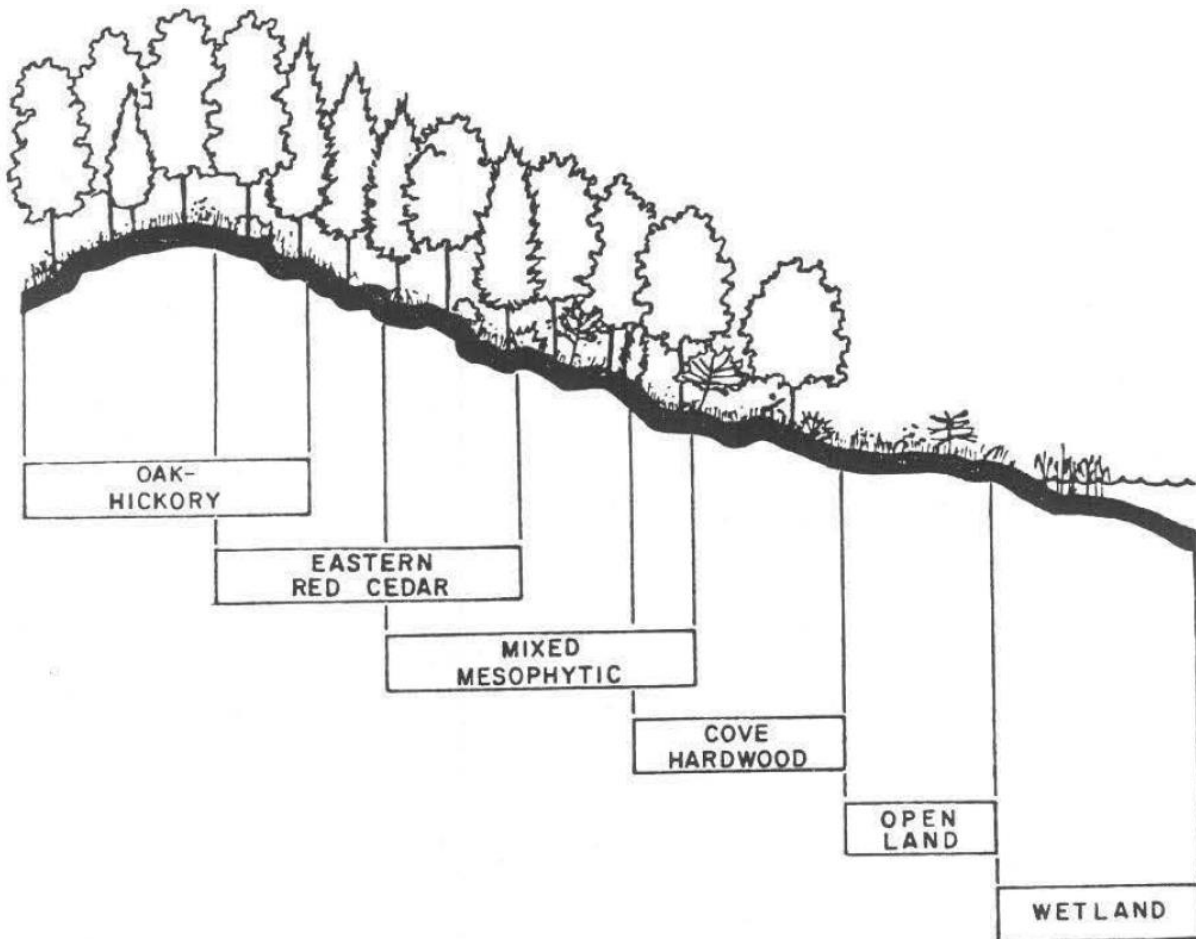
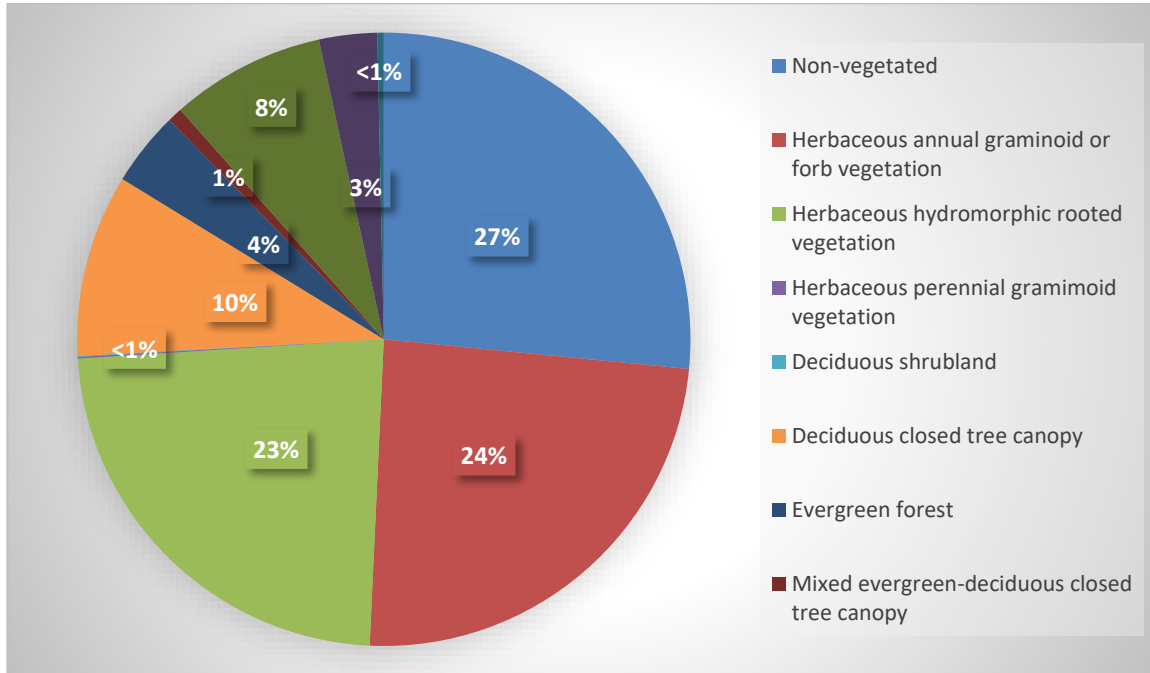


Figure 2.8 - Typical Forest Types at Cheatham Lake

The vegetation on Cheatham Lake is classified by the National Vegetation Classification Standard (NVCS) (Figure 2.9), with the goal being to understand the composition and vegetation of project lands using a consistent national system. Knowledge of what lands are available allows for better management of that land. The acreages (Figure 2.9) on Cheatham Lake are broken down into vegetated and non-vegetated divisions and descriptions (Table 2.4) of the type of vegetation in each class.<sup>1</sup>



**Figure 2.9 - Vegetation Classification Records for Cheatham Lake, as designated by the National Vegetation Classification Standard (NVCS) shown by percent of fee area**  
(Department of Interior & US Geological Service, 2011)

**Table 2.4 - Definitions of NVCS classifications**

<u>Class\Value</u>	<u>Classification Description</u>
<b>Non-Vegetated</b>	
Developed, Medium Intensity	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for part of the total cover.
Barren Land (Rock/Sand/Clay)	Areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.
<b>Shrubland</b>	
Shrub/Scrub	Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true

<sup>1</sup> The data was derived from the Federal Multi-Resolution Land Characteristics Consortium (MRLC) Tree Canopy and Land Use datasets, both 2011.

<u>Class\Value</u>	<u>Classification Description</u>
	shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
<b>Herbaceous</b>	
Grassland/Herbaceous	Areas dominated by gramimoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be used for grazing
<b>Forest</b>	
Deciduous Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.
Evergreen Forest	Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.
Mixed Forest	Areas dominate by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.

## 2-08.C Threatened & Endangered Species

In 1973, Congress passed the Endangered Species Act (ESA) which identifies those species of flora and fauna determined by the Director of the U.S. Fish and Wildlife Service (USFWS) to be endangered or threatened with extinction, and which are protected by law. There are currently 718 species of animal and 941 species of plant in the United States listed as federally threatened or endangered under Section 4 of the ESA (Environmental Conservation Online System, 2015). In Tennessee alone, 73 species of animal and 21 species of plant were listed as either federally threatened or endangered. Only five states (Alabama, California, Florida, Hawaii and Texas) have more federally listed species. These numbers may increase significantly in the future as USFWS continues to list additional species and critical habitat. For instance, in May 2017, there are 30 species of animal and plant in the United States (one in Tennessee) that are candidate species, for which USFWS has sufficient information on biological vulnerability to support issuance of proposal to list but issuance of proposed rule is currently precluded by higher priority listing actions. Another 29 species (0 in Tennessee) have been proposed in the Federal Register to be listed under Section 4 of the ESA.

Any Federal actions which may directly or indirectly affect a federally listed threatened or endangered species, or the critical habitat of a listed species, would require consultation with USFWS to ensure compliance with Section 7 of the Endangered Species Act. Consultation could be formal or informal depending on whether or not a Federal action is likely to adversely affect a listed species or critical habitat. During consultation, the potential effects of the action to Federally-listed species would be addressed.

A list of endangered species within Corps fee and easement properties on Cheatham Lake is found in Table 2.5. The list contains three mammals, five species of plant, and nine species of mussels, which may still survive in reaches of the river or historically occurred prior to impoundment. During coordination of the Master Plan Revision with State and Federal agencies, the TWRA Mollusk Recovery Program indicated two of the mussel species were likely extirpated from Cheatham Lake. Also, the bald eagle (*Haliaeetus leucocephalus*) and Peregrine Falcon (*Falco peregrinus*) which have been delisted from the Endangered Species Act, are present throughout the area (US Fish & Wildlife Service, 2017).

**Table 2.5 - Federally Listed Species Recorded in the Cheatham Lake Project Area**

Category	Species	Common Name
Mammals	<i>Myotis sodalis</i>	Indiana bat
	<i>Myotis grisescens</i>	Gray bat
	<i>Myotis septentrionalis</i>	Northern long-eared bat
Mussels	<i>Epioblasma brevidens</i> **	Cumberlandian combshell
	<i>Plethobasus cooperianus</i>	Orangefoot pimpleback
	<i>Lampsilis abrupta</i>	Pink mucket
	<i>Obovaria retusa</i> **	Ring pink
	<i>Epioblasma florentian walker</i> **	Tan riffleshell
	<i>Pleurobema plenum</i>	Rough pigtoe
	<i>Plethobasus cyphus</i>	Sheepnose
	<i>Cumberlandia monodonta</i>	Spectaclecase
	<i>Quadrula cylindrica</i>	Rabbitsfoot
	Plants	<i>Apios priceana</i>
<i>Physaria globosa</i> *		Short's bladderpod
<i>Arabis perstellata</i>		Brauns rockcress
<i>Astragalus bibullatus</i>		Guthrie's ground-plum
<i>Dalea foliosa</i>		Leafy prairie-clover
	* Critical Habitat Designation ** Likely extirpated per coordination with TWRA.	

Source: (USFWS, 2017) and consultation with USFWS and TWRA

The State of Tennessee passed legislation in 1974 entitled the “Tennessee Nongame and Endangered or Threatened Wildlife Species Conservation Act of 1974” (Tennessee Code Annotated, Sections 70-8-105 and 70-8-107) that contains a listing of animals considered threatened, endangered or in need of protection and management. The legislation is implemented by TWRA and the listing contains nearly 700 species of animals.

Also, the Tennessee Natural Heritage Inventory Program, a part of the Tennessee Department of Environment and Conservation Department of Natural Areas (TDNA), publishes the state’s rare plant list. The ability to legally list plants as Threatened, Endangered, and Special Concern is granted by the State of Tennessee Rare Plant Protection and Conservation Act of 1985. The list contains over 530 species of plants and fungi (Tennessee Division of Natural Areas, 2017). On 28 April 2017, the TDNA provided the Corps with a map of rare plant and animal species listed under the aforementioned State legislation. The map included species that were on Cheatham Lake fee/easement lands, or within a one-mile vicinity of the project. The species and State listing status are included below in Table 2.6. Species that are also federally listed were excluded from Table 2.6 as they were described earlier in this section.

**Table 2.6 - State Listed Species Recorded in the Cheatham Lake Project Area**

Explanation of State Status Codes: E-Endangered; T-Threatened; D-Deemed in Need of Management; S-Special Concern; R-Rare (not state listed)

Category	Scientific Name	Common Name	State Status
Amphibian	<u><i>Cryptobranchus alleganiensis</i></u>	Hellbender	D
Bird	<u><i>Haliaeetus leucocephalus</i></u>	Bald Eagle	D
	<u><i>Aquila chrysaetos</i></u>	Golden Eagle	T
	<u><i>Ixobrychus exilis</i></u>	Least Bittern	D
	<u><i>Falco peregrinus</i></u>	Peregrine Falcon	E
Fish	<u><i>Cycleptus elongatus</i></u>	Blue Sucker	T
	<u><i>Carpionodes velifer</i></u>	Highfin Carpsucker	D
	<u><i>Acipenser fulvescens</i></u>	Lake Sturgeon	E
	<u><i>Etheostoma luteovinctum</i></u>	Redband Darter	D
	<u><i>Ichthyomyzon unicuspis</i></u>	Silver Lamprey	D
Flowering Plant	<u><i>Panax quinquefolius</i></u>	American Ginseng	S
	<u><i>Juglans cinerea</i></u>	Butternut	T
	<u><i>Carex davisii</i></u>	Davis' Sedge	S
	<u><i>Paysonia densipila</i></u>	Duck River Bladderpod	S
	<u><i>Lonicera prolifera</i></u>	Grape Honeysuckle	E
	<u><i>Parnassia grandifolia</i></u>	Large-leaved Grass-of-parnassus	S
	<u><i>Amsonia tabernaemontana</i></u>	Limestone Blue Star	S
	<u><i>Diervilla lonicera</i></u>	Northern Bush-honeysuckle	T
	<u><i>Mirabilis albida</i></u>	Pale Umbrella-wort	T
	<u><i>Polytaenia nuttallii</i></u>	Prairie Parsley	T
	<u><i>Carex hirtifolia</i></u>	Pubescent Sedge	S
	<u><i>Dalea purpurea</i></u>	Purple Prairie-clover	E
	<u><i>Vitis rupestris</i></u>	Sand Grape	E
	<u><i>Boechera shortii</i></u>	Short's Rock-cress	S
	<u><i>Elymus svensonii</i></u>	Svenson's Wild-rye	T
	<u><i>Astragalus tennesseensis</i></u>	Tennessee Milk-vetch	S



	<u><i>Stellaria fontinalis</i></u>	Water Stitchwort	S
	<u><i>Dalea candida</i></u>	White Prairie-clover	T
	<u><i>Symphyotrichum praealtum</i></u>	Willow Aster	E
Mammal	<u><i>Neotoma magister</i></u>	Allegheny Woodrat	D
	<u><i>Zapus hudsonius</i></u>	Meadow Jumping Mouse	D
	<u><i>Sorex longirostris</i></u>	Southeastern Shrew	D
Mollusc	<u><i>Obovaria subrotunda</i></u>	Round Hickorynut	R
Reptile	<u><i>Macrochelys temminckii</i></u>	Alligator Snapping Turtle	D

### 2-08.C.1 Short's Bladderpod

On August 26, 2014, (79 FR 50989) the USFWS identified areas within and adjacent to the Corps' fee and easement property at Cheatham Lake as critical habitat for Short's bladderpod (*Physaria globosa*). Figure 2.10 depicts these areas which, were identified as Units 4-8 by USFWS, and are shown in red (US Fish and Wildlife Service, 2014). Short's bladderpod, a plant in the mustard family, typically grows on steep, rocky, wooded slopes and talus slopes and along tops, bases and ledges of bluffs - often near rivers or streams and on south- to west-facing slopes. Most populations are closely associated with calcareous outcrops. USFWS determined that the species was at risk throughout its range due to: potential future construction and ongoing maintenance of transportation rights-of-way; prolonged inundation and soil erosion due to flooding and water level manipulation; overstory shading due to forest succession and shading and competition from invasive, nonnative plant species; and small population sizes (USFWS, 2013).

There are four areas identified as critical habitat for Short's bladderpod that are partially located on Cheatham Lake Fee property (Units 4, 5, 6, and 7) and another (Unit 8) that is partially located on Corps flowage easement property. The portions of Units 5, 6 and 7 on Corps fee property are classified as Environmentally Sensitive Areas, and described further in Chapter 5-03. Unit 4 is partially located within an existing Corps recreation area (Lock A) and therefore, is not classified as an Environmentally Sensitive Area, however, coordination with USFWS, TWRA and Tennessee Department of Natural Heritage would occur as needed for any individual actions that may affect the species. Unit 8 is located entirely on private lands, including Corps flowage easement.

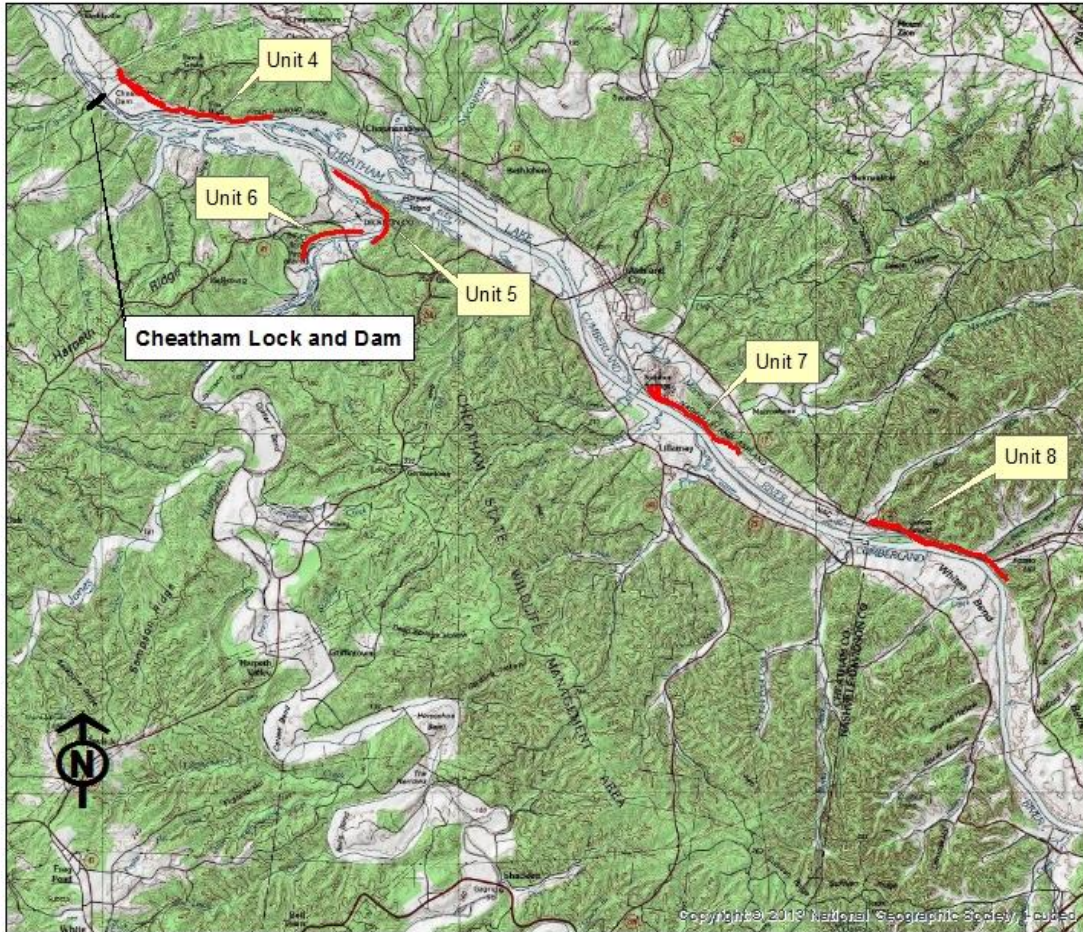


Figure 2.10 - Short's Bladderpod Critical Habitat Areas

## 2-08.D Invasive Species

The Nashville District is faced with numerous and diverse issues concerning invasive species. These problems occur on Corps managed lands and waters and on Corps lands utilized for outgrants and permits. Invasive species are serious threats impacting wildlife and fisheries habitat as well as human health. They may impose enormous costs for eradication and management efforts. The management of invasive species requires steps to be taken against them. These include prevention, early detection and rapid response, eradication, and control. Early detection is a key goal in managing invasive species. As shown in Figure 2.11, being proactive and increasing awareness helps lower costs associated with invasive species management.

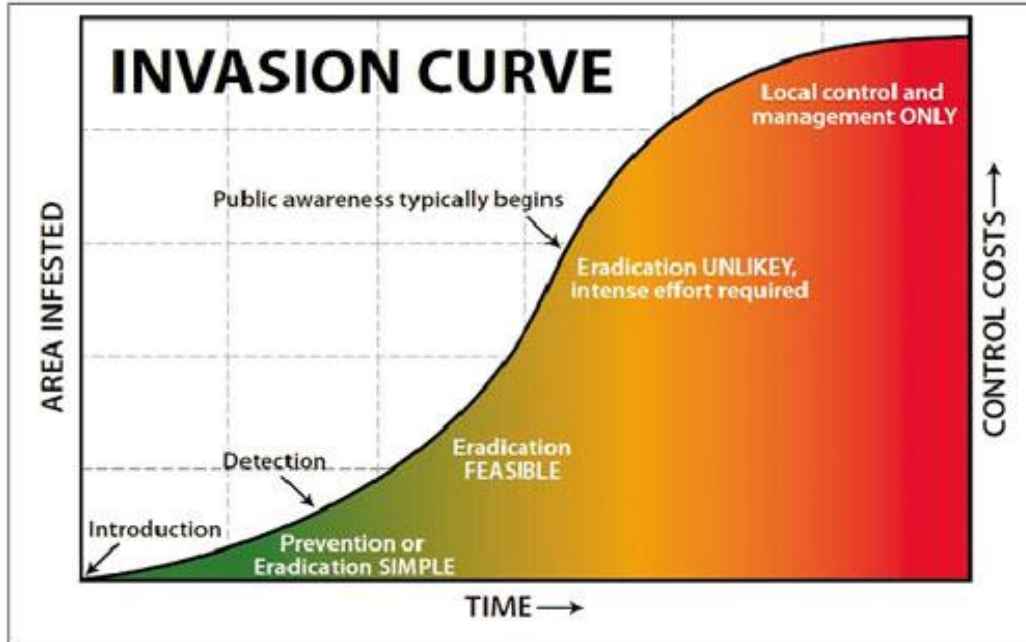


Figure 2.11 - Invasion Curve

Invasive species have been introduced through routes called invasion "pathways." Transported by air, water, rail, or road, invasive species move beyond natural geographic barriers and inhabit new sites. By altering species diversity, hydrology, nutrient cycling, and other ecosystem processes, invasive species can change whole ecosystems and irreparably damage natural resources. Recreational boaters introduce invasive species by, for example, transporting vegetation on trailers and by the release of live bait in bodies of water. Ornamental plants and pets may be imported from a different country to provide unusual products to the market. Some non-native species, intentionally introduced for beneficial purposes, later turn out to be invasive. A small percentage cause serious problems in their new environments and are collectively known as "invasive species." For example, Kudzu (*Pueraria lobata*) was introduced from Japan to the United States in 1876 where it was promoted as a forage crop. It is currently found naturalized throughout the southeastern states 140 years later.

When possible, cultural, mechanical, or biological means to control invasive species will be used in lieu of chemical control. However, if populations pose serious problems, chemical applications may be required. Biological control is defined as the reduction of pest populations by natural enemies and typically involves an active human role. Natural enemies may include parasitoids, predators, and/or pathogenic microorganisms. For instance, three species of parasitoid wasps – *Spathius agrili*, *Tetrastichus planipennis* and *Oobius agrili*, are reared and provided by the USDA as biological control agents for the emerald ash borer.

The Corps has coordinated with State agencies, as well as other Federal natural resource agencies and non-governmental organizations, to develop Policy Letter #32 as an appropriate firewood

policy for Corps lands. Consistent policy and management actions among natural resource agencies within a State are critical to delivering a clear message to users of public facilities.

This policy will prevent or slow the introduction and transportation of invasive forest pest and insects (such as emerald ash borer) to project lands. These pests are generally slow moving when left to their own movement patterns; however, all can move great distances as hitchhikers on firewood transported from one location to another. While the threat of pest movement exists with local firewood, it is greatly reduced.

Under the authority of Title 36 Rules and Regulations, Section 327.12(a), the District Commander established a restriction on Nashville District project lands that prohibits the possession, transportation, use, or storage of non-certified heat-treated firewood, or the current State limit, whichever is more restrictive, or from across State or national boundaries, unless the firewood has been officially certified heat – treated firewood. This restriction will be enforced by corps staff with citation authority using the lowest level of enforcement necessary, as per ER 1130-2-550, Section 6-2.f.

#### **2-08.D.1 Emerald Ash Borer**

The emerald ash borer (EAB), *Agilus planipennis*, attacks only ash trees. It is believed to have been introduced into Michigan 15 to 20 years ago on wood packing material carried in cargo ships or airplanes originating in its native Asia. Since then, the destructive insect has been found in numerous states including Tennessee. Typically, the emerald ash borer beetles can kill an ash tree within three years of the initial infestation. The larvae (the immature stage) feed on the inner bark of ash trees, disrupting the tree's ability to transport water and nutrients. Adults are dark green, one-half inch in length and one-eighth inch wide, and fly only from April until September, depending on the climate of the area. In Tennessee, most EAB adults would fly in May and June. Larvae spend the rest of the year beneath the bark of ash trees. When they emerge as adults, they leave D-shaped holes in the bark about one-eighth inch wide. Extensive information about this forest pest, including photos of its various life stages and identifying damage to living trees, can be found at: <http://www.emeraldashborer.info/> and other related web sites. In order to prevent the spread of the emerald ash borer, non-local firewood is prohibited in Cheatham Lake campgrounds. The closest confirmed finding to the Cheatham Lake area in 2014 was in Davidson County, Tennessee. See Figure 2.12 for quarantined areas in Tennessee.





**Figure 2.12 - 2016 Emerald Ash Borer Quarantined Areas, shaded**  
Source: (TN Department of Agriculture, 2016)

**2-08.D.1 Asian Carp**

The Asian carp were accidentally released in Arkansas during floods on the Mississippi River in the late 1980s and early 1990s. Both bighead and silver carp are at large throughout the basin. Substantial numbers of silver carp were discovered in the Mississippi River in the early 2000s. To date, they are abundant in reservoirs on the lower Tennessee and Cumberland Rivers. They are most abundant in Kentucky and Lake Barkley but are spreading through locks up the Cumberland River. Young carp look very similar to shad and the easiest way to tell them apart is to look at the dorsal (top) fin. Shad will have a long, threadlike fin that extends toward the tail. Asian carp will not have this thread-like fin, see Figure 2.13.



**Figure 2.13 - Comparing Asian Carp to Shad**

The Water Resources Reform and Development Act of 2014 (Public Law 113-121) included direction from Congress to the USFWS to lead a multi-agency effort to slow the spread of Asian carp in the Upper Mississippi River and Ohio River basins, in coordination with the Corps, the National Park Service and the U.S. Geological Survey.

Specifically, WRRDA called for the USFWS to develop and deliver a report to Congress summarizing all activities and expenditures (both federal and non-federal) related to Asian carp prevention efforts in the two watersheds over the previous two years, as well as describing any observed changes in the range of Asian carp in Upper Mississippi River and Ohio River basins. The USFWS Director determined that research could improve the ability to control the spread of Asian carp; and quantitative measures proposed for use in documenting progress in controlling the spread of Asian carp. More information can be found at: <http://www.asiancarp.us/>.

### 2-08.D.1 Invasive Exotic Plants

Numerous invasive exotic plants exist on project lands and waters. Invasive exotic plants pose a serious threat to biodiversity as they invade and displace native plant communities. This disrupts and alters wildlife habitat. Table 2.7 includes common invasive plant species found in Tennessee on Cheatham Lake.

**Table 2.7 - List of Common Invasive Exotic Pest Plants in Tennessee**

<b>Trees</b>
Mimosa ( <i>Albizia julibrissin</i> Durazz)
Princess tree ( <i>Paulownia tomentosa</i> (Thunb.) Sieb. & Zucc.Stevd.)
Tree-of-heaven ( <i>Ailanthus altissima</i> (Mill) Swingle)
<b>Shrubs</b>
Autumn olive ( <i>Elaeagnus umbellata</i> Thunb.)
Japanese Bush honeysuckles ( <i>Lonicera japonica</i> .)
Amur Bush honeysuckle ( <i>Lonicera maackii</i> .)
Marrows Bush honeysuckle ( <i>Lonicera marrowii</i> .)
Japanese barberry ( <i>Berberis thunbergii</i> DC.)
Multiflora rose ( <i>Rosa multiflora</i> Thunb. Ex Murr.)
Privet ( <i>Ligustrum</i> spp.)
<b>Herbaceous Plants</b>
Eurasian water-milfoil ( <i>Myriophyllum spicatum</i> L.)
Garlic mustard ( <i>Alliaria petiolata</i> (M. Bieb.) Cavara & Grande)
Japanese grass ( <i>Microstegium vimineum</i> (Trin.) A. Camus)
Japanese Knotweed ( <i>Polygonum cuspidatum</i> Sieb. & Zucc.)
Japanese spiraea ( <i>Spiraea japonica</i> L.f.)
Musk thistle ( <i>Carduus nutans</i> L.)
Purple loosestrife ( <i>Lythrum salicaria</i> L.)
<b>Vines</b>
Climbing euonymus ( <i>Euonymus fortunei</i> (Turcz.) Hand.-Mazz.)
Japanese honeysuckle ( <i>Lonicera japonica</i> Thunb.)
Japanese wisteria ( <i>Wisteria floribunda</i> (Willd.)DC.)
Kudzu ( <i>Pueraria montana</i> (Lour.)Merr.)

Oriental bittersweet (*Celastrus orbiculata* Thunb.)

## 2-08.E Ecological Setting

The Natural Resource Management Mission of the U.S. Army Corps of Engineers (ER 1130-2-550, Chapter 2, Paragraph 2-2.a. (1), dated 15 November 1996) states the following:

'The Army Corps of Engineers is the steward of the lands and waters at Corps water resources projects. Its Natural Resource Management Mission is to manage and conserve those natural resources, consistent with ecosystem management principles, while providing quality public outdoor recreation experiences to serve the needs of present and future generations.

In all aspects of natural and cultural resources management, the Corps promotes awareness of environmental values and adheres to sound environmental stewardship, protection, compliance and restoration practices. The Corps manages for long-term public access to, and use of, the natural resources in cooperation with other Federal, State and local agencies as well as the private sector.

The Corps integrates the management of diverse natural resource components such as fish, wildlife, forests, wetlands, grasslands, soil, air and water with the provision of public recreation opportunities. The Corps conserves natural resources and provides public recreation opportunities that contribute to the quality of American life.'

In support of this mission statement, the following paragraphs describe the ecoregions where Cheatham Lake is located and the natural resources components found within the project area.

Ecoregions are areas with generally similar ecosystems and with similar types, qualities and quantities of environmental resources. Ecoregion boundaries are determined by examining patterns of vegetation, animal life, geology, soils, water quality, climate and human land use, as well as other living and non-living ecosystem components.

The purpose of ecological land sorting is to provide information for research, assessment, monitoring and management of ecosystems and ecosystem components. Federal agencies, state agencies and nongovernmental organizations responsible for different types of resources within the same area use this information to estimate ecosystem productivity, determine probable responses to land management practices and other ecosystem disturbances, and address environmental issues over large areas, such as air pollution, forest disease or threats to biodiversity.



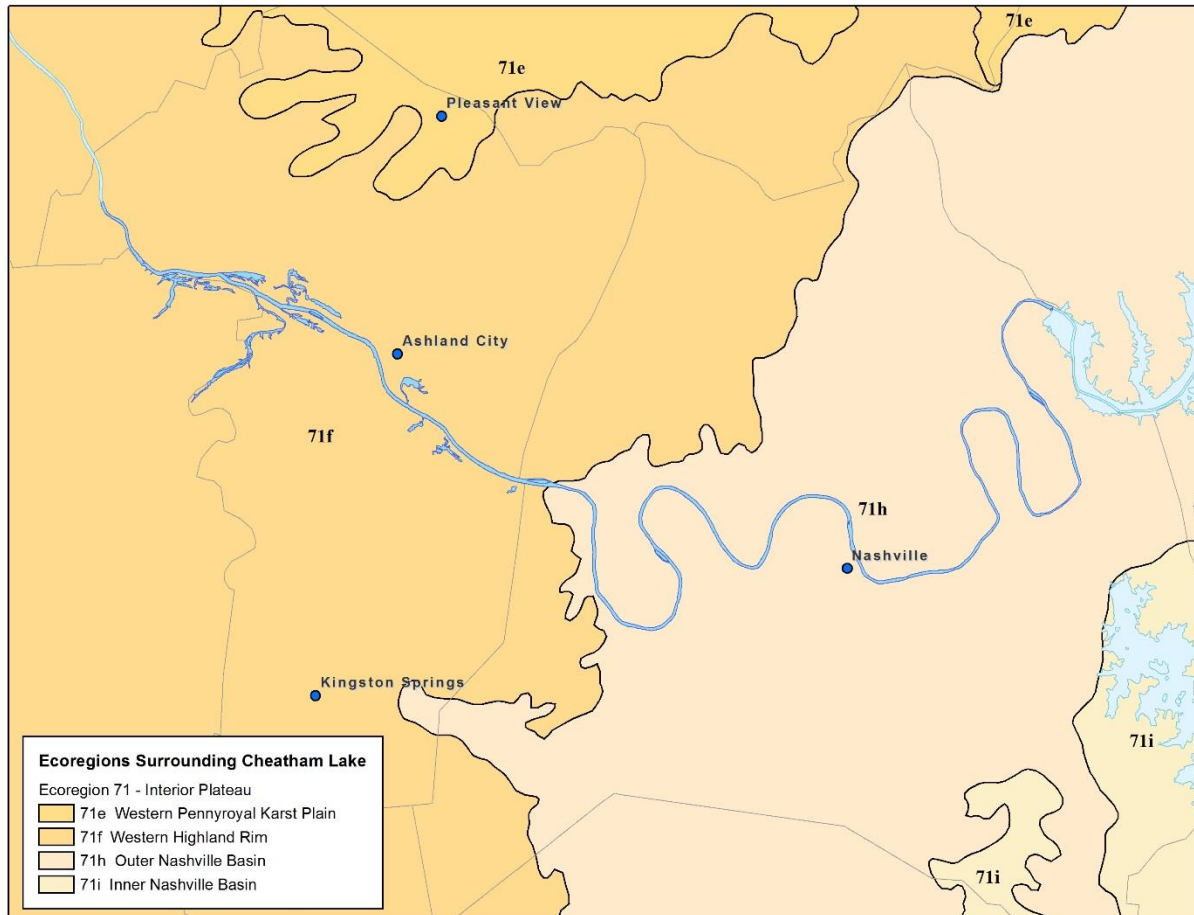
Cheatham Lake falls within the Western Highland Rim and Outer Nashville Basin Ecoregions. See Figure 2.14 to reference the locations of the ecoregions in middle Tennessee (Tennessee Department of Environment & Conservation, 2000).

### **2-08.E.1 Western Highland Rim Ecoregion**

The Western Highland Rim (ecoregion 71f) is characterized by dissected, rolling terrain of open hills with elevations of 400-1000 feet. The geologic base of Mississippian-age limestone, chert and shale is covered by soils that tend to be cherty and acidic with low to moderate fertility. Streams are relatively clear with a moderate gradient. Substrates are coarse chert, gravel and sand with areas of bedrock. The native oak-hickory forests were removed over broad areas in the mid-to late 1800's in conjunction with the iron-ore related mining and smelting of the mineral limonite, however today the region is again heavily forested. Some agriculture occurs on the flatter interfluvial areas and in the stream and river valleys. The predominant land uses are hay, pasture and cattle with some cultivation of corn and tobacco.

### **2-08.E.2 The Outer Nashville Basin Ecoregion**

The Outer Nashville Basin has a rolling and hilly topography with slightly higher elevations than the Inner Nashville Basin. The region encompasses most of the outer areas of the generally non-cherty Ordovician limestone bedrock. The higher hills and knobs are capped by the more cherty Mississippian-age formation, and some Devonian-age Chattanooga shale, remnants of the Highland Rim. The region's limestone rocks and soils are high in phosphorus, and commercial phosphate is mined. Deciduous forest with pasture and cropland are the dominant land covers. The region has areas of intense urban development with the city of Nashville occupying the northwest region. Streams are low to moderate gradient, with productive, nutrient-rich waters, resulting in algae, rooted vegetation, and occasionally high densities of fish. The Nashville Basin has a distinctive fish fauna, notable for fish that avoid the region, as well as those that are present .



**Figure 2.14 - Ecoregions in the Cheatham Lake Area, Cheatham Lake falling in Ecoregions 71f and 71h (USEPA Ecoregions, 2017)**

## 2-08.F Wetlands

According to the US Fish and Wildlife Service’s National Wetlands Inventory (NWI) (2014) there are approximately 1,567 acres identified as wetlands, exclusive of the deepwater habitat, adjacent to or within Cheatham Lake’s area. Approximately 2,924 acres of lake are classified under the Cowardin system; this, other ponded areas (75 acres) and 28 acres of ‘miscellaneous’ classification bring the total acres at Cheatham Lake to 2,999 acres of wetlands. Most common classifications, beyond lake, are palustrine forested or scrub shrub (264 acres), palustrine emergent (125 acres), and riverine (47 acres). Some areas are identified as having artificial structures (dikes, impoundments) associated with historic farming practices. Much more of the fringe uplands around the perimeter of the lake that are now pastureland were likely wetlands prior to pasture conversion. If these areas were no longer grazed by cattle and/or pasture haying ceased, plants indicative of wetland areas would return as in many areas soil and hydrology are present. Department of Interior, US Fish

and Wildlife Service, 2014. National Wetlands Inventory can be accessed at <http://www.fws.gov/wetlands/Data/Mapper.html>.

**Table 2.8 - Acres of Wetlands by Wetland Classification Type on Cheatham Lake**

Wetlands and Deepwater Habitats Classification	Acres (approx) on Cheatham Lake
Lacustrine, Limnetic, Unconsolidated Bottom	1,432
Lacustrine, Littoral, Unconsolidated Bottom	253
Lacustrine, Littoral, Unconsolidated Shore	1
Palustrine, Emergent	125
Palustrine, Forested	849
Palustrine, Scrub-Shrub	264
Palustrine, Unconsolidated Bottom	28
Riverine, Lower Perennial, Unconsolidated Bottom	47

## 2-09 Cultural Resources

The record of human settlement along the middle Cumberland River in Tennessee dates back to at least 10,000 B.C. In the mid-south human occupation is generally divided into five broad cultural-chronological periods: Paleoindian (10,000-8,000 B.C.), Archaic (8,000-1,000 B.C.), Woodland (1,000 B.C.-A.D. 1000), Mississippian (A.D. 900-1000 - 1700-1750), and Historic (A.D. 1700- present). Cultural resources of all periods exist within the Army Corps of Engineers Cheatham Lake project area (Deter-Wolf et al 2011; Gregory et al. 2011). These resources include small prehistoric campsites, Woodland and Mississippian villages, historic towns, and Civil War forts.

Numerous Federal laws, executive orders, and regulations that provide guidance regarding the identification, consideration, and management of cultural resources on federal lands and projects. The most prominent of these include The National Historic Preservation Act of 1966, as amended (NHPA), The Archaeological Resource Protection Act of 1979, as amended (ARPA), Native American Graves Protection and Repatriation Act of 1989, (NAGPRA), Executive Order 11593, and ER 1130-2-540.

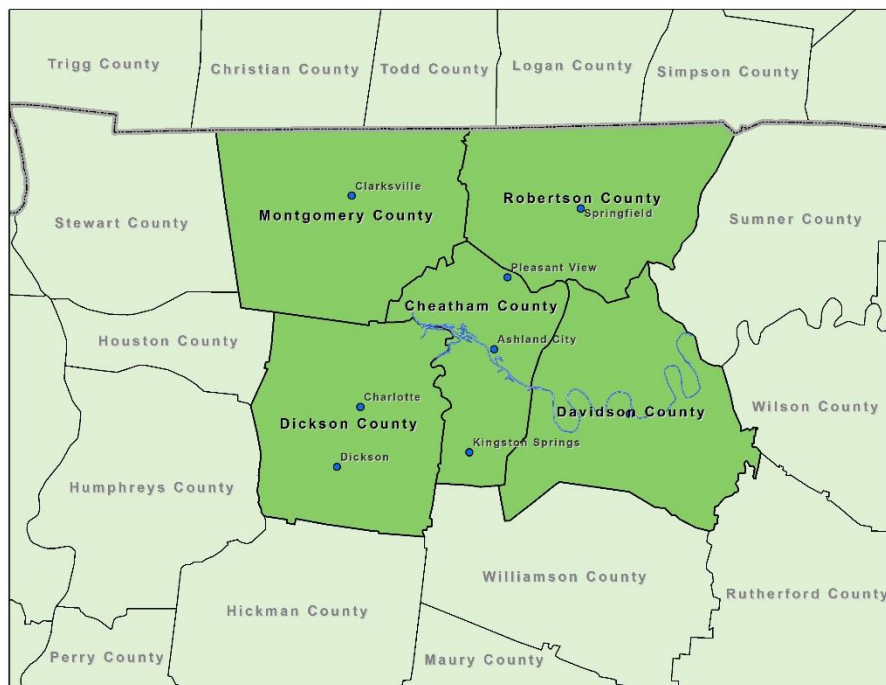
Prior to the inundation of Cheatham Lake, the River Basins Survey completed a reconnaissance survey of the inundation zone (River Basin Survey 1954). These investigations recorded 20 archaeological sites that were easily identifiable on the land surface through the presence of mounds, stone box graves, and dense lithic scatters. 33 additional archaeological sites have been recorded on Cheatham lands over the last several decades, mainly as Section 106 related inventories. Following the 2010 Cumberland River flood, the Tennessee Division of Archaeology and Middle Tennessee State University completed a rapid response survey to monitor previously recorded sites and to record new sites within Cheatham Lake (Deter-Wolf, Peres, & Hodge, 2011).

At the same time, the Corps revisited several sites with funding provided from the American Recovery and Reinvestment Act (Gregory, et al., 2011). While the entire Cheatham Project has not been surveyed with standard archaeological survey techniques, much of the land has been surveyed. There is still the potential for unrecorded sites on Cheatham lands. These would likely occur in the downstream portions of the reservoir where USACE owns large land parcels.

In addition to archaeological sites, the Cheatham Lock, Dam, and Hydropower complex form a contributing element to the National Register eligible Cumberland River Basin Project (McCroskey & McCormick, 2015).

## 2-10 Demographics

Cheatham Lake is encompassed by four counties – Cheatham, Dickson, Davidson, and Sumner; however, the reservoir impacts other surrounding counties as well. Visitation patterns discussed later in the chapter will add a fifth county, Robertson County, to compose the five counties identified as the primary area of focus for the following demographic analysis. The five counties in the area of influence (AOI) are Cheatham, Davidson, Dickson, Montgomery, Robertson, which combined make up roughly 6% (2,353 square miles) of Tennessee’s total land and water area.



**Figure 2.15 - Five Counties in Cheatham’s Area of Interest**

Since 1980, the AOI has seen a total population increase of 76% with the highest increases being in Montgomery and Williamson counties. Rapid growth in cities such as Nashville, Franklin, and

Clarksville have allowed the area of influence to grow faster than the state as a whole which has seen a 45% increase in population in the last 37 years.

Table 2.9 shows population data near the time of the last Master Plan update, in the last census year, and estimations for 2016 with resulting overall percentage increases.

**Table 2.9 - Population by County, 1980-2016**  
(US Census Bureau, 2017)

County	1980	2010	2016 Estimate	Population Change 1980 to 2016	Percent Increase
Cheatham	21,616	39,105	39,880	18,264	84%
Davidson	477,811	626,681	684,410	206,599	43%
Dickson	30,037	49,666	52,170	22,133	74%
Montgomery	83,342	172,331	195,734	112,392	135%
Robertson	37,021	66,283	69,165	32,144	87%
<i>Total</i>	<i>649,827</i>	<i>954,066</i>	<i>1,041,359</i>	<i>391,532</i>	<i>60%</i>

The Nashville metropolitan statistical area (MSA) alone made up 27.7% of the state’s total population in 2015, and according to projections from Boyd Center for Business and Economic Research (CBER), growth in the Nashville MSA is expected to increase by another 45% by 2040. Table 2.10 highlights population projections for Tennessee and the area of influence by county. Only 2 counties are expecting less than 50% growth by 2060 while the other 3 counties are expecting population to grow by a half or more.

**Table 2.10 - Population Projections for Tennessee and Counties in AOI, 2020 to 2060**  
(US Census Bureau, 2017)

County	Year					% Increase 2020 to 2060
	2020	2030	2040	2050	2060	
Cheatham	41,692	46,511	50,338	53,424	56,646	36%
Davidson	714,756	789,590	877,108	985,370	1,105,343	55%
Dickson	56,210	61,996	66,897	71,268	76,064	35%
Montgomery	221,620	264,680	311,239	363,343	418,765	89%
Robertson	78,659	90,656	101,847	112,677	124,672	58%
<i>Total</i>	<i>1,122,937</i>	<i>1,253,433</i>	<i>1,407,429</i>	<i>1,586,082</i>	<i>1,781,490</i>	<i>62%</i>
<b>Tennessee</b>	<b>6,973,863</b>	<b>7,672,027</b>	<b>8,338,654</b>	<b>9,015,412</b>	<b>9,775,653</b>	<b>40%</b>

Within the AOI, the population is primarily Caucasian and non-Hispanic with only 8% of the population being Hispanic or Latino. Other ethnicities within the area of influence include African-American, Asian, and a small percentage of “other” to include American Indian and Alaskan Natives, and Native Hawaiian and Other Pacific Islanders, and individuals who identify with two or more

ethnicities. Figure 2.16 provides a visual representation of the race proportions within the area of influence.

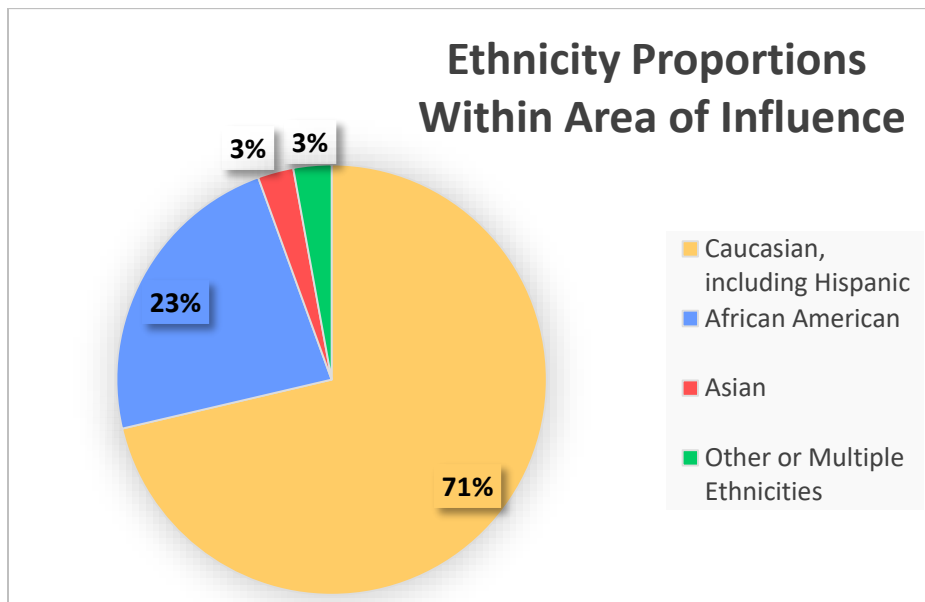


Figure 2.16 - Ethnicity Proportions  
(US Census Bureau, 2017)

In 2012, the average median age across the five counties was 39 which was similar to the state of Tennessee with a median age of 38. Figure 2.17 displays the population distribution by percentage of total population by age groups within the AOI. The data for the five counties in the area of interest matches closely to the age distributions for the state.

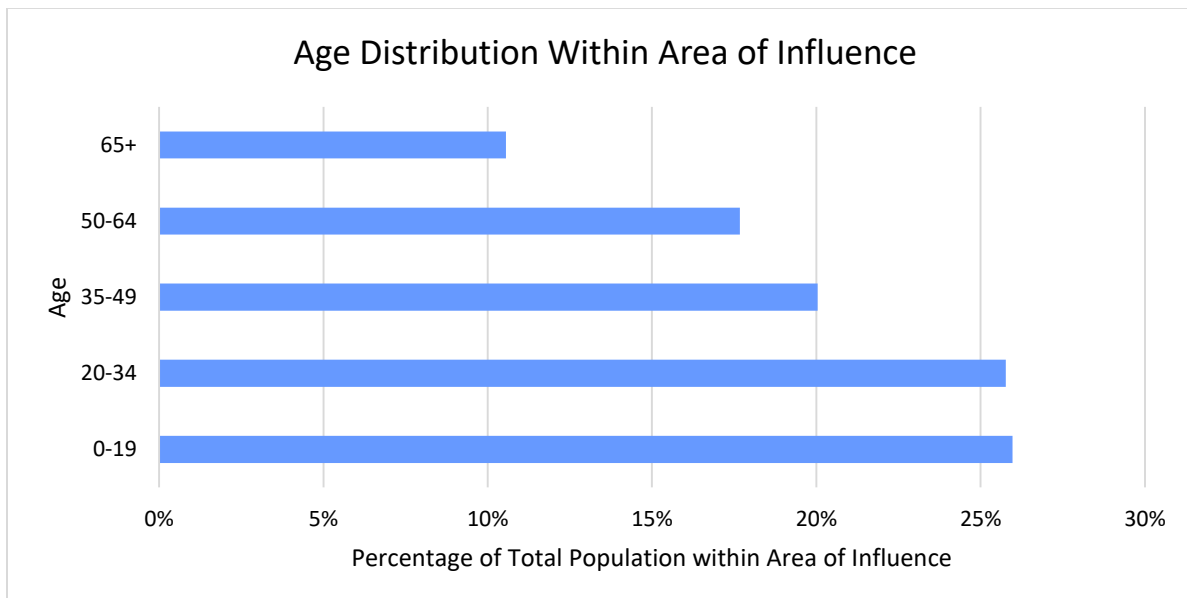


Figure 2.17 - Age Distribution

(US Census Bureau, 2017)

The percentage of people age 25 or older with a Bachelor’s degree or higher in the state of Tennessee is approximately 25%, and on average the AOI is comparable at 27%. However, there is a large amount of variability between counties. For instance, the percentage for Davidson County is 37% whereas the percentage for Dickson County is 15%. Table 2.11 provides more data on education levels by county.

**Table 2.11 - Proportion of Population Age 25 or older with High School or Higher Education**  
 (US Census Bureau, 2017)

<b>County</b>	<b>High school graduate or higher</b>	<b>Bachelor's degree or higher</b>
Davidson	87%	37%
Dickson	84%	15%
Cheatham	84%	19%
Robertson	86%	18%
Montgomery	92%	25%

## **2-11 Economics**

Manufacturing, Retail Trade, and Educational Services, Health Care, and Social Assistance are the largest employing industries in the AOI with Agriculture, Wholesale Trade, and Information being among the lowest employing industries. Outpatient care and professional and business services industries are among the top industries expected to grow quickly in Tennessee. The average mean and median incomes for households, families, and non-families is higher on average in the AOI than for the state. Men tend to have higher incomes than women in both the AOI and the state. Table 2.12 provides more data on mean and median incomes per county.



**Table 2.12 - Median and Mean Income for AOI and Tennessee**  
(US Census Bureau, 2015)

<b>County</b>	<b>Median household income</b>	<b>Mean household income</b>	<b>Median family income</b>	<b>Mean family income</b>	<b>Median non-family income</b>	<b>Mean non-family income</b>	<b>Median earnings for male full-time workers</b>	<b>Median earnings for female full-time workers</b>
Cheatham	\$51,857	\$63,279	\$62,737	\$70,747	\$31,958	\$39,827	\$42,162	\$36,484
Davidson	\$48,368	\$69,962	\$60,398	\$85,170	\$36,642	\$49,182	\$41,618	\$37,822
Dickson	\$44,680	\$58,184	\$52,779	\$68,130	\$21,705	\$31,357	\$41,089	\$30,809
Montgomery	\$50,344	\$61,578	\$57,572	\$68,434	\$32,331	\$40,882	\$42,412	\$32,222
Robertson	\$53,151	\$64,883	\$60,448	\$71,679	\$31,964	\$41,079	\$42,302	\$35,421
<i>AOI Average</i>	<i>\$49,680</i>	<i>\$63,577</i>	<i>\$58,787</i>	<i>\$72,832</i>	<i>\$30,920</i>	<i>\$40,465</i>	<i>\$41,917</i>	<i>\$34,552</i>
<b><i>Tennessee</i></b>	<b><i>\$45,219</i></b>	<b><i>\$63,339</i></b>	<b><i>\$56,110</i></b>	<b><i>\$74,677</i></b>	<b><i>\$26,875</i></b>	<b><i>\$38,755</i></b>	<b><i>\$42,477</i></b>	<b><i>\$34,354</i></b>

The state unemployment rate is 8.4%, and three out of the five counties within the AOI have lower unemployment rates than the state. Davidson County's rate is the lowest at 7.2%, and Montgomery County's rate is the highest at 9.7%. Table 2.13 shows unemployment rates for each county.

**Table 2.13 - Unemployment Rate by County**  
(US Census Bureau, 2015)

County	Unemployment Rate
Cheatham	7.8%
Davidson	7.2%
Dickson	7.5%
Montgomery	9.7%
Robertson	8.4%

Robertson County also has the lowest percentage of people with income below poverty level at 12%. Davidson County has the highest at 18.2%, and Tennessee's percentage is 17.6%. From the data, we see a higher social vulnerability to poverty for younger groups. Table 2.14 displays poverty percentages for all counties within the AOI.

**Table 2.14 - Percentage of People with Income below Poverty Level**  
(US Census Bureau, 2015)

County	All Ages	Age		
		<18	18-64	65+
Cheatham	13.8%	18.7%	13.2%	7.8%
Davidson	18.2%	29.7%	16.0%	8.8%
Dickson	16.3%	23.9%	15.1%	9.0%
Montgomery	15.8%	22.6%	13.9%	7.3%
Robertson	12.0%	16.7%	10.7%	9.2%

In all counties, there are more owner-occupied housing units than renter-occupied housing units. This holds true for the state as well. Davidson County has the smallest split between rental-occupied and owner-occupied residences, while Cheatham County had the largest difference with much higher rate of owner-occupied residences. Table 2.15 provides total number of housing units within each county and the state.

**Table 2.15 - Number of Housing Units**  
(US Census Bureau, 2015)

County	Occupied Housing Units	Owner-Occupied	Renter-Occupied
Cheatham	14,499	11,513	2,986
Davidson	264,211	143,045	121,166
Dickson	18,556	13,388	5,168
Montgomery	66,234	39,171	27,063
Robertson	24,641	18,665	5,976
Tennessee	2,504,556	1,672,329	832,227

Median housing costs are higher for owner-occupied units across all counties and the state. Davidson County has the highest housing costs, and Dickson County has the lowest. Four out of five counties have higher occupied median housing costs than the State of Tennessee. Table 2.16 provides median housing costs for each county and the state.

**Table 2.16 - Median Housing Costs**  
(US Census Bureau, 2015)

County	Occupied	Owner-Occupied	Renter-Occupied
Cheatham	\$983	\$992	\$953
Davidson	\$966	\$1,114	\$874
Dickson	\$738	\$767	\$722
Montgomery	\$934	\$996	\$876
Robertson	\$937	\$1,010	\$813
Tennessee	\$795	\$829	\$764

Montgomery County has the largest land area of all the counties in the AOI; however, it has a smaller population and housing unit density, with Dickson County having the lowest population and housing density. Davidson County has much higher housing and population densities than all of the other counties within the AOI though it is only the fourth largest land area. Table 2.17 shows land area, housing unit density, and population density for all counties within the AOI.

**Table 2.17 - Housing Units & Population Density per Square Mile**  
(US Census Bureau, 2017)

County	Land Area (square miles)	Population (density per square mile)	Housing Units (density per square mile)
Cheatham	302.44	129.3	51.8
Davidson	504.03	1,243.3	563.4
Dickson	489.9	101.4	42.5
Montgomery	539.18	319.6	130
Robertson	476.29	139.2	54.8

## 2-12 Recreation Facilities, Activities and Needs

The recreational opportunities at Cheatham Lake are considered to be of great importance to Middle Tennessee. The “run-of-the-river” project lands are primarily in Cheatham and Dickson Counties, serving the rural communities there, but the water body, snaking through downtown Nashville is heavily enjoyed by recreations. Many recreational activities such as swimming, boating, water skiing, fishing, hunting, picnicking, camping, paddling, enjoying nature and wildlife, and biking are considered major draws to Cheatham.

## 2-12.A Zones of Influence

Cheatham is located within 500 miles, or a day’s travel, of the main population base of the United States (Figure 2.18). Actual visitation to the lake however, consists largely of repeat visitors that live within the immediate vicinity of the lake. Customer survey cards from 2004-2013 polled over 2,300 visitors to Corps recreation areas around the lake (Figure 2.18). 1,900 survey responses (over 80%) reside in zip codes within Montgomery, Robertson, Cheatham, Dickson, and Davidson Counties – the counties immediately surrounding the lake. The communities of Ashland City, Pleasant View, Clarksville (and Fort Campbell Military Base), Springfield, and Chapmansboro are home to 60% of those visitors surveyed, implying that most of the guests to the lake drive 30 minutes or less to recreate at Cheatham Lake.

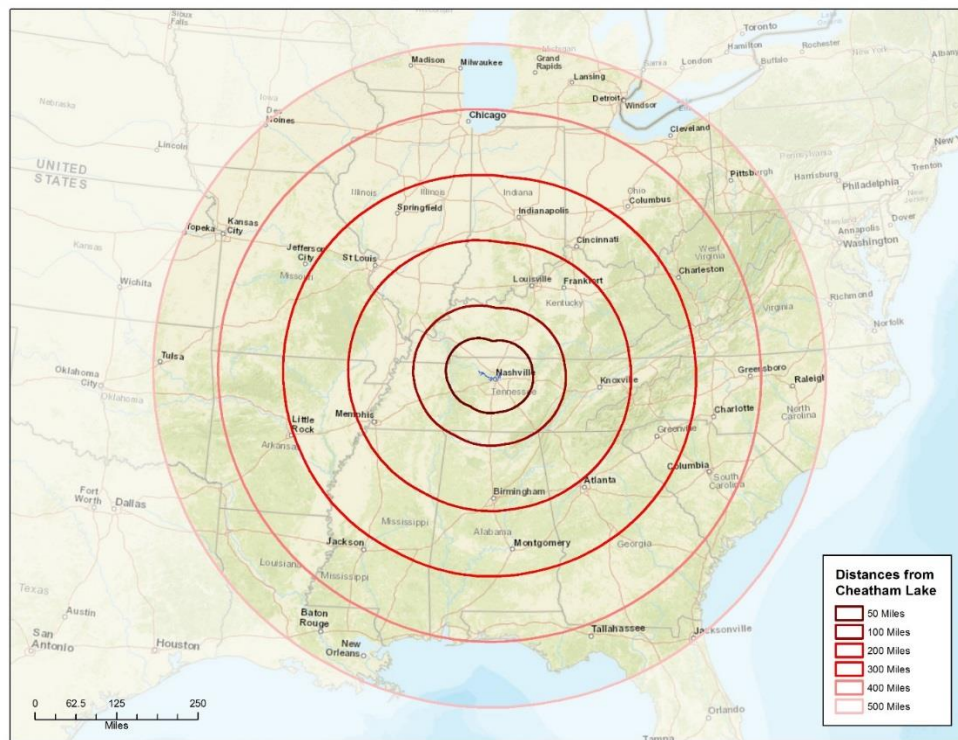
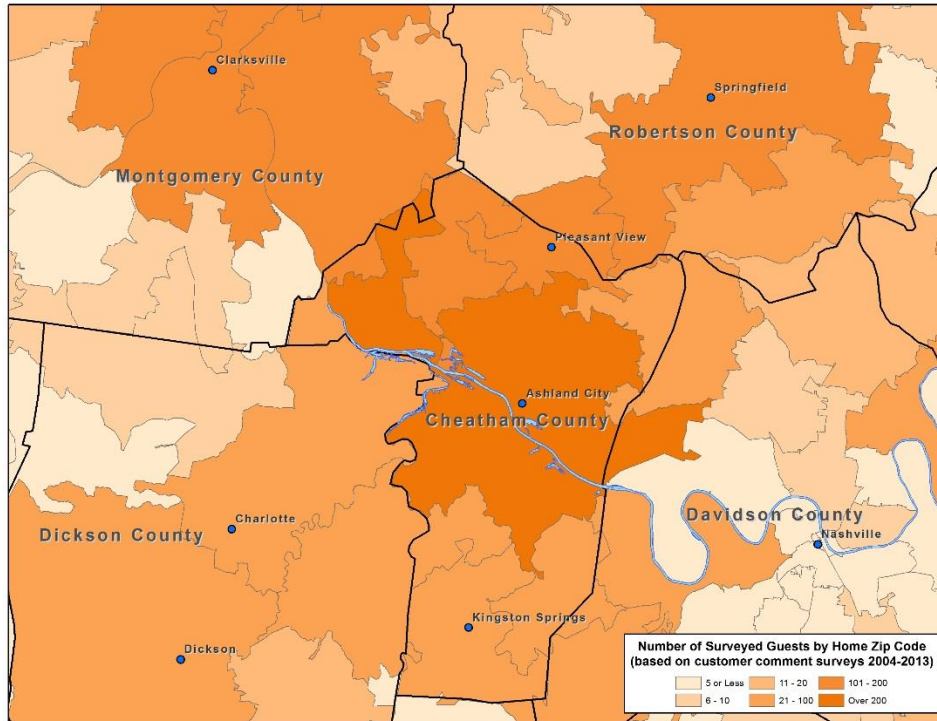


Figure 2.18 - Distances (miles) as the crow flies from Cheatham Lake

The overall trend in population growth is increasing steadily (see chapter 2-10 on demographics), with Montgomery County increasing the tremendously. Factors contributing to Montgomery County’s growth include the presence the large Fort Campbell Army Base, as well as the city of Clarksville, which is less than an hour commute from Nashville. Based on population growth trends in the primary market areas, it is anticipated that demand for recreation opportunities will likely experience a continual increase, and an increase in use of recreation facilities.



**Figure 2.19 – Density of visitor home zip codes** based on over 2,300 customer comment surveys. Location results of these surveys are used to infer that the large majority of Cheatham Lake visitors travel less than an hour to enjoy the lake.

## 2-12.B Visitation Profile

Visitor to Cheatham Lake are a diverse group ranging from campers who enjoy the two campgrounds at the lake, full time and part time residents from private homes that are adjacent the lake, hunters who use the Federal and State Wildlife Management Areas associated with Cheatham, day users who picnic and use playgrounds, marina customers and many other user groups. Visitation on Cheatham Lake is at its highest during the months of April to September, and is significantly lower during the cold months of November to March (OMBIL, 2016).

Visitation to Cheatham Lake is consistently one of the top fifty most visited Corps of Engineers lakes in the nation, ranked the forty-third most visited in fiscal year 2012. It is thought that this is due the lake's proximity to many large populations. Clarksville, Tennessee (and Fort Campbell Army Base) is about thirty miles from the Cheatham Dam. The portion of the Cumberland River under Cheatham's management runs right through downtown Nashville.

**Table 2.18 - Visitation Data by FY (Oct-Sep)**  
(OMBIL, 2016)

<b>Fiscal Year (October to September)</b>	<b>Number of Visits to Cheatham Lake</b>
FY 1999	2,413,000
FY 2000	3,222,582
FY 2001	2,312,931
FY 2002	2,260,881
FY 2003	1,911,097
FY 2004	2,199,145
FY 2005	2,771,664
FY 2006	2,679,105
FY 2007	2,004,400
FY 2008	1,987,834
FY 2009	2,112,767
FY 2010	1,980,991
FY 2011	2,166,570
FY 2012	1,987,647

In addition to overall visitation numbers, utilization data gives a picture of how frequently the campground facilities are being occupied. Figure 2.20 shows campground utilization data for Cheatham’s campgrounds, Lock A and Harpeth River Bridge. This data is from the national reservation system, NRRS. Nationally speaking in FY16, Harpeth River Bridge was the 11<sup>th</sup> most, and Lock A the 40<sup>th</sup> most utilized Corps of Engineers campground in the nation with over 600 campgrounds reporting use rates. The high utilization of these areas speaks to the value and importance the public places on these amenities and the enjoyment they offer to visitors.

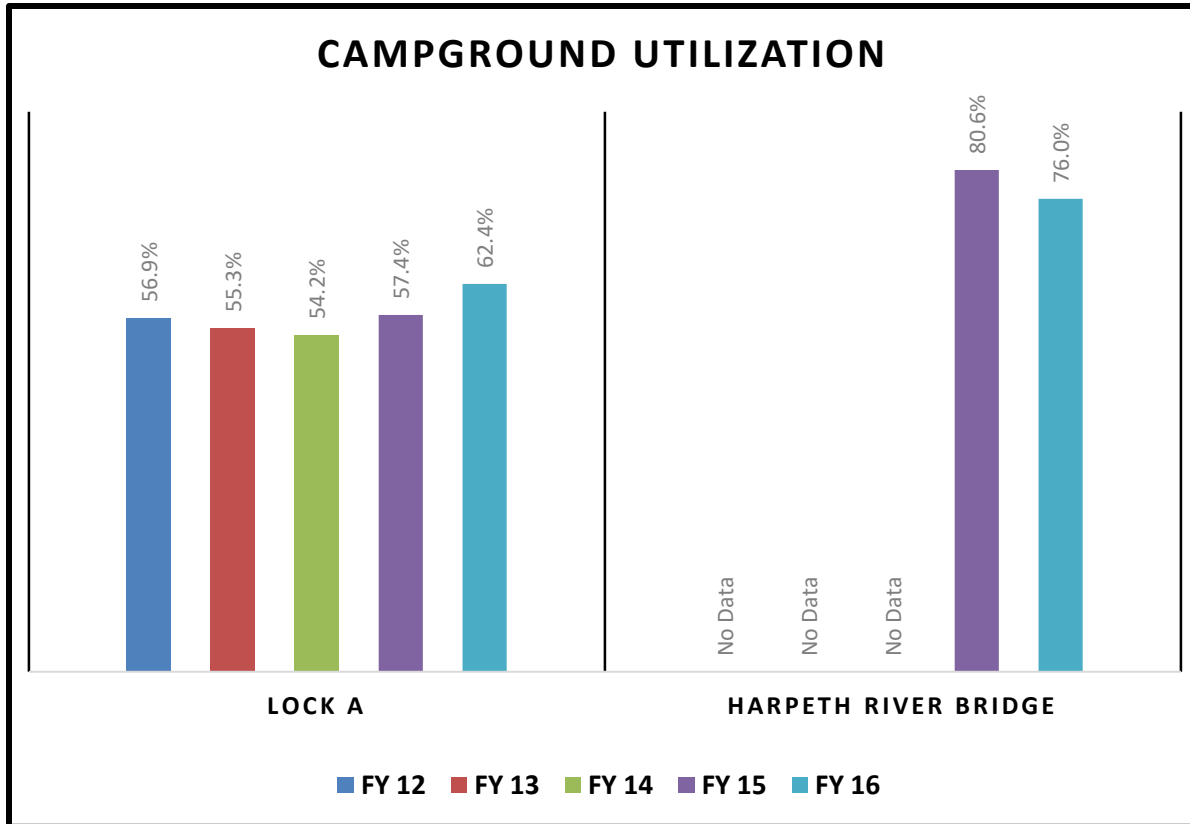


Figure 2.20- Campground Total Percent Usage (Days Available/Days Occupied) by Fiscal Year (NRRS, 2016)

It should be noted that at the time of publication of this Master Plan, the Corps of Engineers is undergoing a reassessment and modification of the way visitation counts are calculated across the nation. Corps visitation data is “frozen” at FY 2012, and no new visitation data will be released until the update to the visitation modification and collection processes are finalized. New visitation data collection will be more detailed and is anticipated to drop visitation numbers at Cheatham Lake and across the Corps based just on the new procedures used to collect and calculate visitation numbers going into future years.

### 2-12.C Recreation Analysis

The Tennessee 2020 Vision for Parks, People & Landscapes, the document serving as the state’s comprehensive outdoor recreation plan (SCORP) (TDEC, 2009), stated, “Access to nearby parks and recreation centers, like fire and police protection, is essential to the wellbeing of every resident.” A survey for input to the Tennessee SCORP found that 90% of those surveyed found water quality to be extremely important, rating it the highest conservation priority for the state. This statewide recreation plan indicates the importance of a balanced approach to managing public lands that takes serious consideration of both the public’s access to recreation, parks and outdoors, as well as the protection of natural resources.

Two of the ten statements of need identified in the Tennessee 2020 Plan tie directly into the recreation and environmental stewardship missions of Cheatham Lake and how the Corps can support them:

**#3: The need of Tennessee’s cities and counties to provide diverse, close-to-home recreation opportunities for all their residents.**

The Tennessee 2020 Vision lists high-sprawl suburban counties, experiencing growth as a result of urban sprawl from adjacent major metropolitan centers as being one of the hardest areas to keep up with demand in providing close-to-home recreation opportunities. While the counties surrounding Cheatham Lake were not mentioned specifically, they fall into the category of experiencing population growth with many residents commuting into Nashville. Cheatham can support these needs – and in many places already supports the need – by providing recreation opportunities to the public living in the area. Also, by working with local governments to make land available via outgrant for community parks.

**#9: The need of communities for more opportunities to enjoy and protect their local rivers, streams and creeks.**

A 2009 Tennessee Recreation Attitudes and Behavior survey found that protecting water quality is one of the public’s highest conservation priorities. Water has a unique draw to it and brings people in to enjoy recreational activities. Cheatham Lake can continue to offer opportunities to enjoy the main pool. The Lake will also collaborate with partner organizations to work towards a connected paddle access system along the tributaries flowing into Cheatham, like the Harpeth River.

## **2-12.D Recreational Carrying Capacity**

Carrying capacity has a number of connotations. Natural science disciplines view carrying capacity in terms of resource degradation and restoration. Site planners view capacity in relation to areas and sizes required to conduct activities effectively. Sociologists and psychologists are concerned about behavior and human interactions and their effect on the quality of the activity experience. Administrators consider capacity in relation to policies, management, and flexibility. Recreational carrying capacity generally relates to social capacity and resource capacity. Social capacity is the level of use beyond which the user does not achieve a reasonable level of satisfaction in their recreational experience.

Carrying capacity is defined as the maximum potential level of use, which avoids overuse or overcrowding. Studies have shown that in evaluating the carrying capacity of water-based



recreation, social capacity factors (overcrowding) were generally more important than resource capacity factors (overuse).

“Carrying capacity” at a project like Cheatham Lake is difficult to quantify merely by statistics on numbers of visitors or boats, types of uses or users, trends of adjacent development, changing demographics, or other selected social or environmental factors. Much of the determination of overcrowding, in particular, tends to be subjective. One hunter may think that having another hunter in his area of the woods is too much. Some user groups prefer to congregate in large social groups, while others prefer more spacing and smaller groups at picnic areas, swim beaches, or campgrounds. At heavily used boat ramps or large marinas, congestion at the point of access may be a serious problem during heavy use periods, but overcrowding quickly is relieved a short distance from these facilities as users have a large area in which to disperse.

Studies also indicate that overcrowding tends to exert a self-regulating force. As one area becomes increasingly crowded so that it impacts users’ comfort levels, the user is likely to go elsewhere. There are times and places that are exceptions; at the busiest holiday seasons at the largest and most accessible facilities, or at minor accesses with limited parking. Due to the limited land area managed by the Corps on Cheatham Lake as well as the current federal funding environment, the likelihood of building new recreation area on Cheatham Lake is low. However increasing diversity in outdoor recreation opportunities in the region acts as a regulating force to disperse outdoor enthusiasts to sites across Middle Tennessee.

Since the 1983 Master Plan Update, the National Recreation Reservation Service (NRRS) has been implemented nationwide which allows the public to reserve specific campsites up to 180 days in advance and group picnic shelters up to 360 days in advance. This service can be accessed at [www.recreation.gov](http://www.recreation.gov), 7 days a week, 24 hours a day. This well-accepted program allows the public to know which areas have vacancies well in advance and helps to alleviate overcrowding.

At this time, and into the foreseeable future, the Corps has no plans of actively limiting uses beyond those already in place, such as routing users to other areas if a particular campground is full, restricting parking to designated parking spaces, ensuring that marinas do not install more moorage slips than their parking lots can accommodate associated vehicles, etc. If future public use increases to the extent that significant use conflicts occur, a formal carrying capacity study may be warranted if it could lead to solutions not available in the absence of such a report. At this time, such a study would have minimal meaningful utility.

## **2-13 Project Access**

Cheatham Lake can be easily accessed by many major interstates. The proximity to Nashville means that I-40, I-24, and I-65 all lead towards the lake. Cheatham Lake can be accessed by road from many major metropolitan areas.

From Nashville: Take I-40 West about 2 miles to TN-155 North for 4 miles, exiting on to Highway 12, which runs along the lake with many access areas along the way.

From Clarksville: Take Highway 12 south through Chapmansboro. From there, there are several accesses to the lake (on the south and west side of the highway) as you continue towards Ashland City.

From Dickson: Take TN-48 North to Charlotte and turn right onto TN-49 East. As you approach Ashland City, there are multiple access sites to Cheatham Lake.

Nashville International Airport (BNA) is a major airport within relative proximity to Cheatham Lake, located in southeast Nashville. Smaller regional airports close by include John C. Tune in West Nashville and Clarksville Regional in Clarksville.

As discussed before, Cheatham Lake is a “run of the river” project along the Cumberland River. The lake can be accessed by water by any ramp along the stretch of water within the Cheatham pool (for recreational boat traffic), from upstream via the lock at Old Hickory Dam, or from downstream Barkley pool via the lock at Cheatham Dam.

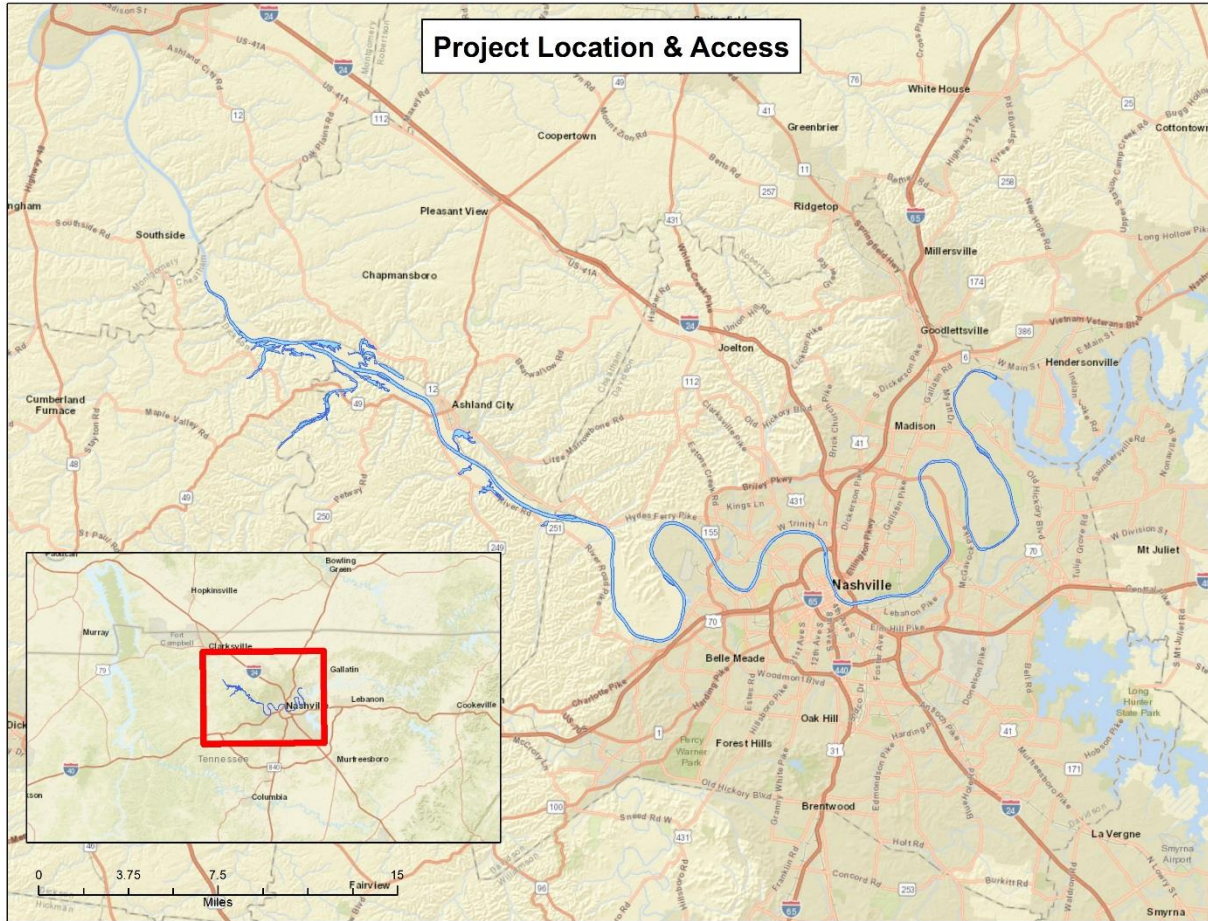


Figure 2.21 - Project Access Map

## 2-14 Real Estate Acquisition Policy

Cheatham Lake is a "run of the river" multipurpose project distinguished from storage projects on the Cumberland River by an absence of a significant flood control storage capacity. The land acquisition policy was conservative for lakes of this nature; that is, the "Eisenhower Policy" limited acquisition to an ascending line commencing on the 390 contour at the dam and extending to elevation 401.9 msl at the upper end of the lake. This policy limited land acquisition to a very narrow fringe of land around the lake and small tracts for lake access points including a ramp and parking.

Recreational lands were given little consideration during the initial acquisition program. Only small several acre tracts were blocked out at existing road ends to provide public access for launching boats. Future land acquisition is discussed in accordance with ER 405-1-11.

Since the project boundary is located very close to the lakeshore in most areas, there is potential for future requests to utilize public property by adjacent residential and commercial landowners. Development continues to be managed through the implementation of a Shoreline Management Plan, policies in Chapters 16 and 17 of Engineer Regulation 1130-2-550, and in accordance with Chapter 8, Real Property Management, of ER 405-1-12.

## **2-15 Applicable Public Laws**

Development and management of federal reservoirs for various purposes is provided under various statutes. These laws cover development of recreation facilities, licensing of project lands for fish and wildlife purposes, protection of natural resources and leasing of public lands for incidental uses other than recreation.

**Recreation** - Development and management of recreation facilities by the Corps, other governmental agencies, local groups or individuals is authorized under the following public laws:

- Water Resource Policies and Authorities – Recreation Planning, Development, and Management Policies ER 1165-2-400 sets forth the basic policies for recreation management at Corps projects. Among other things, this document sets for the Corps' goal to provide economical and quality recreational opportunities in consonance with the wise use of natural resources. It calls for public and agency participation in the planning process for recreation, consistent with the authorized project purposes, protection of the visual and physical characteristics of public lands and waters, elimination of unauthorized structures and habitation on project lands and prevention of conflicts between various user groups and activities. It also provides for the collection of user fees by the Corps and non-federal entities operating authorized recreation facilities on Corps projects. One critical prohibition contained in this regulation relates to Private Exclusive Use (Para. 14). Any form of private exclusive use, except for docks authorized under the Shoreline Management Plan, is discouraged.
- Freedom to Fish Act, Public Law 113-13 (2013) (113th Congress, 1st Session) as modified by Section 2012 of WRRDA 2014. This law directed the Nashville District to cease implementing its permanent 24/7 waterborne restrictions, to not take any action to establish a permanent physical barrier in connection with restricted areas and transferred the sole responsibility of enforcement of restricted areas to the States. The President signed the Water Resources Reform and Development Act of 2014 on 10 June 2014. Section 2012 of the Act extends the moratorium imposed by Freedom to Fish Act on when a new or modified restricted area could be implemented or enforced to June 10, 2018.

### **Real Estate Authorities, including Use Fee**

- The Federal Property and Administrative Services Act of 1949 (PL 81-152) authorizes the Secretary of the Army to dispose of certain properties under his/her jurisdiction. Special authority for disposing of land for public port and industrial facilities is further designated in Section 108 of the Act of Congress (PL 86-465; 74 Stat. 486).
- Section 209 of the Flood Control Act of 1954 (PL 83-780), approved 3 September 1954, amended the Flood Control Act of 1944. It authorized the Secretary of the Army to grant leases to federal, state or governmental agencies without monetary considerations for use and occupation of land and water areas under the jurisdiction of the Department of the Army for park and recreation purposes when in the public interest.
- Title 10, United States Code, Section 2667, authorizes the lease of land at water resource projects for any commercial or private purpose not inconsistent with other authorized purposes, subject to specific restrictions thereupon, as set out in regulations, policy, and Delegations of Authority. Title 16, United States Code, Section 460d, authorizes use of public lands for any public purpose, including fish and wildlife, if it is in the public interest. Such uses are also subject to regulations, policy and Delegations of Authority. The use of project lands for easements and licenses is authorized in various Congressional Acts and codified in Titles 10, 16, 30, 32 and 43 of the United States Code. Lands and rights-of-way will be acquired pursuant to provisions of the Uniform Real Property Acquisition and Relocation Assistance Act of 1970, PL 91-646, as amended.
- The Land and Water Conservation Fund Act of 1965, approved 1 September 1964 (PL 88-578, 78 Stat. 897), contains provisions by which the Corps may charge for admission and use of its recreation areas under prescribed conditions.
- The Omnibus Budget Act - Day Use Fees, approved 10 August 1993 (PL 103-66), contains provisions by which the Corps may collect fees for the use of developed recreation sites and facilities, including campsites, swimming beaches and boat ramps but excluding a site or facility which includes only a boat launch ramp and a courtesy dock.

### **Civil Works Authorities**

- The Federal Water Project Recreation Act, approved 9 July 1965 (PL 89-72, 79 Stat. 213) contains cost sharing provisions for acquisition of lands and development of recreation facilities for water resources projects authorized after 1965. It also provides for cost sharing development of new areas that were not part of initial project construction.

- The Rivers and Harbors Act, approved 2 March 1945 (PL 79-14), specifies the rights and interests of the states in watershed development and water utilization and control, and the requirements for cooperation with state agencies in planning for flood control and navigation improvements.
- Section 4 of the Flood Control Act, approved 22 December 1944, (PL 78-534), authorizes providing facilities for public use, including recreation, and conservation of fish and wildlife.

#### **Access to Persons with Disabilities**

- The Architectural Barriers Act of 1968 (PL 90-480), together with the Acts and Amendments listed below provides information and guidance regarding universal accessibility for persons with disabilities to Corps' recreation facilities and programs.
- The Rehabilitation Act of 1973 (PL 93-112) and the Rehabilitation Act Amendments of 1974 (PL 93-516) (see Architectural Barriers Act above).
- The Rehabilitation, Comprehensive Services, and Developmental Disabilities Amendments of 1978 (PL 95-602) (see Architectural Barriers Act above).
- The Americans with Disabilities Act of 1990 (PL 101-336) (See Architectural Barriers Act above).

#### **Environmental**

- The Clean Water Act of 1972 (PL 95-217) establishes a national goal of eliminating all pollutant discharges into US waters by 1985. This Act requires that Federal agencies shall comply with all laws regarding control and abatement of water pollution, and that disposal sites for the discharge of dredged or fill material shall be specified through the Environmental Protection Agency.

**Fish and Wildlife** - Fish and wildlife resources are maintained and protected in compliance with the following public laws:

- The Fish and Wildlife Coordination Act, enacted 10 March 1934, as amended, 14 August 1946 (PL 79-732), 1958 (PL 85-624), provides authority for making project lands of value for wildlife purposes available for management by interested federal and state wildlife agencies. It further provides for more effective integration of a fish and wildlife conservation program with federal water resources developments.
- The National Environmental Policy Act of 1969, as amended (42 USC 4321 et seq), declares a national environmental policy and requires that all federal agencies shall, to the fullest

extent possible, use a systematic, interdisciplinary approach which integrates natural and social sciences and environmental design arts in planning and decision making.

- The Endangered Species Act of 1973 as amended (16 USC 1531 and 1536) requires that federal agencies shall, in consultation with the U.S. Fish and Wildlife Service (USFWS) (or the National Marine Fisheries Service), use their authorities in furtherance of conserving endangered and threatened species and take such action as necessary to assure that their actions are not likely to jeopardize such species or destroy or modify their critical habitat.
- The Water Resource Development Act of 1986, Section 1135, provides for modifications in the structures or operations of a project, consistent with authorized project purposes to improve the quality of the environment, i.e. restoration of fish and wildlife habitat.

**Forest Resources** - Protection and Improvement of Natural Resources. The Forest Conservation Act (PL 86-717) approved 6 September 1960, provides for the protection of forest cover in reservoir areas, and specifies that reservoir areas of projects for flood control, navigation, hydroelectric power development, and other related purposes, owned in fee and under the jurisdiction of the Secretary of the Army and the Chief of Engineers, shall be developed and maintained so as to encourage, promote and assure fully adequate and dependable future resources of readily available timber through sustained yield programs, reforestation, and accepted conservation practices, and to increase the value of such areas for conservation, recreation and other beneficial uses; provided, that such development and management shall be accomplished to the extent practicable and compatible with other uses of the project. The law further provides that in order to carry out the national policy declared in the first section of this Act, the Chief of Engineers, under the supervision of the Secretary of the Army, shall provide for the protection and development of forest or other vegetative cover and the establishment and maintenance of other conservation measures on reservoir areas under his jurisdiction, so as to yield the maximum benefit and otherwise improve such areas. Programs and policies developed pursuant to the preceding sentence shall be coordinated with the Secretary of Agriculture, and with appropriate state conservation agencies.

**Cultural and Historical Considerations** - A number of laws mandating the protection of cultural resources on public lands have been passed during the past 75 years. The following laws subsume, clarify or supersede all previous cultural resource law:

- The National Historic Preservation Act of 1966 (NHPA) (P.L. 89-665; U.S.C. 470 et seq.) established a program for the preservation of historic properties throughout the nation, including requirements for federal agencies to take into account the effects of undertakings on historic properties.
- The Archaeological Resources Protection Act of 1979 (ARPA) (16 USC 470 et seq.), PL 96-95, 96th Congress Revision and update of 1906 Antiquities Act. Protects archaeological

resources and sites that are on public lands and Indian land, and fosters increased cooperation and exchange of information between governmental authorities, the professional community, and private individuals. ARPA also requires permits for the investigation of archaeological on public lands, and established unauthorized excavation and destruction of archaeological sites over 100 years old as felony.

- The 1980 Historic Preservation Amendment to the National Historic Preservation Act of 1966, PL 96-515, states a policy of preserving, restoring and maintaining cultural resources and requires that federal agencies take into account the effect of any undertaking on any site eligible for the National Register of Historic Places.
- The Archaeological and Historic Preservation Act of 1979, (P.L. 96-95) provides for the preservation of historical and archaeological data which might otherwise be lost or destroyed as the result of flooding or any alteration of the terrain caused as a result of any federal construction projects.
- The Archeological and Historical Data Conservation Act of 1974 – PL93-291 provides for the preservation of significant scientific, pre-historical, historical, or archeological data that might be lost or destroyed as a result of various Federal actions

#### **Other Cultural/Historical Laws**

- The Native American Graves Protection and Repatriation Act (NAGPRA) (PL 101-601) requires federal agencies and museums to inventory human remains and associated funerary objects and to provide culturally affiliated tribes with the inventory of collections. The Act requires repatriation, on request, to the culturally affiliated tribes and establishes a grant program within the Department of the Interior to assist tribes in repatriation and to assist museums in preparing the inventories and collections summaries. NAGPRA also requires notification of tribes within 72 hours of newly discovered American Indian human remains.
- Antiquity Act of 1906, PL 59-209 establishes the role of the Federal Government in the protection, preservation, and public availability of the historic, architectural, and archeological resources of the nation. This act requires a permit to research historical and cultural resources on Federal property and establishes penalties for destruction of antiquities on Federal land.
- The Historic Sites Act of 1935, PL 74-292 specifically establishes national policy to preserve prehistoric sites of national significance. The National Park Service was directed to make the necessary investigations to obtain the “true and accurate...facts and information...”



- Section 208 of the Water Resources Development Act (WRDA) of 2000 allows for the reburial of Native American remains found on Corps-administered lands. In consultation with affected Indian tribes, the Secretary of the Army may identify and set aside areas at civil works projects of the Department of the Army that may be used to rebury Native American remains that have been discovered on project land; and have been rightfully claimed by a lineal descendant or Indian tribe in accordance with applicable Federal law.

## CHAPTER 3 - RESOURCE GOALS AND OBJECTIVES

### 3-01 Primary Goals

The terms “goal” and “objective” are often defined as synonymous, but in the context of this Master Plan, goals express the overall desired end state of the Master Plan whereas resource objectives are the specific task-oriented actions necessary to achieve the overall Master Plan goals.

The focus of the Cheatham Lake Master Plan is to find a balanced approach to the use of the lake while sustaining the natural cultural, and socio-economic resources of the area. To achieve this, the Master Plan’s goals are to prescribe an overall land use management plan, resource objectives and associated design and management concepts. The following excerpt from EP-1130-2-550, Chapter 3, expresses the goals for the Cheatham Lake Master Plan.

- **GOAL A** - Provide the best management practices to respond to regional needs, resource capabilities and suitabilities, and expressed public interests consistent with authorized project purposes.
- **GOAL B** - Protect and manage project natural and cultural resources through sustainable environmental stewardship programs.
- **GOAL C** - Provide public outdoor recreation opportunities that support project purposes and public demands created by the project itself while sustaining project natural resources.
- **GOAL D** - Recognize the particular qualities, characteristics and potentials of the project.
- **GOAL E** - Provide consistency and compatibility with national objectives and other state and regional goals and programs.

### 3-02 Resource Objectives

Resource objectives are defined as clearly written statements that respond to identified issues and that specify measurable and attainable activities for resource development and/or management of the lands and waters under the jurisdiction of the Nashville District, Cheatham Lake Project Office. The objectives stated in this document support the goals of the Master Plan, Environmental Operating Principles (EOPs) and applicable national performance measures. They are consistent with authorized project purposes, Federal laws and directives, regional needs, resource capabilities, and take public input into consideration. Both the Tennessee 2020 Vision Plan (TDEC, 2009) and the Tennessee Wildlife Resources Agency Strategic Plan 2014-2020 (TWRA, 2014) were considered as

well. The objectives in this Master Plan, to the best extent possible, aim to maximize project benefits, meet public needs and foster environmental sustainability for Cheatham Lake.

### **3-02.A Recreational Objectives**

- Evaluate the demand for improved recreation facilities and increased public access on Corps-managed public lands and water for recreational activities (i.e. camping, walking, hiking, biking, boating, hunting, fishing, wildlife viewing, etc.) and facilities (i.e. campsites, picnic facilities, overlooks, all types of trails, boat ramps, courtesy docks, interpretive signs/exhibits and parking lots). Goal A, C
- Consider and provide recreational opportunity for a spectrum of public use for all, including individuals, families, groups, youth, elderly and disabled, with a variety of recreational facilities. Goal A, C, E
- Evaluate demand for commercial and municipal facilities on public lands and waters. Goal A, C
- Ensure consistency with HQUSACE recreation strategies. Leverage opportunities to partner through outgrants and/or other means to continue to provide recreational services where funding is constrained. Goal E
- Reference the Tennessee 2020 Vision Plan and the Tennessee Wildlife Resources Agency Strategic Plan 2014-2020 to ensure consistency in achieving recreation goals. Goal E

### **3-02.B Natural Resource Management Objectives**

- Coordinate with state and federal agencies to actively manage and protect fish and wildlife populations and habitats. Identify and protect special status species by implementing ecosystem management principles. Goal A, B, D, E
- Maintain the natural qualities and appropriate vegetative cover of the shoreline lands as a buffer between developments to enhance aesthetic qualities of the environment and protect the natural character of the project's resources. Goal A, D
- Optimize resources, labor and partnerships for the prevention and control of exotic and invasive species. Goal B

- Identify and protect unique or sensitive habitat areas and minimize activities which disturb the scenic beauty and aesthetics of the lake. Goal A, B, C, D, E
- Stop unauthorized uses of public lands such as agricultural trespass, unpermitted docks and other structures, unauthorized clearing of vegetation, unauthorized roadways, off-road vehicle (ORV) use, trash dumping and placement of advertising signs that create negative environmental impacts. Goal A, B, C, D, E

### **3-02.C Cultural Resource Objectives**

- Recognize that project cultural resources are a vital part of the historic context and heritage of the United States and increase public awareness and education of regional history. Goal B, D, E
- Identify and inventory all significant cultural resources (National Register or eligible properties) which occur within the project area as funds permit. Goal A, B, D, E
- Maintain full compliance with applicable cultural resources laws and regulations for public lands surrounding the lake. Goal B, D, E
- Prevent the inadvertent loss of the project's cultural resources from natural or human causes through a program of evaluation and protective or mitigative measures. Goal B, D, E

### **3-02.D Economic Impact Objectives**

- Balance economic and environmental interests involving Cheatham Lake. Goal A, B, C, D, E
- Evaluate the type and extent of additional commercial and municipal development that is compatible with national Corps' policy on both recreation and non-recreational outgrants and that may be sustained on public lands. Goal A, B, C, D, E
- Work with local communities to promote tourism and recreational use of the lake to favorably impact socioeconomic conditions surrounding the lake. Goal A, B, C, D, E

## **3-03 Environmental Operating Principles (EOPs)**

The United States Army Corps of Engineers Environmental Operating Principles were developed to ensure that Corps of Engineers missions include totally integrated sustainable environmental

practices. The Principles provided corporate direction to ensure the workforce recognized the Corps of Engineers role in, and responsibility for, sustainable use, stewardship, and restoration of natural resources across the Nation and, through the international reach of its support missions. Since the Environmental Operating Principles were introduced in 2002 they have instilled environmental stewardship across business practices from recycling and reduced energy use at Corps and customer facilities to a fuller consideration of the environmental impacts of Corps actions and meaningful collaboration within the larger environmental community.

The concepts embedded in the original Principles remain vital to the success of the Corps and its missions. However, as the Nation's resource challenges and priorities have evolved, the Corps has responded by close examination and refinement of work processes and operating practices. This self-examination includes how the Corps considers environmental issues in all aspects of the corporate enterprise. In particular, the strong emphasis on sustainability must be translated into everyday actions that have an effect on the environmental conditions of today, as well as the uncertainties and risks of the future. These challenges are complex, ranging from global trends such as increasing and competing demands for water and energy, climate and sea level change, and declining biodiversity; to localized manifestations of these issues in extreme weather events, the spread of invasive species, and demographic shifts. Accordingly, the Corps of Engineers is re-invigorating commitment to the Environmental Operating Principles in light of this changing context.

The Environmental Operating Principles relate to the human environment and apply to all aspects of business and operations. They apply across Military Programs, Civil Works, Research and Development, and across the Corps. The Principles require a recognition and acceptance of individual responsibility from senior leaders to the newest team members. Re-committing to these principles and environmental stewardship will lead to more efficient and effective solutions, and will enable the Corps of Engineers to further leverage resources through collaboration. This is essential for successful integrated resources management, restoration of the environment and sustainable and energy efficient approaches to all Corps of Engineers mission areas. It is also an essential component of the Corps of Engineers' risk management approach in decision making, allowing the organization to offset uncertainty by building flexibility into the management and construction of infrastructure.

The re-energized Environmental Operating Principles are:

- Foster sustainability as a way of life throughout the organization.
- Proactively consider environmental consequences of all Corps activities and act accordingly.
- Create mutually supporting economic and environmentally sustainable solutions.
- Continue to meet our corporate responsibility and accountability under the law for activities undertaken by the Corps, which may impact human and natural environments.

- Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
- Leverage scientific, economic and social knowledge to understand the environmental context and effects of Corps actions in a collaborative manner.
- Employ an open, transparent process that respects views of individuals and groups interested in Corps activities.

More information on the USACE Environmental Operating Principles is found in the Headquarters Reissuance of the U.S. Army Corps of Engineers Environmental Operating Principles, 07 August 2012.

## **CHAPTER 4 - LAND ALLOCATION, CLASSIFICATION, WATER SURFACE AND PROJECT EASEMENT LANDS**

### **4-01 Land Allocation**

Allocation refers to the congressionally authorized purpose for which the project lands were acquired. There are four land allocation categories applicable to Corps projects:

#### **4-01.A Operations**

Lands acquired for the congressionally authorized purpose of operating the project. All of the land on Cheatham Lake is included in this Operations allocation, meaning lands acquired for this project were in accordance with the authorizing documents for the project, such as Navigation and Hydropower. This allocated use takes precedence over any of the following classification categories.

#### **4-01.B Recreation**

Lands acquired specifically for the congressionally authorized purpose of recreation. These are referred to as separable recreation lands. Recreation lands in this allocation can only be given a land classification (see below) of "Recreation." Cheatham Lake does not have any lands specifically authorized for this purpose.

#### **4-01.C Fish and Wildlife**

Lands acquired specifically for the congressionally authorized purpose of fish and wildlife management. These are referred to as separable fish and wildlife lands. Lands under this allocation

can only be given a land classification (see below) of “Wildlife Management.” Cheatham Lake does not have any lands specifically authorized for this purpose.

#### 4-01.D Mitigation

Lands acquired or designated specifically for the congressionally authorized purpose of offsetting losses associated with development of the project. These are referred to as separable mitigation lands. Lands under this allocation can only be given a land classification (see below) of “Mitigation.” When Cheatham Lake was created, no mitigation lands were purchased. Therefore, there are currently no lands allocated for “Mitigation.”

### 4-02 Land and Water Classification

Land Classification is the primary use for which project lands are managed. Project lands are zoned for development and resource management consistent with authorized project purposes and the provisions of NEPA and other Federal laws. There are five categories of classification identified as: Project Operations, High Density Recreation, Mitigation, Environmentally Sensitive Areas, and Multiple Resource Management Lands. Project maps delineating land according to the following classifications are organized by site number in Appendix III. Acreages for each classification are noted in Table 4.1.

**Table 4.1 – Land Classification Acreage**

<b>Classification</b>	<b>Acreage</b>	<b>Percentage of Fee Land (above normal pool)</b>
Project Operations	19	<1%
High Density Recreation	305.5	7.2%
Environmentally Sensitive Areas	168	4%
Multiple Resource Management Lands Vegetative Management	1,441	33.9%
Multiple Resource Management Lands Wildlife Management	2,274	53.5%
Multiple Resource Management Lands Low Density Recreation	41.5	1%
Multiple Resource Management Lands Future/Inactive Recreation Area	0	0%
<b>Total Land Acres</b>	<b>4,249</b>	<b>100%</b>

## **4-02.A Project Operations**

This category includes those lands required for the dam, spillway, switchyard, offices, maintenance facilities and other areas that are used solely for the operation of the project. There are 19 acres specifically classified for these features on Cheatham Lake.

## **4-02.B High Density Recreation**

Lands developed for intensive recreational activities for the visiting public including boat ramps, day use areas and campgrounds. These could include areas for concessions (marinas, comprehensive resorts, etc.) and quasi-public development. Cheatham Lake has 305 acres classified as High Density Recreation, examples including: Lock A Campground, Sycamore Creek Recreation Area, Riverview Marina, and Riverfront Park.

## **4-02.C Environmentally Sensitive Areas**

Areas where scientific, ecological, cultural or aesthetic features have been identified. Designation of these lands is not limited to just lands that are otherwise protected by laws such as the Endangered Species Act, the National Historic Preservation Act or applicable State statutes. These areas must be considered by management to ensure they are not adversely impacted. Typically, limited or no development of public use is allowed on these lands. No agricultural or grazing uses are permitted on these lands unless necessary for a specific resource management benefit. Cheatham Lake has 168 acres classified as Environmentally Sensitive.

### **Criteria for Environmentally Sensitive Areas**

- Federally listed threatened or endangered plant or animal species.
- Rich species diversity, large mature native tree species or ecologically sensitive plant/animal species.
- High value as nesting, resting, feeding or roosting areas for sensitive neotropical songbirds, shorebirds, waterfowl, small mammals, amphibians and reptiles.
- Visual buffer to adjacent private development, wildflower/wildlife viewing areas or natural landscape appeal.
- Important water quality function – serves to buffer runoff for streams, wetlands and erosion sensitive areas.
- Presence or high probability for presence of archeological, historical or geological significance.

Cheatham Lake currently has two identified Environmental Sensitive areas. Forty-eight acres are located at the Indian Town Bluff site, at the mouth of the Harpeth River. The remaining 31 acres are on Pack Island and two unidentified islands on the Harpeth River.



## **4-02.D Multiple Resource Management Lands**

This classification allows for the designation of a predominate use as described below, with the understanding that other compatible uses described below may also occur on these lands. (e.g. a trail through an area designated as Wildlife Management). Land classification maps reflect the predominant sub-classification rather than just Multiple Resource Management.

### **4-02.D.1 Low Density Recreation**

Lands with minimal development or infrastructure that support passive public recreational use (e.g. primitive camping, fishing, hunting, trails, wildlife viewing, etc.). The one mile Tennessee State University Trail (10 acres) is the only identified Low Density Recreation area on Cheatham Lake.

### **4-02.D.2 Wildlife Management**

Lands designated for stewardship of fish and wildlife resources. Majority of these lands in this classification are outgranted to the Tennessee Wildlife Resources Agency (TWRA) for the purposes of active wildlife management and public hunting or fishing. Of the 5,298 acres of lands and water licensed to TWRA, 2,274 land acres are identified as wildlife management. These areas include: Pardue Pond Refuge, Dyson Ditch, Johnson Creek, Hudgens Sough, and Marrowbone Creek.

### **4-02.D.3 Vegetative Management**

Lands designated for stewardship of forest, prairie and other native vegetative cover. This classification includes the thin strip of public property adjacent to residential developments. Cheatham Lake has 1,441 acres classified as vegetative Management.

### **4-02.D.4 Future or Inactive Recreation Areas**

Areas with site characteristics compatible for potential future recreational development or recreation areas that are closed. Until these lands are developed by others or funding is obtained by the Corps, they will be managed for multiple resources. If proposals for future development arise by state or local governments, further analysis of these sites would be conducted to ensure compatibility of proposed actions with statutory requirements. No acreage at Cheatham Lake has been designated for this purpose.

## 4-02.E Water Surface

Cheatham Lake has a surface water management program that designates the following four classifications: Restricted, Designated No-Wake, Fish and Wildlife Sanctuary, and Open Recreation. Acreages for each water surface classification can be found in Table 4.2.

**Table 4.2 - Water Classification Acreage (355 feet AMSL)**

Classification	Acreage	Percentage of Water Area
Restricted	21	<1%
Designated No-Wake	133	5%
Fish and Wildlife Sanctuary	253	9.5%
Open Recreation	2240	85%
<b>Total Water Surface Acres</b>	<b>7,450</b>	<b>100%</b>

### 4-02.E.1 Restricted

These are water areas restricted for project operations, safety and security purposes. This would include the waters directly adjacent to the Cheatham Lock and Dam as well as areas near designated swimming beaches. There are 21 acres designated as restricted areas.

### 4-02.E.2 Designated No-Wake

Water areas designated to protect environmentally sensitive shoreline areas, recreational water access areas from disturbance and for public safety. Typically these areas are located around Commercial Marinas, riverports, public boat ramps and some narrow overpasses. There are 133 designated no-wake acres.

### 4-02.E.3 Fish and Wildlife Sanctuary

Water areas with annual or seasonal restrictions to protect fish and wildlife species during periods of migration, resting, feeding, nesting and/or spawning. Fish and wildlife sanctuary areas on Cheatham Lake include Pardue Pond Refuge (69 acres) and Dyson Ditch Refuge (184 acres). Both of these areas are closed to hunting during refuge closure dates, unless otherwise indicated. These areas are currently licensed to Tennessee Wildlife Resources Agency and are managed as wildlife refuges. Additionally, portions of Marks Creek and Big Marrowbone Creek are designated safety zones (resting areas for waterfowl).

#### **4-02.E.4      Open Recreation**

The remaining water acres of the lake are open to recreational use. There is no specific zoning for these areas, but there is a buoy system in place to help aid in public safety. The main channel markers are maintained by the United States Coast Guard while the secondary channel markers, designated “no wake” area buoys and “restricted” area buoys are maintained by the Cheatham Resource Manager’s Office.

### **4-03   Project Easement Lands**

These are lands on which easement interests are held but no fee title ownership. The lands were acquired for specific purposes and do not convey the same rights or ownership to the Corps as other lands. These are typically composed of three different classification identified as Operations Easement, Flowage Easement and Conservation Easement. Cheatham Lake has only Flowage Easement.

#### **4-03.A   Flowage Easement**

Easements that give the Corps of Engineers the right to inundate these lands during flood risk management operations to provide adequate storage for flood waters. There are 1,208 acres of flowage easement lands (above normal pool) located at Cheatham Lake.

## CHAPTER 5 - RESOURCE PLAN

This chapter further describes specific classifications for all Cheatham Lake lands and waters. Each classification will be further described to include area names, managing agency, location, acreage resource objectives and developmental needs.

### 5-01 Project Operations Areas

These areas, 19 acres, include all restricted access zones around Cheatham Lock and Dam (i.e. powerhouse, switchyard, lock operations buildings, fleet yard and resource shop compound) that are protected by fences and/or gates. The management goal for these areas is to provide basic safety and security of Corps' facilities to protect and insure proper operations of the Project. Developmental needs for these areas include facility upgrades to meet Corps sustainability objectives.

### 5-02 High Density Recreation

Areas included in this classification, 305 acres, are developed and managed for intensive recreational activities including campgrounds, day use/recreation areas, secondary access areas (i.e. boat ramps), and commercial marinas. High Density Recreation areas may be managed and operated by the Corps of Engineers or outgranted to another agency or private entity for management. These areas are managed primarily to meet the recreational and economic impact resource objectives identified in Chapter 3.

#### 5-02.A Campgrounds and Recreation Areas

##### 5-02.A.1 Lock One Park, Site No. 98

Management Agency: Metropolitan Government of Nashville and Davidson County

Land Classification: High Density Recreation

Rationale: This area supports the High Density Recreation classification because of the recreational development and high visitation.

Location: Lock 1 Park is located just downstream of downtown Nashville on Lock Rd.

Description: Lock One Park consists of 4.57 acres of developed park space leased to Metro Parks Department. The area consists of a terraced topography with a mixture of manicured lawn and

dense forested areas. The site has foundations of historic buildings from the original lock reservation including the lockmasters residence. Common wildlife to the area raccoons, squirrels, opossums, skunks, Canada geese and other migratory waterfowl as well as numerous songbirds.

Recreation improvements are limited in this area, but large manicured lawns and large sections of the original lock structure, make the area a popular choice for picnicking and bank fishing for local citizens.

Area Usage: This area receives moderate to heavy visitation. Much of the use comes from the nearby residential development.

Site-Specific Objectives:

- Provide day use recreation opportunities
- Provide lake access for fishing
- Maintain historic structures

Development Needs: Based on the City's management plan.

## **5-02.A.2 Cheatham Dam Left Bank, Site No. 101**

Management Agency: USACE

Land Classification: High Density Recreation

Rationale: This area supports a classification of High Density Recreation because of the aesthetic qualities and existing recreational facilities.

Location: This recreation area is located in rural Dickson County directly adjacent to Cheatham Power Plant. This area can be accessed primarily by county roads from TN Hwy 49 or TN Hwy 48.

Description: This 17 acre recreation area is unique in that it provides excellent viewing of the Cheatham Lock and Dam structure as well as bank fishing access to the river (tailwater) immediately downstream of the hydropower generator discharge. Although the roadway leading to the park is steep, the topography in the park is relatively flat. White-tailed deer, squirrels, wild turkeys, bald eagles, ospreys, pelicans and numerous gull species are common sites in this area.

Pedestrian access to the river is provided by 3 sets of concrete steps leading across the riprap bank to the water's edge. Other amenities include 5 picnic sites, a group picnic shelter, a restroom, 2 parking areas with 58 spaces. Much of the outdated playground equipment has been removed over

time as the individual components become unsafe due to deterioration. If funding allows, a new playground facility will be constructed in this area.

Area Use: This area receives moderate to heavy use from both water-oriented and land based activities. The area is frequented by sightseers as well as fishermen during a majority of the year. While the group picnic shelter is used sporadically, it is rarely reserved.

Site-Specific Objectives:

- Provide access for fishing, wildlife viewing, and sightseeing
- Maintain the aesthetic appeal of the area

Development Needs:

- Replace playground equipment
- Replace outdated public restroom
- Improve fishing platform
- Provide additional stairs accessing the river
- Add three covered picnic sites between the parking lot and guardrail

### **5-02.A.3 Cheatham Dam Right Bank, Site No. 102**

Management Agency: USACE

Land Classification: High Density Recreation

Rationale: This area supports a classification of High Density Recreation because of the aesthetic qualities, visitation and existing recreational facilities.

Location: The Right Bank Day Use Area is located in Cheatham County 11 miles north of Ashland City and approximately 3 miles off TN Hwy 12 via Cheatham Dam Rd. and is directly adjacent to Cheatham Lock and Dam and Lock A campground.

Description: This recreation area contains 74 acres of flat bottom land. Approximately 67 acres have developed facilities and manicured grounds. These improvements include one single lane boat ramp, one double lane boat ramp, parking lots with 288 car spaces and 76 car/trailer spaces which provide access to both the upstream and downstream side of the Cheatham Dam. The area has a 5 group picnic shelters, a 17 single table mini shelters, 2 restrooms, 43 picnic sites, 26 benches, a fish cleaning station, fee booth, 2 fishing platforms, developed swimming area, 2 playgrounds. There are also 4 sets of concrete steps that lead across the riprap bank to the water's edge. White-tailed deer, squirrels, Canada geese, wild turkeys, bald eagles, ospreys, pelicans and numerous migratory waterfowl species are common sites in this area.

Area Use: Due to its amenities, Right Bank Day Use area is the most frequently visited recreation area on Cheatham Lake. The developed swimming area is the only beach on Cheatham Lake and draws heavy visitation during the peak summer months. Day use fees are collected at Right Bank from Memorial Day to Labor Day. Typically the area is heavily used by both boat and bank fishermen, picnickers, and swimmers. This is also a popular area for walking/exercise and wildlife viewing. During fall and winter, the boat ramp has moderate usage from fishermen and waterfowl hunters.

Site-Specific Objectives:

- Provide land and water based fishing access
- Maintain the aesthetic appeal of the area
- Continue to manage native grasslands to enhance wildlife viewing opportunities

Development Needs:

- Additional picnic sites
- Continue to improve bank fishing access facilities (steps and sidewalk repairs)
- Nature Trail
- Drainage repairs

Special Considerations: As a result of recent legislation (Freedom to Fish), boat fishing in parts of the tailwater area is restricted during specific dam operations (i.e. generator startup, open spillway gates or lock discharge). However, lifejackets must be worn at all times when boating below Cheatham Dam. Additionally, the tailwater boat ramp will be closed when spillway gates are in a free flow operational condition.



**Figure 5.1 - Right Bank Day Use Area Beach**

#### **5-02.A.4 Johnson Creek Recreation Area, Site No. 103**

Management Agency: USACE

Land Classification: High Density Recreation

Rationale: The area currently supports a classification of High Density Recreation because of existing recreation facilities and aesthetic qualities

Location: Johnson Creek is located 12 miles west of Ashland City and 3 miles off TN Hwy 49 on Old Lock A Rd.

Description: Johnson Creek encompasses 7 acres of moderately steep topography in a large embayment. Improvements include a single lane boat ramp, courtesy dock, chemical restroom, 6 picnic sites, one bench, and a parking area with 10 car/trailer spaces and 5 car spaces.

Area Use: Area receives moderate use during peak recreation season boaters and day users. The launching ramp is divided from the parking and picnicking area by Old Lock A Rd. Future development will be limited by the area's steep topography. During fall and winter, the area has moderate usage from fishermen and waterfowl hunters.

Site-Specific Objectives:

- Provide day use opportunities
- Provide lake access for fishing and boating

Development Needs:

- Additional picnic sites

#### **5-02.A.5 Lock A Campground, Site No. 104**

Management Agency: USACE

Land Classification: High Density Recreation

Rationale: Lock A is a highly developed campground and recreation area with significant recreation improvements that support a land classification of High Density Recreation.

Location: Lock A is located in Cheatham County approximately 3 miles off TN Hwy 12 via Cheatham Dam Rd., Ashland City, TN. Lock A is located on the right bank of the Cumberland River at mile



150.5. This old lock reservation was converted to a camping area and is perennially one of the most popular recreation areas on Cheatham Lake.

Description: Lock A is a 28 acre camping area adjacent to the shoreline on low lying lands. Scattered tree cover includes pecans, oaks, hickories, sweetgum, hackberry, red cedar and maple. Wildlife in the area includes White-tailed deer, raccoons, skunks, opossums, Canada geese and numerous song birds. Bald eagles and osprey are also common sites.

The campground improvements include a sanitary dump station, 45 campsites with water and 50 amp electric hookups, 2 park attendant sites, a restroom with showers, playground equipment, a fee booth, a multipurpose game court, a single lane boat ramp, 2 courtesy docks, laundry facilities, group picnic shelter, amphitheater, 7 benches, and 2 parking lots with 15 car spaces and 17 car/trailer spaces. Lock A has a short trail on site that provides access to an overlook and the historic site of the old lockmaster living quarters. The Cumberland River Bicentennial Trail passes through the campground providing campers to over 8 miles of walking and biking trail.

Area Use: Lock A campground is extremely popular, particularly among local residents living within 25 miles of the site. The area has heavy usage throughout the recreation season with an occupancy rate of nearly 61%. Approximately 52% of users utilize either the Golden Age/Access or the America the Beautiful Pass. The campground is typically full most weekends during the summer season.

Site-Specific Objectives:

- Provide camping opportunities
- Provide water access for boating and fishing
- Provide opportunity for pedestrian and bicycle trail network

Development Needs:

- Concrete remainder of campsites
- Construct additional volunteer campsites
- Improve/Expand Trail
- Install Wifi
- Make drainage improvements
- Resurface and cover uphill sports court

Special Considerations: Lack of available fee property is a limiting factor for future development at this campground.



**Figure 5.2 – Lock A Campground**

### **5-02.A.6 Pardue Recreation Area, Site No. 105**

Management Agency: USACE

Land Classification: High Density Recreation

Rationale: This area supports the High Density Recreation classification because of the existing recreational development and aesthetic qualities.

Location: Pardue Recreation Area is located in Dickson County approximately 5 miles west of Ashland City and 1.5 miles off TN Hwy 49, at the mouth of the Harpeth River.

Description: This 4 acre area is mainly open with a mix of hardwood trees. Dominate tree species include oaks, hickories, and hackberry. The topography is relatively flat. Wildlife including squirrels, cottontails, raccoons, herons and skunks inhabit the area. Various migratory waterfowl species, neotropical songbirds, ospreys, and bald eagles can also be seen passing through the area.

Amenities in the area include a boat ramp with courtesy dock, playground equipment, 9 picnic sites, 2 pit toilets, 6 benches, and 2 parking lots with 40 car/trailer spaces. This area also has a concrete sidewalk parallel to the shoreline that is popular among bank fishermen.

Area Use: This area experiences moderate to heavy visitation during the spring and summer recreation season from boaters and day users. During fall and winter, the boat ramp has moderate usage from fishermen and waterfowl hunters.

Site-Specific Objectives:

- Provide lake access for fishing and boating
- Provide recreation facilities for a quality recreation experience

Development Needs:

- Install additional picnic facilities
- Provide waterborne restroom



**Figure 5.3 Pardue Recreation Area**

**5-02.A.7 Harpeth River Bridge Campground, Site No. 107**

Management Agency: USACE

Land Classification: High Density Recreation

Rationale: This area supports the High Density Recreation classification because of the extensive recreational development and heavy visitation.

Location: Harpeth River Bridge Campground is located on Hwy 49, approximately 5 miles west of Ashland City. It is nestled along the banks of the scenic Harpeth River approximately two miles upstream from its confluence with the Cumberland River.

Description: This 25 acre waterfront area features gentle sloping topography near Highway 49 with low lying flat lands adjacent to the river channel. The area has a typical “park” characteristic with scattered trees and no understory. Dominate species include oak, hickory, maple, hackberry and elm. Common wildlife in the area includes squirrels, Whitetail deer Canada geese, songbirds, herons and other wading birds. Approximately 25 of the 54 acres are located west of Hwy 49. These areas are currently undeveloped and consist of fields of Native Warm Season Grasses with a thin riparian zone of dense undergrowth along the river.

The area features a group picnic shelter, 14 concrete campsites, a park attendant campsite, a playground, waterborne restroom and shower facility, sanitary dump station, boat ramp, courtesy dock, 5 benches, and 2 parking lots with 9 car spaces and 16 car/trailer spaces.

Area Usage: With an average occupancy rate of 78%, Harpeth River Bridge is the most heavily used campground on Cheatham Lake with June, July and October being the busiest months. A majority of the users (61%) utilize either the Golden Age/Access or the America the Beautiful Pass. The boat ramp also receives light use from non-camping day users. This area is only open to pedestrian traffic during the off season. The boat ramp and group picnic shelter also receives light use from non-camping day users.

Site-Specific Objectives:

- Provide lake access for fishing and boating
- Provide facilities for quality recreational opportunities
- Improve tourism for local community

Development Needs:

- Provide additional campsites
- Install volleyball court



**Figure 5.4 Harpeth River Bridge Campground**

#### **5-02.A.8 Sycamore Creek Recreation Area, Site No. 108**

Management Agency: USACE

Land Classification: High Density Recreation

Rationale: Developed facilities and heavy use of the area supports the High Density Recreation classification.

Location: Sycamore Creek Recreation Area is located on Chapmansboro Rd. approximately 4 miles from Ashland City, TN. This area is adjacent to Sycamore Creek, one half mile from it's confluence with the Cumberland River.

Description: This 17 acre, water front area features a low lying picnic area and parking lot with a gentle slope to the water's edge. Four acres of the area are developed and have a typical "park" characteristic with scattered trees and minimal understory. Facilities in this portion of the park include a single lane boat ramp, courtesy dock, 10 picnic sites, 2 group picnic shelters, a playground, waterborne restroom facility, 2 benches, and 2 parking lots with 40 car spaces and 45 car/trailer.

The remaining acreage in this area is mostly undeveloped, forested land separated from the developed park by a shallow drainage creek. About two acres of this area have been cleared of undergrowth to accommodate bank fishing and future development.

Area Usage: This area is extremely popular with boaters, paddlers and day users. Parking for boaters routinely exceeds carrying capacity on weekends throughout the summer. During the fall and winter, the area receives moderate use from fishermen and day users.

Site-Specific Objectives:

- Provide day use opportunities
- Provide fishing and boating access to the lake

Development Needs:

- Develop parking, a trail and picnic sites on the forested portion of the park.

**5-02.A.9 Bluff Creek Recreation Area, Site No. 109**

Management Agency: USACE

Land Classification: High Density Recreation

Rationale: This area supports the High Density Recreation classification because of the recreational development and moderate visitation.

Location: Bluff Creek is located approximately 2 miles west of Ashland City, TN on State Hwy 49. The boat ramp is one half mile from the main channel of the Cumberland River.

Description: This 6 acre day use area features flat topography with a gentle slope to the water's edge. A riparian zone around the lake consists mainly of mature maple, ash, sweetgum, and elm trees with minimal understory. Common wildlife to the area includes raccoons, squirrels, skunks, Canada geese and songbirds.

The day use area has a total of 5 picnic sites, an accessible fishing sidewalk, chemical restroom, single lane boat ramp, courtesy dock, 2 benches, and a parking lot with 5 car spaces and 20 car/trailer spaces. Due to minimal availability of land at this location, expansion of recreation facilities outside the existing footprint of the area will be limited

Area Usage: This area experiences moderate to heavy visitation during the spring and summer recreation season from boaters and day users. During fall and winter, the boat ramp has moderate usage from fishermen and waterfowl hunters.

Site-Specific Objectives:

- Provide lake access for fishing and boating
- Provide facilities for quality recreational opportunities
- Improve tourism for local community

Development Needs:

- Improve entrance to the area

**5-02.A.10 Riverbluff Park, Site No. 110**

Management Agency: Town of Ashland City

Land Classification: High Density Recreation

Rationale: This area supports the High Density Recreation classification because of the extensive recreational development and high visitation.

Location: River Bluff Park is located near the intersection of TN Hwy 49 and the TN Waltz Parkway in Ashland City, TN.

Description: This 38 acre recreation area features flat topography and has development on both Corps property (18 acres) and City property (20 acres). The area is mostly manicured lawn with wooded riparian areas along the surrounding tributaries. The dominate tree species include maple, elm, hackberry and sweetgum. Canada geese, squirrels, and songbirds can be seen using the area.

Area improvements include a group picnic shelter, picnic sites, playground, waterborne restroom, farmers market, athletic fields, a two lane boat ramp, courtesy dock and parking lots. The area is typically serviced with a portable chemical toilet during the winter months.

Area Usage: This area experiences moderate to heavy visitation during the spring and summer recreation season from boaters, bank fisherman and day users. This is also a popular area for walking/exercise and sightseeing. During fall and winter, the area has moderate usage from fishermen and waterfowl hunters.

Site-Specific Objectives:

- Provide day use recreation opportunities
- Provide lake access for boating, fishing and hunting
- Improve tourism for the local community

Development Needs:

- Based on the City's development plan

**5-02.A.11      Brush Creek Recreation Area, Site No. 111**

Management Agency: USACE

Land Classification: High Density Recreation

Rationale: This area supports the High Density Recreation classification because of the extensive recreational development and high visitation.

Location: Brush Creek Recreation Area is located on River Road approximately 4 miles from the courthouse in Ashland City, TN.

Description: Approximately 6 acres of this 9 acre site are developed for intensive recreation. The remaining 3 acres are heavily wooded with no developed recreational facilities. The topography is relatively flat and is bordered Brush Creek. The developed portion of the area has a typical "park" setting with scattered trees, minimal understory and grass ground cover. Common tree species include elm, maple, hackberry, sweetgum and various oak species. Common wildlife to the area includes squirrels, raccoons and various songbirds.

This area features recreational facilities including a waterborne restroom, a group picnic shelter, playground equipment, 2 picnic sites, a fishing pier, bank fishing trail, a single lane boat ramp, a courtesy dock, 5 benches, and 2 parking lots with 33 car spaces and 20 car/trailer spaces.

Area Usage: Due to its easily accessible location, this area experiences heavy visitation during the recreation season and moderate use by fishermen during the off season. Some areas experience occasional flooding at upper operational pool levels.

Site-Specific Objectives:

- Provide day use recreation opportunities
- Provide lake access for boating, fishing and hunting

Development Needs:

- Additional picnic sites
- Add fill to parking areas prone to inundation



Special Considerations: Lack of available fee property is a limiting factor for future development at this recreation area.



**Figure 5.5 Brush Creek Recreation Area**

#### **5-02.A.12 Bull Run Recreation Area, Site No. 114**

Management Agency: Town of Ashland City

Land Classification: High Density Recreation

Rationale: This area supports the High Density Recreation classification because of the extensive recreational development and visitation.

Location: Bull Run is located on TN Hwy 12 South approximately 6 miles from the courthouse in Ashland City, TN.

Description: Of the 63 total acres, approximately 4 acres have been developed for day use recreation. During the 2004 REAL Program the area was permanently closed. The park was leased to the Town of Ashland City in 2009 and re-opened for public use.

Much of the area is forested with mature oak and hickory species. The topography consists of upland forest to low lying, gently sloping bottomlands. Abundant wildlife including White-tailed

deer, wild turkey, squirrels, raccoons, opossums and multiple songbirds can be seen using the area.

Area Usage: This area experiences moderate to heavy visitation during the spring and summer recreation season from bank fisherman, paddlers and day users.

Site-Specific Objectives:

- Provide day use recreation facilities
- Provide lake access for boating and fishing

Development Needs:

- Based on the County's development plan.

**5-02.A.13 Lock 2 Park, Site No. 119**

Management Agency: Metropolitan Government of Nashville and Davidson County

Land Classification: High Density Recreation

Rationale: This area supports the High Density Recreation classification because of the recreational development and high visitation.

Location: Lock 2 Park is located on Lock 2 Road in the Pennington Bend Community in Nashville, TN. The area is conveniently accessed from the Music Valley Drive exit of Briley Parkway.

Description: Lock 2 Park consists of 13 acres of developed park space leased to Metro Parks Department. The area is relatively flat and is maintained in a "park" setting with sparsely scattered oak, maple, sweetgum and hackberry trees spread through a grassy area. The area has three historic buildings from the original lock reservation including the lockmasters residence. Common wildlife to the area includes White-tailed deer, wild turkey, raccoons, squirrels, opossums, skunks, beavers, Canada geese and other migratory waterfowl as well as numerous songbirds and raptors.

Recreation improvements include a playground, picnic sites, a 1-lane boat ramp, and parking lots.

Area Usage: This area receives moderate to heavy visitation. Much of the use comes from the nearby residential development and boaters.

Site-Specific Objectives:

- Provide day use recreation opportunities
- Provide lake access for boating, fishing and hunting

- Maintain historic structures

Development Needs:

- Based on the City's development plan

Special Considerations: The Lockmaster's house is eligible for listing on the National Register of Historic Properties. Any proposed alterations to the lockmaster's house or other structures will need to be coordinated with the Tennessee State Historical Preservation Officer.

### **5-02.A.14 Riverfront Park, Site No. 531**

Management Agency: Metropolitan Government of Nashville and Davidson County

Land Classification: High Density Recreation

Rationale: This area supports the High Density Recreation classification because of the extensive recreational development and high visitation.

Location: Riverfront Park is located in downtown Nashville at Broadway and 1<sup>st</sup> Avenue.

Description: Riverfront Park consists of 5 acres of fee land, and many additional acres of flowage easement along both banks of the river along downtown Nashville. New additions to the park and were constructed in 2014 under a cost share agreement between USACE and the Metropolitan Government of Nashville and Davidson County (Metro).

Area Usage: This area is heavily used by pedestrians and tourists to Nashville who are looking for scenic vistas of the Cumberland River and a quiet retreat from the hustle and bustle of Lower Broadway. The park hosts several events throughout the year and the terraced lawn makes the park an excellent venue for small concerts and music festivals, or to enjoy a picnic lunch on nice afternoons. There is a large courtesy dock located adjacent to the park where transient boaters can rent overnight space for their vessels while visiting Nashville. The Regional Transit Authority operates a station onsite for the Music City Star regional commuter train.

Site-Specific Objectives:

- Provide day use recreation opportunities
- Provide lake access for boating, fishing and scenic viewing

Development Needs:

- Based on the City’s development plan

### 5-02.B Access Areas

There are three water access areas on Cheatham Lake that are classified as High Density Recreation. The specific objective for these areas is to provide lake access for boating, fishing, hunting, sightseeing and other outdoor activities. Table 5.1 provides a summary of these areas including site #, managing agency, acreage and development needs. All areas include a parking area (gravel or paved) and a concrete boat ramp. Basic services include periodic mowing and trash/litter pickup. Typically these areas experience high visitation during the peak recreation season and additional parking and launching lanes are needed at some areas. However, limited space and difficult topography could make expansion costly and challenging.

**Table 5.1 - Access Areas**

Site #	Site Name	Managing Agency	Area (Acres)	Development Needs
113	Sam’s Creek Boat Ramp	Cheatham County, TN	0.5	Based on County’s development plan
231	Cleeces Ferry Left Bank	USACE	10	No proposed development
232	Cleeces Ferry Right Bank	USACE	1.5	Add picnic sites

### 5-02.C Commercial Concession Marinas and Resorts

These sites are leased to and operated by private businesses to provide visitors with additional services not offered at Corps of Engineers Recreation Areas. Typically these areas will stimulate the local economy by improving local tourism. The services may include slip rentals, on-water fuel docks, restaurant/snack bar, and boat rentals.

### **5-02.C.1 Riverview Marina and Restaurant, Site No. 302**

Riverview Marina and Restaurant is located at Cumberland River Mile 158.1 immediately across the river from Riverbluff Park in Ashland City, Tennessee. Improvements on the approximately one acre of Corps leased to the marina include a floating dock, boat ramp, and roadway. Riverview provides fuel service and transient dock space to recreational vessels. The restaurant and campground facilities are located on private property.

### **5-02.C.2 Dozier's Boat Dock**

This narrow one half acre parcel of Corps property is located near the confluence of the Harpeth and Cumberland Rivers in Charlotte, Tennessee and was previously licensed to Dozier's Boat Dock and Restaurant. Improvements to the Corps property and water include two floating docks and access steps. Mr. Dozier's restaurant located on the adjacent property was inundated during record flooding in 2010 and hasn't reopened. Mr. Dozier still operates a seasonal campground on the adjacent private property.

## **5-03 Environmentally Sensitive Areas**

The following sites, totaling 96 acres, has been identified to contain unique ecological, cultural or aesthetic features that justify an Environmentally Sensitive Area land classification. However, unless specifically prohibited, low impact recreational activities such as hiking, wildlife viewing and hunting will be permitted within this Environmentally Sensitive Areas.

### **5-03.A Old Citadel, Site No. 650**

The 26 acre Old Citadel site sits at the confluence of the Cumberland and Harpeth Rivers atop a narrow 200 foot bluff. The site, also commonly referred to as Indian Town Bluff, contains evidence of Mississippian, Woodland and Archaic time period occupation by Native American tribes. Early site archaeologists described it as part of a larger village site that extends across the Harpeth River. The Old Citadel site was listed on the National Register of Historical Places in 1974. Section 110 of the NHPA guides the management of the property. Title 36 Code of Federal Regulations part 372.14(a) specifically addresses destruction, removal or any alteration to public property including archaeological and historical resources. In addition, the protections of the Archaeological Resources Protect Act (ARPA) apply. Unauthorized excavation at the site is strictly prohibited. Furthermore, ARPA penalties for such actions include a felony conviction with up to one year in jail and \$10,000 fine for the first offense.

### **5-03.B Islands of the Harpeth, Site No. 651**

There are 71 acres of islands on the Harpeth River that have been designated as environmentally sensitive. Although many of these islands are licensed TWRA for wildlife management, they have been classified as environmentally sensitive to provide additional protection for these unique resources. Islands typically have environmentally valuable characteristics resulting from mainland isolation, varying slope aspects, unique aesthetics and distinct habitat types. The islands also provide valuable fish habitat for spawning, feeding and shelter.

Many of the islands on Cheatham Lake are classified as forested/shrub wetland and provide nesting and roosting habitat for a variety of avian species including osprey, black-crowned night heron, great egret, cattle egret and Canada geese.

### **5-03.C Short's Bladderpod Unit 5, Site No. 652**

Unit 5 is classified as an environmentally sensitive area because it has been identified by the US Fish and Wildlife Service as critical habitat for Short's Bladderpod. This unit is located approximately 3.4 miles west of the city limits of the town of Ashland City, on a hillside and bluffs on the left descending bank of the Harpeth River that begin approximately 0.27 miles east of the Montgomery Bell Bridge, where SR-49 crosses the river and bisects the unit, and parallels the river in an upstream direction for approximately 1.1 miles. The portion of this USFWS unit on Corps of Engineers managed land is about 22.44 acres. The features essential to the conservation of the species in this unit may require special management considerations or protection to address threats related to erosion or prolonged inundation due to water level manipulation; changes in land use, including residential or commercial construction, which could cause removal of forest vegetation or soils or soil loss due to erosion; and shading or competition due to encroachment of native and invasive, nonnative plants.

### **5-03.D Short's Bladderpod Unit 6, Site No. 653**

Unit 6 is classified as an environmentally sensitive area because it has been identified by the US Fish and Wildlife Service as critical habitat for Short's Bladderpod. This area is located approximately 3.1 miles west of the city limits of the town of Ashland City, on the west slope of a hillside and associated bluffs that begin on the point of land formed by the confluence of Cumberland and Harpeth rivers and extend upstream along the right descending bank of the Harpeth River, reaching the unit's southernmost boundary approximately 0.6 km (0.4 mi) east of SR-49, where it crosses the Harpeth River. The portion of this USFWS unit on Corps of Engineers managed land is about 42.91 acres. The features essential to the conservation of the species in this unit may require special management considerations or protection to address threats related to erosion or prolonged inundation due to water level manipulation; changes in land use, including residential or

commercial construction, which could cause removal of forest vegetation or soils or soil loss due to erosion; and shading or competition due to encroachment of native and invasive, nonnative plants.

### **5-03.E Short's Bladderpod Unit 7, Site No. 654**

Unit 7 is classified as an environmentally sensitive area because it has been identified by the US Fish and Wildlife Service as critical habitat for Short's Bladderpod. This unit is located along the southwest city limit of the town of Ashland City, on hillsides and bluffs that begin approximately 0.26 km (0.16 mi) east of the confluence of Marrowbone Creek and the Cumberland River and extends upstream on the right descending bank of the Cumberland River for approximately 1.4 miles. Here, the unit continues in a southeasterly direction for approximately 0.5 miles from the point where the river veers away from the hillside and bluffs. The portion of this USFWS unit on Corps of Engineers managed land is about 7.43 acres. The features essential to the conservation of the species in this unit may require special management considerations or protection to address threats related to erosion or prolonged inundation due to water level manipulation; changes in land use, including residential or commercial construction, which could cause removal of forest vegetation or soils or soil loss due to erosion; potential right-of-way construction or maintenance using herbicides or mechanized equipment along the Nashville and Western Railroad, which traverses the unit; and shading or competition due to encroachment of native and invasive, nonnative plants.

## **5-04 Multiple Resource Management Lands**

Lands in this classification will have a predominate sub-classification with the understanding that other compatible uses may also occur on these lands. These sub-classifications - Low Density Recreation, Wildlife Management, Vegetative Management and Future/Inactive Recreation Areas - are further described below.

### **5-04.A Low Density Recreation**

These are lands with minimal development that support passive recreational use. There are 42 acres classified as Low Density Recreation on Cheatham Lake. These areas are managed primarily to meet the recreational and natural resource management objectives identified in Chapter 3. Specific areas are referenced below.

#### **5-04.A.1 Tennessee State University Trail, Site No. 206**

Management Agency: USACE

Land Classification: Low Density Recreation

Rationale: This area supports the Low Density Recreation classification due to the limited development and passive recreational use.

Location: The Tennessee State University (TSU) Trail is located off of River Road Pike near the Cheatham County and Davidson County line, and is immediately adjacent to Sam's Creek and the TSU Agriculture Research Station. The area is about 42 acres.

Description: In 2004, a Challenge Partnership Agreement was signed between TSU, TWRA and USACE to construct an interpretive trail on federal property. A grant was acquired for \$22,704.00 from USACE Headquarters to complete the construction of the trail that extends almost  $\frac{3}{4}$  mile long.

The area consists of river bottomland with silver maple, red maple, pignut hickory, and box elder. The Substrate is dominated by soft silts in excess of 1 inch with low dissolved oxygen levels. Crusher rock and fine stone dust (chat) was used to create a 50 foot by 60 foot gravel parking lot and as a base for the interpretive trail. A guardrail was erected to delineate the parking area and prevent unauthorized off road traffic. Labor was provided by volunteers and employees from TSU, TWRA, and USACE.

The TSU Interpretive Trail meanders through native grasslands, local wildflowers, and a forested area that ends at a viewing platform overlooking a wetland. Along the trail, viewers are likely to see a variety of songbirds, deer and eastern wild turkey. At the wetland viewing area, visitors have an opportunity to view turtles, fish, and other aquatic wildlife.

Area Use: The TSU trail receives low to moderate visitation. Much of the use comes from local citizens seeking aerobic activity in a serene environment.

Site Specific Objectives:

- Provide day use walking trail
- Maintain wildlife viewing areas

Development Needs:

- No development needs at this time



## **5-04.B Wildlife Management**

Cheatham Lake Wildlife Management Area (WMA) consists of five units of land that are licensed to TWRA for fish and wildlife activities. These lands, approximately 2,379 acres, are designated for the management of wildlife and fisheries resources to meet the natural resource management objectives. The primary goal for these lands is to coordinate with state and federal agencies to actively manage and protect fish and wildlife populations and habitats and to provide recreational hunting and fishing opportunities. Wildlife management on Cheatham Lake is conducted primarily by the Tennessee Wildlife Resources Agency (TWRA). TWRA is licensed full management privileges on 2,815 acres at the following sites: Pardue Pond Wildlife Refuge (Site 601), Dyson's Ditch WMA (Site 602), Johnson Creek WMA (Site 603), Hudgens Slough WMA (Site 604), and Marrowbone Creek WMA (Site 605).

Most of these areas consist of open bottomlands with pockets of forested habitat and a dense riparian area adjacent to streambanks. The majority of the areas are farmed in row crops by TWRA's contract sharecropper who leave a percentage of unharvested crops for wildlife use.

The area is also managed to provide users with quality hunting, fishing, and other outdoor recreation experiences. A total of 40 waterfowl hunting blind sites are scattered among these areas and are permitted by TWRA through an annual drawing held on the first Saturday in August. Wildlife viewing enthusiasts can also enjoy the abundant wildlife in the area, including white-tailed deer, turkey, bobcat, coyote, fox, river otter, beaver and raccoon.

## **5-04.C Vegetative Management**

Encompassing 1,475 acres, Vegetative Management is the largest sub-classification of Multiple Resource Management Lands on Cheatham Lake. Land in this sub-classification typically consists of a thin strip of land adjacent to private property in or near a residential development. The shoreline in these areas is generally allocated as "Limited Development" in the Cheatham Lake SMP. The SMP provides detailed guidance concerning specific uses of these lands with the goal of balancing private exclusive uses of public land with the protection and restoration of the lake's natural resources. In these "Limited Development" areas, permits may be issued to authorize the construction of private boat docks, as well as limited vegetation modification or agricultural leases. The primary resource objective for these lands is natural resource management with a goal to maintain the natural qualities and appropriate vegetative cover on the shoreline as a buffer between the lake and private developments. These buffers enhance aesthetic qualities of the environment and protect the natural character of the project's resources. Management activities included in this sub-classification include boundary maintenance, native tree plantings and tree

density requirements, shoreline erosion control, invasive plant removal and public education concerning the protection of shoreline buffer zones.

## **5-05 Water Surface**

Water surface area designations are described earlier in Section 4-02.F. Coordination will be made with the TWRA prior to establishing any “No-Wake” zones. The main navigation channel is maintained by the United States Coast Guard under the U.S. Aids to Navigation Western Rivers System.

## **5-06 Project Easement Lands**

### **5-06.A Flowage Easement**

The 1,208 acres of flowage easement on Cheatham Lake were purchased in Davidson and Dickson Counties to give the Corps of Engineers the right to inundate these lands during flood risk management operations to provide adequate areas for flood waters. The flowage easement on Cheatham Lake varies in elevation depending on location. Typical management of flowage easement lands include surveillance and elevation marking to insure that landowners do not construct habitable structures or place fill material within the easement. All activities within the flowage easement must be evaluated to insure compliance with the Nashville District Cut and Fill Policy, December 2002.

## CHAPTER 6 - SPECIAL TOPICS/ISSUES/CONSIDERATIONS

### 6-01 Lake Levels

Cheatham Lake is a “run of the river” multi-purpose project distinguished from upstream projects on the Cumberland River by an absence of flood control storage capacity other than two to three feet for power generation and . Releases from upstream storage reservoirs contribute to the flows available for project uses and also result in a more sufficient and higher quality of water for domestic and industrial use, pollution control downstream, and conservation and recreation purposes.

Operation of the Cheatham pool in accordance with the plan for flood regulation may cause the headwater level to be drawn below elevation 385 msl at the start of a flood in order to provide additional storage capacity for reducing the flood crest. It is not expected that this drawdown will ever exceed one or two feet; however, the minimum permissible headwater level is elevation 382 msl and if necessary, the outflow shall be regulated to keep the pool from falling below this level.



Figure 6.1 Cheatham Lock



Figure 6.2 Ashland City Wal-Mart during the May 2010 Cumberland River Basin Flood

Although water level management is not affected by the Master Plan revision process, it is an interesting topic that has generated much discussion, especially since the unprecedented May 2010 Cumberland River Basin flood. Prior to this occurrence, the last time the Cumberland River reached flood stage at Nashville was in May 1984. During the 1984 event Nashville’s flood crest reached 45.26 feet (flood stage 40 feet) over an extended period of time. In May 2010, the Cumberland Basin experienced a 36 hour rainfall event that produced record flooding, causing two billion dollars in damages in Davidson, Cheatham, Dickson, and Montgomery counties. Although the Corps operated all flood risk management projects to reduce downstream flooding, the vast majority of the rainfall occurred in drainage areas uncontrolled by Corps flood risk management projects.

Because of this, historic crests were observed at Nashville, Clarksville, and Cheatham Lock and Dam. The Cumberland River flood crest at Clarksville was at 62.58 feet (flood stage 46 feet), and at Nashville at 51.86 feet (flood stage 40 feet). During this event the maximum pool of Cheatham Lake was record breaking 404.15 msl, 19.15 feet above normal. Due to these high levels, Cheatham Lock was overtopped and personnel were evacuated from the project by boat. Fortunately, the lock and dam design allows overtopping of the lock without threat of failure of the dam.

More information on this flood event can be found in the *May 2010 Flood Event Cumberland River Basin After Action Report*, <https://www.hsd.org/?view&did=21310>.

## **6-02 Bicentennial Trail**

Once a railroad bed that connected Nashville to Clarksville via Ashland City, the Cumberland River Bicentennial Trail is now a seven mile trail utilized for pedestrian and bicycle traffic only. One of the first “Rails to Trails” projects in the state of Tennessee, the trail officially opened to the public in March 1995. Originally planned to span the distance between Nashville and the Land Between the Lakes, the trail currently begins at Marks Creek on Chapmansboro Road (approximately 1.5 miles northwest of Ashland City) and ends at the entrance to the Right Bank Recreation Area on Cheatham Dam Road.

There are currently four trailheads: Marks Creek, Sycamore Creek, Eagle Pass, and Cheatham Dam. Marks Creek Trailhead provides parking for approximately 19 cars, a chemical restroom, informational display, picnic table, and a bench. Sycamore Creek Trailhead shares an entrance with the Dyson’s Ditch WMA, which includes a 40 car parking lot, picnic table, informational display, and chemical restroom. The trail is paved from Marks Creek to Sycamore Creek. The Eagle Pass Trailhead is located directly across the road from the Sycamore Creek Trailhead next to the Dyson Ditch Refuge. The remainder of the unpaved trail was added in 2000, and runs along the Dyson Ditch Refuge and Lock A Campground, ending at the Cheatham Dam Trailhead in the Right Bank Recreation Area. Restrooms, picnic tables, parking lots, and other amenities are located at the Right Bank Recreation Area, however a day use fee is required prior to entrance.

The trail meanders back and forth across Corps property, with approximately 4.5 miles on Corps Fee Lands. The remainder of the trail property is either leased or owned by the Town of Ashland City. The trail is primarily maintained by the city and the Friends of the Cumberland River Bicentennial Trail with annual cleanups and fundraisers. The Cheatham Dam Trailhead is also typically cleaned up during the Corps’ annual National Public Lands Day event.

The city additionally owns four miles near the Montgomery County line, however no timeline has been set for construction due to funding. Additional Corps property is leased to Ashland City for

the development of a greenway trail at River Bluff Park. It is the city's plan to eventually tie this greenway trail in with the Cumberland River Bicentennial Trail.

### **6-03 Tennessee State University Agriculture Station**

The 124-acre TSU Agriculture Research and Education Center (AREC) is located on the southeast side of the lake, about 5 miles from Ashland City. While the AREC isn't located on Corps property, the facility is surrounded by Corps lands managed as low density recreation and vegetative management. The presence of the AREC offers a unique opportunity to collaborate on projects that benefit both parties. The center is designed as a teaching and learning facility with applied research in agroforestry, agriculture, small ruminant management, vegetable and small fruit production, sustainable agriculture, organic production, pesticide storage and handling, post-harvest handling and environmental stewardship/water quality. (Tennessee State University, 2014)

### **6-04 Ashland City Expansion of Recreation Areas**

The Town of Ashland City has continued to be dedicated to the development of outdoor recreation over the past thirty years. This includes Corps outgranted areas such as Bull Run Recreation Area, and portions of Riverbluff Park, as well as an informal partnership to develop and maintain the Cumberland River Bicentennial Trail.

In the Cheatham Lake Master Plan 1983 Revision, Ashland City Park (site no. 181) was designated as a future recreation site. Since that time the park has been renamed River Bluff Park (site no. 110), and has been developed to include several amenities (See chapter 5-02.A.10). In 2008 a supplement was added to the city's lease for the addition of 6.7 acres for the installation, operation, and maintenance of a greenway trail that would connect the park to another city park, Poole Recreation Area. The ultimate goal of this greenway is to extend it the Mark's Creek Trail Head of the Cumberland River Bicentennial Trail. At the time of this revision the construction of the greenway trail has not been implemented. As of 2016 River Bluff Park consists of 15.4 acres of fee owned land and water and 1.10 acres of flowage easement.

In 2009 the Town of Ashland City acquired the use of additional Corps lands with the lease of Bull Run Recreation Area (Site no. 114). Originally operated by the Corps, the area was permanently closed during the 2004 Recreation Excellence at Army Lakes (REAL) Program. The city was granted a twenty year lease in 2009. Although a large parcel of land (57 total acres), only four acres are developed for recreation use (See chapter 5-02.A.12).

Ashland City also developed and maintains the seven mile Cumberland River Bicentennial Trail. Chapter 6-02 gives a comprehensive description of this trail and the city's involvement.

## **6-05 Downtown Nashville Waterfront Redevelopment**

In the 1780s, Nashville's first settlers came over by land and via river to settle along the Cumberland River. Those settlers built a two-acre fort around a freshwater spring on the river bluff and named it Fort Nashborough. In 1784, Davidson County is established and the settlement's name was changed from Nashborough to Nashville (Nashville Riverfront, 2010). Nashville Riverfront Park was created in the early 1980's along the river side of downtown Nashville to commemorate Nashville's river history.

In recent years, a revitalization effort has been put in motion to redevelop the riverfront areas along the Cumberland River in downtown Nashville. The plans include improvements on both sides of the river. The area on the west side, across from First Avenue along downtown Nashville is referred to as Riverfront Park. The stretch on the east side of the Cumberland River, along the stadium is referred to as Cumberland River Park. The parks stretch half a mile along the Cumberland River between river miles 190.6 and 191.1 on the right and left banks of Cheatham Lake.

In 2012, under Congressional Authorities of Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act, the Metropolitan Government of Nashville & Davidson County (Metro) Parks and Recreation received a Consent to Easement from the Corps of Engineers. The Consent to Easement granted Metro permission to make improvements on Riverfront Park that included: upgrading the existing City Wharf, docking facilities, pedestrian trails, overlooks, and removal of structures, bank stabilization, and the construction of a new boardwalk. The project encompasses exclusively public land held by Metro, its agencies, and the United States Army Corps of Engineers.

Between the two sides of the river, Nashville's Riverfront Parks consist of park space that incorporates gardens, gathering areas, and lawns for events and other activities. The park has over a mile of paths, a 13,000 square-foot dog park, 18,000 square foot ornamental garden, 45 foot tall public art sculpture, restrooms and concessions, public Wi-Fi in selected areas, and a 1.5 acre event lawn. Activities in the park include: two custom ping pong tables, nine custom swings, two half-court basketball courts, game boards for chess and checkers, and active workout area including 11-station fitness circuit courts. Riverfront Park can seat 6,800 in their new Ascend Amphitheater. Seating includes 100 premium box seats, 2,200 temporary fixed seats, and 4,500 lawn capacity. The Ascend Amphitheater provides a kitchen and dining facilities for the crew and a 5,000 square-foot artist wing.

Riverfront Park has incorporated in its design to be aesthetically pleasing, energy efficient, and environmentally friendly. The Riverfront West amphitheater has received the Leadership in Energy and Environmental Design (LEED) Gold Certification. Some of the sustainability highlights include: 400,000 gallon rain harvesting tank, geothermal heating and cooling system, 1,350 square feet of solar panels on the roof, 9,000 square feet of permeable paving, and 267 trees representing over 38 different species. (Nashville.gov, 2015)

## **6-06 Partnerships**

Increasing demands on Corps resources and facilities paired with declining recreation program budgets makes partnerships essential to our ability to provide safe and healthy recreation experiences. These may include outgranting selected recreation areas, partnering with local governments or organizations to construct additional facilities and utilizing volunteers to perform various jobs including park attendants and routine maintenance. Recent challenge partnerships with local governments have resulted in the construction of an amphitheater and courtesy dock. On average 132 volunteers provide 2,405 hours of service valued at \$46,000 per year at Cheatham Lake. In FY 16, volunteers provided 2,489 hours of service valued at \$59,000. Future partnership and volunteer opportunities will be pursued in accordance with the USACE Recreation Strategic Plan.

## **6-07 Federal Funding**

A significant change since the original Master Plan and subsequent updates which has significantly affected the Corps/outgrantee relationships and potential for future recreational development is the federal funding environment. Initially, many of the recreation areas designated in earlier Master Plans were, at least in part, developed by the Corps. Many access roads, parking lots, launching ramps, restrooms, and other support facilities were constructed or improved by the Corps at full federal expense in order to attract new concessionaires to meet public recreation demands. Later, provisions of Public Law 89-72 required cost-sharing partners to develop further recreational improvements. Under both scenarios, after an operator was selected through open competition and developed the site for full public use, the Corps continued to maintain the federally constructed portion of the site, including re-paving of parking lots and access roads within its boundaries. Parking and launching was free to the using public. Due to funding constraints over the recent decades, the Corps was unable to continue this service. Concessionaires were encouraged to assume maintenance responsibilities in exchange for authority to charge reasonable fees for public launching to recoup some of their costs. In addition, concessionaires were authorized, upon meeting qualification requirements, to charge for “managed parking.”

Due to the aforementioned federal funding regime, unless the Corps itself proposes to develop an area, potential applicants will be responsible for completing a full market analysis and feasibility study as well as funding required environmental and cultural studies. At this time, the Corps has no plans to independently or jointly develop “new” public recreation areas. A critical point to emphasize in this update is that, while economic development and resulting positive impacts to the local and regional economy are definite factors in evaluating proposals for recreation development, the primary consideration is the public need for, and public benefits to be achieved by, the proposal. At times, residential subdivision or commercial developers have requested to construct launching ramps or marinas to service their adjacent developments. The Corps does not authorize recreational access or other development activities for the primary purpose of enhancing the value of adjacent private developments.

## **6-08 Shoreline Management Plan**

The Shoreline Management Plan (SMP) is an appendix to the Cheatham Lake Operational Management Plan. The SMP provides policies and guidelines to balance private shoreline uses with the protection and restoration of the natural environmental conditions of Cheatham Lake. This plan can be viewed at <http://www.lrn.usace.army.mil/Locations/Lakes/Cheatham-Lake/Shoreline-Management/>.

## **6-09 Water Safety**

With over 250 million annual visits, the Corps is one of the largest federal provider of outdoor recreation. Since a large majority of these visitors engage in water related activities, water safety education is top priority. Nationwide, the Corps participated with other agencies concerned with water safety as far back as the early 1950's. The Corps in the Nashville District started an organization in 1951 that became the National Water Safety Congress. In the mid-1970's, the Chief of Engineers issued the first official directive for the Corps to amplify its water safety educational efforts after nearly 500 lives were lost at Corps lakes in a single year. In 1986, the Corps National Water Safety Program was started with a mission is to increase public awareness of boating and water safety through educational materials and products.

With public safety as a primary concern, Cheatham Lake implements the water safety program at the project level to reduce public accidents and fatalities through education, publicity, patrols on land and water and teamwork with partners. Education is provided through information in recreation areas, bulletin boards, posters, signs, banners, and brochures. The water safety promotional materials provided by the [HQUSACE Water Safety Committee](#) are used extensively to leave a lasting impression. Web pages (like the [National Water Safety Congress](#) and the [National](#)



[Safe Boating Council](#)), fishing reports, and exhibits in the Visitor Center provide educational information. The Cheatham Lake staff routinely conducts water safety programs for schools, summer camps and various civic groups.

Publicity is provided through participation in special events such as boat shows, State Fairs, local festivals and parades, shoreline cleanups, and National Public Lands Day. News releases are issued through radio, TV and print media. Social media is also heavily utilized to disseminate the water safety message. The Cheatham Lake staff also participates in the Nashville District Water Safety Task Force to review ways to promote water safety, share information and develop strategies for reducing public accidents and fatalities at Nashville District lakes, locks and dams.

## **6-10 Tree Vandalism**

Tree vandalism is the unauthorized removal of woody vegetation from public property. More specifically, the cutting of trees or the damage or removal of any vegetation for any purpose, including the creation of lake views, pruning, landscaping, mowing or under brushing, is a federal crime punishable under the provisions of Title 36 Code of Federal Regulations, Part 327.14.

Minimal fee land holdings and continued residential development adjacent to Cheatham Lake has resulted in increased numbers of these cases. Tree vandalism can damage or destroy necessary vegetative buffer zones resulting in the loss of habitat, increased erosion, reduced water quality and degraded view shed aesthetics. In the past, the Corps has worked closely with violators to restore the areas and/or collect monetary value of damages to protect the natural resources of the lake. However, prevention of tree vandalisms is the Corps' primary objective.

In addition to fines and/or restoration, shoreline permits for future use of the property may be suspended or revoked until the area is adequately restored. This is meant to deter potential violators from assuming they can simply pay a fine to clear the vegetation from the lakeshore. Further information concerning the destruction of vegetation and permit revocation can be found in the Cheatham Lake Shoreline Management Plan referenced in Paragraph 25 (e).

Anyone who observes or has knowledge of theft, vandalism, or any other threat or suspicious activity against Corps property is also encouraged to participate in the "Corps Watch" program, which is a nationwide crime-watch program developed to protect public property managed by the Corps of Engineers. Each year, millions of your tax dollars are lost due to property damage from vandalism, larceny, arson, and environmental and cultural resource degradation. This program is designed to heighten public awareness of the impacts of crime within or around dams, lakes, locks, recreation areas, and other Corps of Engineers property and facilities.

## 6-11 Cultural Resource Vandalism

Archaeological sites are present throughout the Cheatham Lake area. Collecting artifacts and illegal excavation of sites is prohibited under Title 36 Code of Federal Regulations, Part 327.14 (Title 36) and the Archaeological Resources Protection Act (ARPA). In addition, the Archaeological Resources Protection Act also extends to historic resources over 100 years old, which includes buildings and structures. Archaeological sites, historic buildings, and historic structures are non-renewable resources. Once the resource is damaged and destroyed, information about the resource is lost forever. As the stewards of these resources, the Corps is responsible for protecting and managing cultural resources for future generations.

The value of archaeological sites derives from the data and the context. The relationship of artifacts to one another spatially within a site provides insight into past cultures. When artifacts are removed from those contexts through uncontrolled excavation, the context is lost and little meaning can be assigned to the artifacts. Moreover, looters tend to be interested in specific complete artifacts such as projectile points, pots, or items of personal adornment. In the search for artifacts that may be salable on the black market, looters frequently destroy middens, which may be rich with information relating to diet (such as charred seeds and bones), pot holes, which reveal information on houses, families, and structures, burials, and other data rich features. Metal detecting is equally disruptive, because digging the metal object from the ground destroys the context and removes the object from the site. In turn, any future investigations of the site would be missing important pieces of information that lead to reliable interpretations about the past.

Looting is an illegal, unethical, and selfish act that leads to the loss of public resource and incurs public expense. Looting is punishable under Title 36 and ARPA. Under ARPA, looting is a felony and a first offense may result in fines up to \$100,000 and one year in prison. A second offense may result in a maximum fine of \$500,000 and five years in jail. Alternatively, illegal looting activities may be prosecuted under Title 36. In addition to the expenses incurred relating to the prosecution, the Corps must act to inventory the site damage, stabilize damage sites to prevent further natural erosion and curate artifacts in perpetuity.

Citizens providing tips leading to the arrest and prosecution of offenders may be rewarded up to \$1,000. The Archaeological Resources Protection Act, Section 205 of the Water Resources Development Act of 2000, and the Economy Act (31 U.S.C. 1535) authorize such awards. The "Corps Watch" toll free hotline at 1-866-413-7970 is available 24-hour-a-day to report theft, vandalism or any threat or suspicious activity against Corps property. Caller identity is protected and the proper authorities are notified.

Legitimate excavations of archaeological sites are permissible by obtaining an Archaeological Resources Protection Act Permit. An ARPA permit application requires a research design, field

methodology, curation agreement and supervision by an archaeologist that meets the Secretary of Interior's qualifications for professional archaeologists (36 CFR part 61). Pursuant to Corps regulations, ARPA permit applications are minimally reviewed by the Resource Manager's office, Real Estate Branch and Cultural Resource Management staff, but may require additional reviews and consultation with Tribes.

## **6-12 Drones**

The use of unmanned aerial systems (UAS), also known as drones, has become increasingly popular. However, due to the potential breaches of security in and around critical infrastructure (locks, dams, power plants, and switch yards) and user conflicts at recreation areas, the Nashville District of the U.S. Army Corps of Engineers passed a policy in 2016 limiting the use of UAS by the public at Corps projects. According to the policy, UAS operation for hobby, recreational, and/or commercial purposes is prohibited unless authorized by the District Commander. USACE regulation regarding the public and commercial operation of aircraft, including UAS, is contained in 36 CFR, Chapter III, Part 327.4, Aircraft. Due to these limitations, Brush Creek Recreation Area is the only area approved for the operation of UAS at Cheatham Lake.

Operators are reminded that they will be held liable for damage to Corps of Engineers property resulting from piloting a UAS or any other activity associated with operating a UAS. The operation of unmanned aircraft that harasses or jeopardizes wildlife or critical habitat is prohibited. UAS should be operated in accordance with applicable state laws and Federal Aviation Administration regulations including any UAS registration requirements. They may be flown only during daylight hours only and while maintaining a visual line of sight of the aircraft while it is in operation. Operators who wish to request exceptions to the policy, or for commercial use must contact the Cheatham Lake Resource Manager's Office.

More information on the policy may also be found in the August 5, 2016 News Release: <http://www.lrn.usace.army.mil/Media/News-Stories/Article/906273/corps-unveils-policy-for-operation-of-unmanned-aerial-systems-at-nashville-dist/> or by contacting the Cheatham Lake Resource Manager's Office.

## **6-13 Metal Detecting**

The use of metal detectors can potentially be destructive to buried cultural and natural resources, as discovery of these resources often leads to looting. The Nashville District's Standard Operating Procedure on Metal Detector Use, in accordance with Title 36 specifies locations around the district designated as previously disturbed and appropriate for metal detecting activities. At Cheatham

Lake, metal detecting is only permitted at the sand beach within the Right Bank Recreation Area. Metal detecting is prohibited in all other areas of Cheatham Lake.

## **6-14 User Fees - Entrance, Launching and Parking Fees**

ER 1165-2-400, dated 9 August 1985, authorizes the charging of user fees to the public to offset the costs of providing and maintaining recreation facilities and services. The Corps is limited to imposing user fees for use of campgrounds and specialized sites (day-use) which are directly operated by the Corps. Non-federal public agencies and outgrantees may charge entrance and user fees commensurate with the development and services provided. All entrance and user fees must be approved by the Corps. Facilities provided at Corps projects must be open to all on equal terms and require uniform fee schedules for public use. Fees associated with parking within commercial marinas must be consistent with the surrounding market.

## **6-15 Boundary Line Disputes**

The government boundary line has been surveyed, marked, and periodically remarked for over 50 years. U.S. Code, Title 28, Part VI, Chapter 161, paragraph 2409(g) states that: "Any civil action under this section, except for an action brought by a State, shall be barred unless it is commenced within twelve years of the date upon which it accrued. Such action shall be deemed to have accrued on the date the plaintiff or his predecessor in interest knew or should have known of the claim of the United States." Based on the above, the Nashville District's policy is that the marked government boundary has been in place for a sufficient time that we will no longer accept challenges to it. Project personnel can assist in identifying the marked boundary, which will be considered the definitive demarcation between Corps property and adjacent private or other non-Corps lands.

## **6-16 Marine Sanitation Devices**

Cheatham Lake is designated as a "discharge lake" for purposes of disposing of sewage from vessels with installed Marine Sanitation Devices (MSDs). U.S. Coast Guard regulations pertaining to MSDs can be found at: [http://www.access.gpo.gov/nara/cfr/waisidx\\_00/33cfr159\\_00.html](http://www.access.gpo.gov/nara/cfr/waisidx_00/33cfr159_00.html)

Regulations pertaining to MSDs first came about in the Water Quality Improvement Act of 1970. Section 13 of that law mandated that the newly created Environmental Protection Agency (EPA) promulgate standards designed to prevent the discharge of untreated or inadequately treated

sewage into waters of the United States. Section 13 was incorporated into the 1972 Federal Water Pollution Control Act Amendments of 1972 (later renamed the Clean Water Act) as Section 312, with two additions which allowed states to petition EPA to totally prohibit discharges into specified waters.

EPA designated two types of waters, (1) no discharge waters and (2) treated effluent waters, commonly referred to as discharge waters. No discharge waters included:

- Freshwater lakes, reservoirs, or impoundments whose inlets and outlets are such as to prevent the ingress and egress of vessels subject to Coast Guard regulations.
- Rivers not capable of interstate transportation.
- Other waters designated by the State as having special water quality needs which require stricter protection than Federal standards, such as water supply reservoirs. Requests for waivers must be fully justified and EPA must determine that adequate pump-out facilities are available before a petition would be granted.

Treated Effluent Waters included:

- Coastal waters and estuaries.
- Great Lakes and their connections.
- Freshwater lakes and impoundments accessible through locks.
- Flowing waters that are capable of interstate navigation by boats subject to regulation.

Vessels on Cheatham Lake are allowed to discharge properly treated wastes from approved Marine Sanitation Devices in the lake waters.

## **6-17 Clean Marina Program**

The Clean Marina Program is a voluntary initiative that helps marina operators become more environmentally aware and protect the natural resources that provide their livelihood – clean water and fresh air. The Program is an education and outreach initiative that encourages the implementation of best management practices at marinas. Boaters are also encouraged to adopt environmentally responsible behaviors. "Clean Marina" designations recognize marinas for exceeding regulatory requirements by voluntarily incorporating higher environmental standards into daily operations. The Clean Marina Program also serves as a forum for sharing technical guidance on such items as solid and hazardous waste management, state and Federal regulations, and pollution prevention techniques.

Originally developed in coastal states to address non-point source pollution under the Coastal Zone Management Act Reauthorization Amendments of 1990, Clean Marina Programs have been

adopted or are being developed in 18 states (Alabama, California, Connecticut, Delaware, Florida, Georgia, Louisiana, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, North Carolina, Ohio, South Carolina, Texas and Virginia), the District of Columbia and several Federal agencies including the National Park Service, the Tennessee Valley Authority, and the Corps of Engineers. With 456 lakes around the United States, the Corps of Engineers, with our partners, is the largest provider of marinas east of the Mississippi River.

Building on the solid foundation of our Environmental Operating Principles and in implementation of our Civil Works Strategic Plan, the Corps of Engineers strongly endorses the Clean Marina Program. Eight marinas within the Nashville District have been awarded Clean Marina status. Though none of them are located on Cheatham, the project would be open to working with a marina to obtain the accreditation. For more information on the Clean Marina Program, see: <http://www.wood.army.mil/engrmag/PDFs%20for%20Oct-Dec%2004/Treadway.pdf>  
<http://www.cumberlandrivercompact.org/pdf/CleanMarinaIntroduction.pdf>

## **6-18 Nashville District Guidelines and Policy for Cut and Fill Proposals**

Drafted in December, 2002, this document provides formal guidelines and coordination procedures to evaluate cut and fill placement proposals on Corps of Engineers fee or flowage easement lands within the Nashville District. Typically the flowage easement estates contain restrictions that prohibit the construction of a habitable structures. These restrictions also prohibit the placement of any other structure, including fill material, without the approval of the District Engineer. Generally, no fill material will be allowed below the top of the flood control pool unless alternate storage volume is provided within same general elevation band. All requests for cut and fill placement shall be submitted in writing to the Resource Manager (RM). The RM will then submit the complete proposal to the Natural Resource Management Branch for routing to the appropriate offices.

## **6-19 Paddlesports**

According to the Physical Activity Council, paddlesports have been growing in popularity in recent years and continues to grow with 21.7 million Americans participating in paddling in 2014. This represents an increase of more than three million participants since 2010. Paddling participants nationally made 216 million annual outings in kayaks, rafts, canoes, and stand up paddle boards in 2014.

The U.S. Coast Guard (USCG) National Recreation Boating Safety Program found approximately 62% of adults who boated in 2012 did so at least once in canoes and/or kayaks, and that these vessels account for 29% of boats owned in 2012 in the country. The program also found that powerboat fatalities decreased from 2011 – 2015, whereas paddlecraft deaths increased slightly. It is important to always have a life jacket, be familiar with the area and type of river, and leave a float plan. There are also life jackets made specifically for paddle sports, and should be worn whenever on the water.

At this time paddling is most commonly found upstream of Cheatham Lake on the Harpeth River, a tributary of the Cumberland River. The Tennessee Scenic Rivers Association designates Hartman Park and Stewarts Lane (both on Whites Creek) as designated paddle access areas on the Cumberland River in North Nashville. The Corps has also designated a paddle access area in Sycamore Creek. It is projected that as the sport continues to increase, the lake will see more paddlers, particularly in areas like Sycamore Creek. Other creeks, coves, shallow parts of the lake, and along the shoreline away from the main navigation channel also make for popular locations. Access to the lake for paddlers is found in all access areas and recreation areas, along the shoreline from adjacent private property, and areas without any launching ramps.

While there are currently no plans for the Corps to develop kayak-specific launching facilities on Cheatham Lake at this time, the Corps is open to partnering with other groups and agencies to improve paddlesport access within the Corps area of management at Cheatham Lake.

More information on paddlesports can be found at these websites: Tennessee Scenic Rivers Association - <http://www.paddletsra.org/>, the Cumberland River Compact - <http://cumberlandrivercompact.org>, and the American Canoe Association - <https://aca.site-ym.com/>.

## **6-20 Guidelines for Issuance of Outgrants**

### **National Land Use Policy for Recreational and Non-Recreational Outgrants**

A national land use policy for recreational outgrants, titled “Recreational Outgrant Development Policy”, was issued by the Corps in December, 2005. This policy outlines the Corps’ philosophy and guidelines related to the acceptable types of uses of Corps-managed public lands. A sister policy for activities not involving recreation, such as roadways, utilities, commercial or residential development, municipal requests for infrastructure, state and federal agency requests for use of Corps-managed lands, etc., was published in March, 2009 titled “Non-Recreational Outgrant Policy. Both policies have been incorporated into the ER-1130-2-550 in Chapters 16 and 17.

### **Nashville District Outgrant Guidelines**

A Real Estate outgrant is generally defined as a written document setting the terms and conditions of non-Army use of public property and conveys or grants the right to use Army-controlled real property. Common outgrants include public park and recreation leases, commercial concession leases, fish and wildlife licenses, agricultural leases and various easements for roadways, communication lines, power lines and water or sewer lines. Each outgrant proposal will be reviewed for compatibility with all project purposes, current policies and regulations to include ER 1130-2-550, Chapters 16 and 17, ER 405-1-12, Chapter 8, environmental impacts and concerns, cultural resources effects and compliance, fish and wildlife, endangered species, public sentiment and the overall public interest. Outgrant requests will be processed in accordance with the Standing Operating Procedures (SOP) for Processing Major Outgrants and standard processes set by USACE.

All federal actions are subject to National Environmental Policy Act (NEPA) coordination and compliance reviews. Minor requests with minimal environmental impact may be determined to fit a Categorical Exclusion under NEPA. Requests involving more than minor impacts may require an Environmental Assessment (EA) or Environmental Impact Study (EIS) Assessments must consider, among other factors, cultural and historic resources, water quality, air quality, threatened and endangered species, economic and social impacts, aesthetics, hazardous substances and cumulative impacts. Coordination also occurs with corresponding Federal agencies, state agencies and public involvement with respect to requested activities.

## **6-21 Other Areas Affecting Recreation Profile of Cheatham Lake**

Due to the limited federal land acquisition at Cheatham Lake, there are a few facilities which are not located on Corps fee owned property but whose operations depend directly on the lake or provide visitors access to the lake. Three commercial marinas and two Metro Parks fall into this category.

Harpeth Shoals Marina is located in Ashland City, Tennessee at Cumberland River Mile 157.8 adjacent to the Braxton Condominiums. With the exception of a small portion of the channel leading to the Cumberland River, all land based improvements at Harpeth Shoals are located on private property. Improvements include a boat ramp, covered boat slips, a fuel dock, septic pump out service, and ship store.

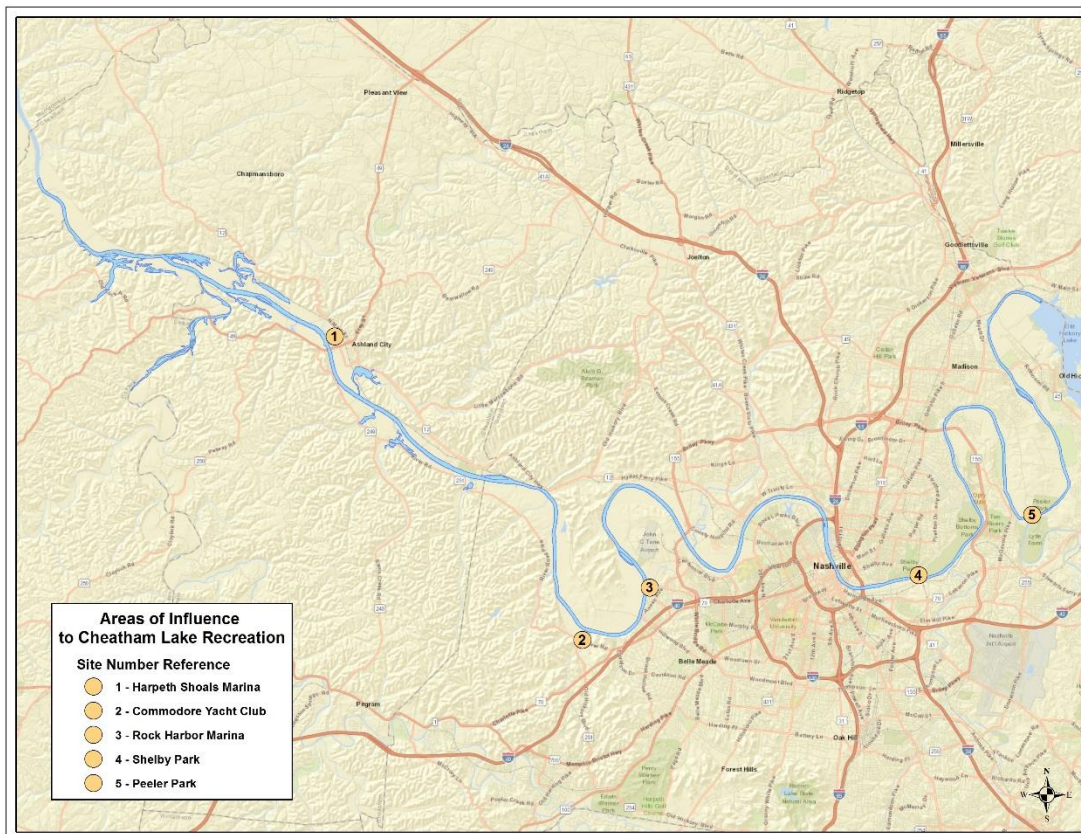
Rock Harbor Marina is located at Cumberland River Mile 175 in Nashville, Tennessee within the footprint of a retired rock quarry that was adjacent to the River. Improvements include a fuel dock, ship store, paddle board rentals, restaurant, marine service department and covered slips.



Commodore Yacht Club is a private boat club partially located on flood flowage easement property at CRM 172.5. CYC does offer fuel and septic pump out service to the public, but most services, including boat launching, are limited to members.

Shelby Park is a large, urban multi-use park along the Cumberland River in Nashville, Tennessee at CRM 193.5. The park is owned and operated by Metro Parks. Development along the Cumberland River offers visitors river views; migratory bird and other wildlife viewing opportunities; and a boat launching ramp that is a popular access point for paddlers in the downtown Nashville area. Other improvements in the park include playgrounds; a fenced off-leash dog park; adult and youth softball fields; the Old Timers adult baseball fields; 9 and 18 hole golf courses; Sevier Lake, popular for casual fishing; several reservable picnic shelters; and the Shelby Park Community Center which offers free programs as well as basketball, tennis and multi-use courts.

E. N. Peeler Park is a large park in Madison, Tennessee tucked away at the end of a long curve in the Cumberland River known as Neely's Bend at CRM 206.5. The park is owned and operated by Metro Parks. Its farmland setting on the river features a 1.9-mile paved multi-use path, equestrian trails, a public boat launching ramp, and an air field for remote-controlled planes. Recently, Metro Parks completed the purchase of the Taylor Farm property just north of the park, an addition of 381 acres, giving Peeler Park a total of over 650 acres of parkland.



**Figure 6.3 - Recreation Sites Affecting the Recreation Profile at Cheatham Lake**

## CHAPTER 7 - AGENCY AND PUBLIC COORDINATION

A major purpose of Master Planning documents, including appendices, is to set forth the basic operating and management philosophies for Corps of Engineers projects. It is imperative that the preparation of these plans include, to the fullest extent possible, input by, and coordination with, all members of the affected public and representatives of its interests. EP 1130-2-550 contains specific coordination and public involvement requirements. These include in-house, interdisciplinary coordination and review, interagency and public coordination, and notification of Congressional interests. To this end, the Corps formed an internal team of Nashville District Office personnel, with representatives of Operations, Office of Counsel, Real Estate, Water Quality, Engineering and Planning and Cheatham Lake Project personnel including park rangers and management. This team identified representatives of various public interest groups to assist in developing a draft update for presentation to the general public, agencies, and Congressional interests for review and comment. These representatives included members from counties surrounding the lake, marina associations, tourism organizations, and state and federal resource agencies. The make-up of the team, minutes of the June 24, 2015 and September 9, 2015 meetings and responses to comments and/or recommendations are provided below in this chapter. As input was received, it was incorporated, as applicable, into the draft Master Plan. An Environmental Assessment (EA) evaluating the impacts of implementation of this update has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA), including public interest review.

### 7-01 Stakeholder Minutes, February 22, 2017

#### ADMINISTRATIVE RECORD CHEATHAM LAKE MASTER PLAN REVISION

CELRN-CHE/R

22 February 2017

SUBJECT: Cheatham Lake MP Revision – Stakeholder Group Meeting

Purpose: Meeting to bring awareness to partner agencies and communities that the Master Plan Revision process is beginning and to ask them for assistance in telling us what their interests are in Cheatham Lake.

1. The following participants attended the meeting on 22 February 2017:

List attendees

Attendees contact info and office

**Stakeholder Attendees:**

Franklin Wilkinson – Cheatham Co. Mayor’s office  
Sheriff Mike Breedlove – Cheatham Co.

Chief Tim Brinkley – Cheatham Co.  
Eric Tummins – TWRA  
Jamey Bagget – TWRA  
Steve Swan – TWRA  
Ann Morbitt – TDEC Water Resources  
Dorie Bolze – Harpeth River Watershed Association  
Gary Binkley – Commissioner of Cheatham Co.  
Gary Patterson – Harpeth River State Park  
Gina Anzaldua – Cheatham Co. Chamber of Commerce  
Michael King – Tennessee Scenic Rivers Association  
Chris Robbins – TSU Extension Associate for Farm Operations  
Daryl Phillips – Economic and Community Development of Cheatham  
Tony Young – Ashland City Parks

**Corps of Engineers:**

Brian Mangrum  
Allison Walker  
Tadd Potter  
Mary Lu Noah  
Dina Henninger  
Dean Austin  
Kyle Beverly  
Dave Funderburk

**2. Meeting Minutes**

**A. Order of Events**

- a. Power Point by Tadd Potter regarding Cheatham Lake
- b. Power Point by Allison Walker regarding Master Plan
- c. Questions and Discussion

**B. Discussion Items:**

- a. D. Bolze – What areas are stakeholders to focus on? What are reasons or anticipated areas that need feedback?
  - i. Response – pulled up map and discussed some of the areas on the draft classification map
- b. D. Bolze & G. Binkley – Is the Corps looking to purchase land? Or looking to sell land?

- i. Response – No, the Corps acquired land under the Eisenhower Acquisition Act to purchase the minimum amount of land to operate Cheatham Lake. Land acquisition was very specific for this project
- c. G. Binkley - What about the development of the berm at A.O. Smith? How can we ease the parking problems and access the lake easier?
  - i. Response - Looking at the classification map, we can look at different ideas and see if we can work together to make things work. Even after the Master Plan is complete, we can add supplements to the plan at a later date. Developing ideas in the master plan should make some of the processes easier if there's a time when development takes place (but doesn't circumvent the permit process)
- d. G. Binkley - who do we work with on the berm near A.O. Smith?
  - i. Response - you can go through Tadd Potter, Cheatham's Resource Manager
  - ii. T. Potter - the complete application should be coming in soon.
- e. D. Bolze – Requests draft classification map
- f. Flowage Easement Discussion
  - i. B. Mangrum - Cheatham Lake has flowage easement upstream beginning in Davidson County to Old Hickory
  - ii. G. Binkley - why do we have flowage easement?
  - iii. B. Mangrum - explains the flowage easement and the guidelines for adjacent landowners.
  - iv. T. Potter - if a landowner has flowage easement, they still may need approval by obtaining a consent to easement in order to maintain flood storage capacity. Mitigation may be required if they fill on flowage easement property.
- g. T. Young - is there hunting at Indian Town Bluff?
  - i. Response - Yes there is hunting (only accessible via boat), but area is not licensed to TWRA and is proposed to be classified environmentally sensitive and very low impact.
  - ii. T. Young - Could there be interpretive recreation?
  - iii. Response: you would have to cross private land that does not allow access. Not sure how you could access Indian Town Bluff.
- h. G. Binkley - Does Corps have anything to do with Harpeth State Park?
  - i. Response – Corps does not, we own fee property up the Harpeth River for about 6 miles from the confluence of the Cumberland River. Beyond that, we acquired about 5.5 miles of flowage easement.
  - ii. G. Patterson - agreeing with Brian not much access on Corps property.
- i. G. Binkley - Parking is an issue

- i. Response - explains Title 36 and that Corps Rangers only have jurisdiction Corps property. Title 36 extends to all lands owned in fee and water areas within a water resource development project (interpreted to mean the project pool).
  - j. C. Robbins - how does erosion effect our map? A lot of landowners are asking about the Survey markers that have disappeared after the flood.
    - i. Response – Survey team Vaughn Melton came in and surveyed after the flood. Cheatham Lake lost land due to the flood, the corners may be in the water now. Once the land is gone, adjacent landowners could have waterfront property.
  - k. D. Bolze - should we have a broader discussion with other entities to discuss the parking, traffic, and just the growing demand due to increase in visitation?
    - i. Response - agrees and mentions demand on the infrastructure as well
  - l. D. Bolze - what are the rules on the water regarding paddle boarding?
    - i. Response - TWRA has guidelines regarding the use of paddle boards.
- C. Data requests/Action Items:
- a. Dina – email draft classification map, classification definitions, and link to 1983 MP to stakeholders (Allison to provide info)
- D. Plan Forward
- a. Discuss MP thoughts with stakeholders as needed
  - b. Provide Draft MP mid-May
  - c. Follow up stakeholder meeting late May

Disclaimer

This document is not intended as an exact translation but is intended to address generalized topics of discussion covered during the meeting.

Submitted 22 February 2017

PREPARED BY: Dave Funderburk, Tel: 615.792.5697

## **7-02 Stakeholder Meeting Minutes - June 20, 2017**

### **ADMINISTRATIVE RECORD CHEATHAM LAKE MASTER PLAN REVISION**

CELRN-OPN-CHR

SUBJECT: Cheatham Lake MP Revision – Stakeholder Group Meeting

20 June 2017

Purpose: Meeting to bring awareness to partner agencies and communities that the Master Plan Revision process is beginning and to ask them for assistance in telling us what their interests are in Cheatham Lake.

1. The following participants attended the meeting on 20 June 2017:

**Stakeholder Attendees:**

Franklin Wilkinson – Cheatham Co. Codes  
Ann Morbitt – TDEC Water Resources  
Tony Young – Ashland City Parks

**Corps of Engineers:**

Brian Mangrum  
Allison Walker  
Tadd Potter  
Cody Flatt  
Travis Wiley  
Trey Church  
Dina Henninger  
Dean Austin

2. Meeting Minutes
  - A. Order of Events – Agenda
    - a. Introductions of Attendees
    - b. Brief Refresh of the Master Plan Process – Power Point by Resource Manager Tadd Potter
    - c. Status of the Master Plan Revision by Chapters with input by Allison Walker
      - i. Chapter 1- Introduction. No major changes - includes authorizations, history, scope of master plan, project stats, etc.
      - ii. Chapter 2 – Project Setting. Changes and updates made to reflect current conditions. Includes chapters that describe different aspects of the project
      - iii. Chapter 3 – Resource Goals and Objectives. Changes to these reflect current conditions at the lake as well as federal climate. Broadly stated goals and objective pertaining to the management of the project
      - iv. Chapter 4 – Classifications. “Meat and Potatoes of the Master Plan”. All new as there were no classifications in the master plan. No major changes to on-the-ground management conditions
      - v. Chapter 5 – Resource Plan. Changes to these reflect current federal funding environment, generally focused on maintaining rather than expanding infrastructure. Site-by-site plans for each area around the lake. Also a “meat and potatoes” section of the MP.
      - vi. Chapter 6 – Special Topics. Items important to the project that don’t fit into previous chapters of the MP. Many of these are updates or new to the project since the last Master Plan.
      - vii. Chapter 7 – Agency & Public Coordination. Record of meetings and conversations that develops as the MP process evolves

- viii. Chapter 8 – Summary of Recommendations. Brief overview of major updates/changes to the plan if/when finalized. Changes as MP development progresses.
- d. Process Moving Forward
  - i. Timeline – July 7<sup>th</sup> – Stakeholders submit final comments to the draft MP before the document goes to public workshop
  - ii. Public workshop – late July early August
  - iii. Travis Wiley – NEPA and Environmental Assessment Statement concurrent with MP Revision – similar MP updates have concluded with a “Finding of No Significant Impact”.
- B. Discussion Items:
  - a. Ann Morbitt – Asked about coordination with her office (TDEC) and Travis Wiley about water intakes/water quality and drought events.
    1. Response – Travis Wiley discussed with Ms. Morbitt about coordination.
  - b. Tony Young – general comment about working with the city (Ashland City). Also requested another swim beach location.
    1. Request for swim beach noted. At this time, there’s not a good location on Cheatham to propose a swim beach site in the MP.
- C. Plan Forward
  - a. Deadline Dates for final stakeholder comments (July 7<sup>th</sup>)
  - b. 508 compliance working with Travis Wiley and other district elements to make it available at least 2 weeks prior (July 14<sup>th</sup>) to public workshop
  - c. Dates identified potentially for public workshop are July 27<sup>th</sup>, August 1<sup>st</sup> and 3<sup>rd</sup>.

#### Disclaimer

This document is not intended as an exact translation but is intended to address generalized topics of discussion covered during the meeting.

Submitted 23 June 2017

PREPARED BY: Dina Henninger, Tel: 615.792.5697

## **7-03 Response to Public Comments on the Master Plan**

Three comments were received regarding blueways and paddle sport access at Cheatham Lake and in the Greater Nashville Area. The comments are listed below, followed by response to the comments:

- I am very interested in the further use of this area for recreational paddle sports (kayaking, canoeing and Standup Paddle Boards). Public Access to the water remains a problem.

Along with a group of citizens from North Nashville, Tennessee Scenic Rivers Association (TSRA) is interested in adjusting the broken lock 1 in the Lock One Park area to be suitable



for access. This project has the approval of the Metro Parks Dept and the citizens group. Current hold up is finding a volunteer engineer to approve our plan.

Would also advocate for an access site on the upstream entry into the Bell Bend off Old Hyde's Ferry Pike.

- I was not able to attend the public meeting on the Cheatham Lake Master Plan but I have some things I would like to be known. I have lived in the Scottsboro community since 1979. I own 4 kayaks because I love taking family and friends with me to enjoy the peace and beauty of gliding through creeks and lakes, most of which seem to be accessible by driving to Cheatham County. I completely support your Masterplan. I selfishly would love to be able access a Blueway without driving to Cheatham County. Scottsboro is so accessible from the Greater Nashville area and greater accessibility to non-motorized boating offers a healthy and environmentally friendly option for outdoor recreation. My friend has described in detail, better than I can, some important details. "There is a tremendous opportunity to create connectivity for human powered boats from Nashville to Cheatham Dam, a Blueway. There is already a network of access/put-ins above Nashville and downtown as well in Ashland city. Full connectivity could be realized by adding only two more sites. The Lock one site (managed by Metro with a plan by TSRA) and creating a site on the upstream entry into Bells Bend off Old Hyde's Ferry Pike (east Bells Bend). This would create/further the blue way from downtown, lock one, east Belles Bend, Cleese's ferry, Bull Run Rec area, Ashland City, Sycamore Creek and Cheatham Dam. There is a wetland mitigation project (I think) at the east Bells Bend site developed and I would be happy to take lead on investigating an access option there. I believe this infrastructure would promote health, quality of life and stimulate economic opportunities for the area."

I hope you will consider my request and my friend's suggestions for how to create connectivity for our bustling little community as well as the greater Nashville area.

- I was not able to attend the public meeting but would like to provide input on the plan. I live in the Bells Bend/Scottsboro area and our community is very engaged and support your Masterplan. There is a tremendous opportunity to create connectivity for human powered boats from Nashville to Cheatham Dam, a Blueway. There is already a network of access/put-ins above Nashville and downtown as well in Ashland city. Full connectivity could be realized by adding only two more sites. The Lock one site (managed by Metro with a plan by TSRA) and creating a site on the upstream entry into Bells Bend off Old Hyde's Ferry Pike (east Bells Bend). This would create/further the blue way from downtown, lock one, east Belles Bend, Cleese's ferry, Bull Run Rec area, Ashland City, Sycamore Creek and Cheatham Dam. There is a wetland mitigation project (I think) at the east Bells Bend site developed and I would be happy to take lead on investigating an access option there. I believe this infrastructure would promote health, quality of life and stimulate economic opportunities for the area.

Please let me know if this concept could be integrated into the plan as this could be a real asset to the region.

Cheatham Lake Master Plan response to these public comments:

This Master Plan addresses the increasing popularity of paddlesports in Chapter 6-19. While the Corps at this time has no plans to build access locations for kayak and canoe launching, Cheatham Lake is open to partnering with other organizations in an effort to improve the recreation experience for paddlers. The role of the Corps would vary based on the location of the proposed access site and Corps jurisdiction in that area. To begin the conversation of partnering to develop improved paddle access, interested parties are encouraged to contact the Resource Managers Office.

## CHAPTER 8 - SUMMARY OF RECOMMENDATIONS

ER-1130-2-550 and ER 1130-2-540 and their implementing guideline EPs were issued in 2013. The primary goals, objectives and guidelines are reflected in this Master Plan. The full text of these regulations is available online. Only the major changes and statements of particular interest have been addressed here and reflect only a summary of the major changes in the MP.

These include not only changes to the Master Plan document or regulations themselves, but also new policies, guidelines and funding realities that affect the administration of Cheatham Lake.

### Significant Changes in the Revision of the Master Plan

- **Web Based Master Plan:** The Master Plan Update and all associated documents will be posted on the internet to encourage fast and easy access for the public, as well as allow for changes to statistics, figures, and documents to be made significantly faster than it would be to reprint paper copies.
- **Increased Outgranting:** If non-Corps entities are willing and able to assume responsibilities for operating and maintaining existing public recreation facilities or develop new facilities that meet or exceed Corps standards, and provide the public an equal or better level of service, the Corps has a strong interest in partnering to do so.
- **The Federal Funding Environment:** Due to funding constraints over recent decades, the Corps has been unable to continue development or cost sharing in recreation developments. Concessionaires have assumed maintenance responsibilities in exchange for authority to charge reasonable fees for public launching and “managed parking” to recoup some of their costs.
- **Land Allocation/Classification:** EP 1130-2-550 (2013) outlined land use allocations, and more importantly, classifications that need to be designated for all lands within Corps jurisdiction. Categories in 1983 included Fish and Wildlife Lands, Reserve Forest Lands, Operational Lands, and Recreation Lands, but no map was provided in the 1983 Master Plan to show which lands were which. Classification outlined in EP 1130-2-550 and the corresponding designations for lands on Cheatham Lake can be found in Chapter 4. It is important to note that the new regulations include a classification for Environmentally Sensitive Areas as a designation of protection for lands with unique characteristics.
- **Carrying Capacity:** At this time, and into foreseeable future, the Corps has no plans of actively limiting uses beyond those already in place. If future public usage increases to the extent that significant use conflicts occur, a formal carrying capacity study may be

warranted if it could lead to solutions not available in the absence of such a report. At this time, such a study would have little meaningful utility.

- **Tree Vandalism:** Efforts to prevent vandalism include warnings, restitution agreements, citations and at times court action to recover damages. Language was added to the 2012 Shoreline Management Plan (SMP) (and was unchanged in the 2016 SMP) allowing a moratorium to be placed on issuing of any permits/licenses in the affected and damaged area.
- **Boundary Line Policy:** Nashville District's policy is that the marked government boundary has been in place for a sufficient time that we will no longer accept challenges to it. Project personnel can assist in identifying the marked boundary, which will be considered the definitive demarcation between Corps property and adjacent private or other non-Crops lands. Responsibility fall on the land owner to get any boundary line disputes surveyed.
- **User Fees:** Concessionaires are authorized to implement user fees to the public to offset the costs of providing and maintaining recreation facilities and services.
- **Environmental Operating Principles:** These principles foster unity of purpose on environmental issues, reflect a new tone and direction for dialogue on environmental matters, and ensure that employees consider conservation, environmental preservation and restoration in all Corps activities.
- **Nashville District Fill Policy:** This policy contains the guidelines for cut and fill in the Nashville District, primarily stating that no net loss in flood storage capacity is permitted.
- **Recreation Development Policy for Outgranted Corps Lands:** This policy contains guidance to establish consistent, nationwide policy that will be applied to evaluate requests for recreation development at Corps water resources development projects. The intent is to provide public outdoor recreation opportunities that support project purposes and meet the recreation demands created by the project itself while sustaining our natural resources.
- **Non-Recreational Outgrant Policy:** This policy contains guidance to establish a consistent, nationwide policy that will be applied to evaluate non-recreational real estate outgrant requests for use of Civil Works lands and waters. The intent is to meet legitimate needs for the use of project lands and waters while sustaining our natural resources and protecting authorized project purposes.

- **Environmentally Sensitive Areas:** The establishment of Environmentally Sensitive Areas (ESA's) was called for in the Corps' 2013 Master Planning regulations. Cheatham Lake has many special areas that are deserving of such recognition due to their aesthetic, cultural, ecological or scientific values. Several areas have been reclassified as ESA's.
- **Policy Letter #32 Firewood Policy:** This policy contains guidelines to protect the forest resources on U.S. Army Corps of Engineers, Nashville District land by implementing an effective firewood policy consistent with the policies by the State natural resources agencies that decreases the risk of infestations of emerald ash borer (*Agrilus planipennis*) and other damaging forest pests from spreading onto project lands and adjacent areas.

## CHAPTER 9 - BIBLIOGRAPHY

One particularly important societal change since the last revision that has had a tremendous impact on the availability of current information is the nearly universal access to the internet and electronic mail. This allows anyone with a desire to know to gain immediate access to the latest demographic makeup and trends associated with any county surrounding the Cheatham Lake area, the economic base of the region, access to local, state, and federal databases of a whole host of subjects such as threatened and endangered plant and animal species, water quality, environmental studies, tourism information, employment, and even the latest public notices and status of Corps activities, such as emergency operations, water levels, or public meetings. Obviously, such information in static form in a Master Planning document would be quickly outdated. Therefore, that type of information, which was a routine component of earlier Master Plans is not presented in this document. Internet search functions will generally allow access to the full text of laws, regulations, and major policies cited in this update. Where not obvious, every attempt will be made to guide the reader to applicable citations. In addition, the Corps of Engineers maintains an exhaustive information base about the Corps, its activities, projects, regulations, etc., including those pertaining to Cheatham Lake, at <http://corpslakes.usace.army.mil>. For answers to questions that cannot be found through these resources, there is always email and one-on-one personal communication. Questions or comments can be directed to the Resource Managers Office at 1798 Cheatham Dam Road, Ashland City, TN 37015 phone 615-792-5697 or to the Nashville District Corps of Engineers, Natural Resources Management Branch, 110 9<sup>th</sup> Avenue South, Nashville, TN 37203, phone 615-736-5115.

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## **APPENDIX A - CLASSIFICATION MAPS AND PLATES**

Sites are numbered according to site numbers referenced in Chapter 5.

## **APPENDIX B - PARK PLATES**

Plates are numbered according to site numbers referenced in Chapter 5.

## **APPENDIX C - NEPA DOCUMENTS**