LAKE BARKLEY MASTER PLAN

US Army Corps
of Engineers ®
Nashville District

October 2017

CELRN-OP-R (1130)

07 OCT 2017

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

SUBJECT: Lake Barkley 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 Lake Barkley. 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. BAR MP
2. BAR MP EA
3. BAR MP FONSI

Approval Recommended: _____
DIANE E. PARKS
Chief, Operations Division

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Approved: _____
CULLEN A. JONES, P.E.,PMP
LTC, EN
District Commander

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

AAR – After Action Review
AMSL – Above Mean Sea Level (based on the National Geodetic Vertical Datum of 1929)
AOR – Area of Responsibility
ARPA – Archeological Resources Protection Act
ASA(CW) – Assistant Secretary of the Army for Civil Works
ATR - Agency Technical Review
BLUF – Bottom Line Up Front
BMP - Best Management Practice
CE – Corps of Engineers
cfs – Cubic Feet per Second
CHBCR – Central Hardwoods Bird Cons. Region
COB – Close of Business
COL – Colonel
CONUS – Continental United States
COP – Community of Practice
COR – Contracting Officer's Representative
CRA – Continuing Resolution Authority
CRM – Cumberland River Mile
CW – Civil Works
CWA – Clean Water Act, 1977
CX – Center of Expertise
DA – Department of Army
DCW – Director of Civil Works
DE – District Engineer/ Division Engineer
DM – Design Manual
DO – Dissolved Oxygen
DOD – Department of Defense
DQC – District Quality Control
EA – Environmental Assessment
EAB – Emerald Ash Borer
EC – Engineering Circular
EDW – Enterprise Data Warehouse
EIS – Environmental Impact Statement
EM – Engineering Memorandum
EO – Executive Order
EOC – Emergency Operations Center
EOPs – Environmental Operating Principles
EP – Engineering Pamphlet
EPA – Environmental Protection Agency
EQ – Environmental Quality
ER – Engineering Regulation
ERCA – Environmental Restoration & Conservation Area
ERDC – Engineering Research & Design Center
ESA – Endangered Species Act/ Environmentally Sensitive Area
FWS – Fish and Wildlife Service
FEMA – Federal Emergency Management Agency
FOIA – Freedom of Information Act
FONSI - Finding of No Significant Impact
FR – Federal Register
FRM – Flood Risk Management
FY – Fiscal Year
GIS - Geographic Information Systems
GOV – Government
GPS – Global Positioning System
GS – General Schedule
GSA – General Services Administration
H&H – Hydrology and Hydraulics
HABS – Harmful Algal Blooms
HEC – Hydrologic Engineering Center
HEP – Habitat Evaluation Procedures
HES – Habitat Evaluation System
HP – Horsepower
HQUSACE – Headquarters, U. S. Army Corps of Engineers

HTRW – Hazardous, Toxic, and Radioactive Wastes
IWR – Institute for Water Resources
KDFWR – Kentucky Department of Fish and Wildlife Resources
KDOP – Kentucky Department of Parks
KW – Kilowatt
LBL – Land Between the Lakes National Recreation Area
LTC – Lieutenant Colonel
MCX – Mandatory Center of Expertise
MFR – Memorandum for Record
MG – Major General
MOU – Memorandum of Understanding
MP – Master Plan
MRLC – Multi-Resolution Land Characteristics Consortium
MSC – Major Subordinate Command
MSD – Marine Sanitation Device
MSL/msl – Mean Sea Level (based on the National Geodetic Vertical Datum of 1929)
MW – Megawatt
NAGPRA – Native American Graves and Repatriation Act
NAV – Navigation
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
NTE – Not to Exceed
NGVD – National Geodetic Vertical Datum
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
PMBP – Project Management Business Process
PMP – Project Management Plan
POC – Point of Contact
PRB – Project Review Board
Q & A – Question and Answer
QA/QC – Quality Assurance / Quality Control
QMP –Quality Management Plan
QMS – Quality Management System
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
SITREP – Situation Report
SME – Subject Matter Expert
SMP – Shoreline Management Plan
SOP – Standard Operating Procedure
SOW – Scope of Work
T&ES – Threatened and Endangered Species
TBA – To be Announced
TBD – To be Determined
TDEC – Tennessee Department of Environment and Conservation
TMDL – Total Maximum Daily Load
TVA – Tennessee Valley Authority
TWRA – Tennessee Wildlife Resources Agency

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 - Barkley Lock and Dam Project

1-01 Project Authorization

The Barkley Dam and Lake Barkley project was authorized by the River and Harbor Act of 1946 (Public Law 525, 79th Congress, 2nd Session). At the time of authorization, the project was designated as the Lower Cumberland Project, but under provisions of a Joint Congressional Resolution approved in 1956 (Public Law 537, 84th Congress, 2nd Session) the name was changed to Barkley Dam and Lake Barkley after U.S. Senator and 35th Vice President, Alben W. Barkley.

1-02 Project Purpose

The primary authorized purposes for Barkley Dam and Lake Barkley include navigation, flood control (flood damage reduction) and the production of hydroelectric power. Although recreation was not originally an authorized function of this project, lands were acquired and recreation facilities constructed to assure unencumbered access to the lake for the general public. Today the

resources of Lake Barkley are managed to not only provide recreation but also to improve fish and wildlife habitat and provide water supply for surrounding municipalities.

1-03 Purpose and Scope of the Master Plan

This revised Master Plan replaces the 1983 Master Plan for Development and Management of Lake Barkley. In accordance with Engineering Regulation (ER) 1130-2-550 and ER 1130-2-540 and their corresponding Engineering Pamphlets (EP's), 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 throughout the life of the project. The plan includes recommendations as to the optimum location and design of recreation facilities, taking into consideration a variety of elements, such as the natural and cultural environment, economic feasibility, projected recreation demand and future operation and management capabilities.

The Master Plan (MP) 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 MP 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 MP 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

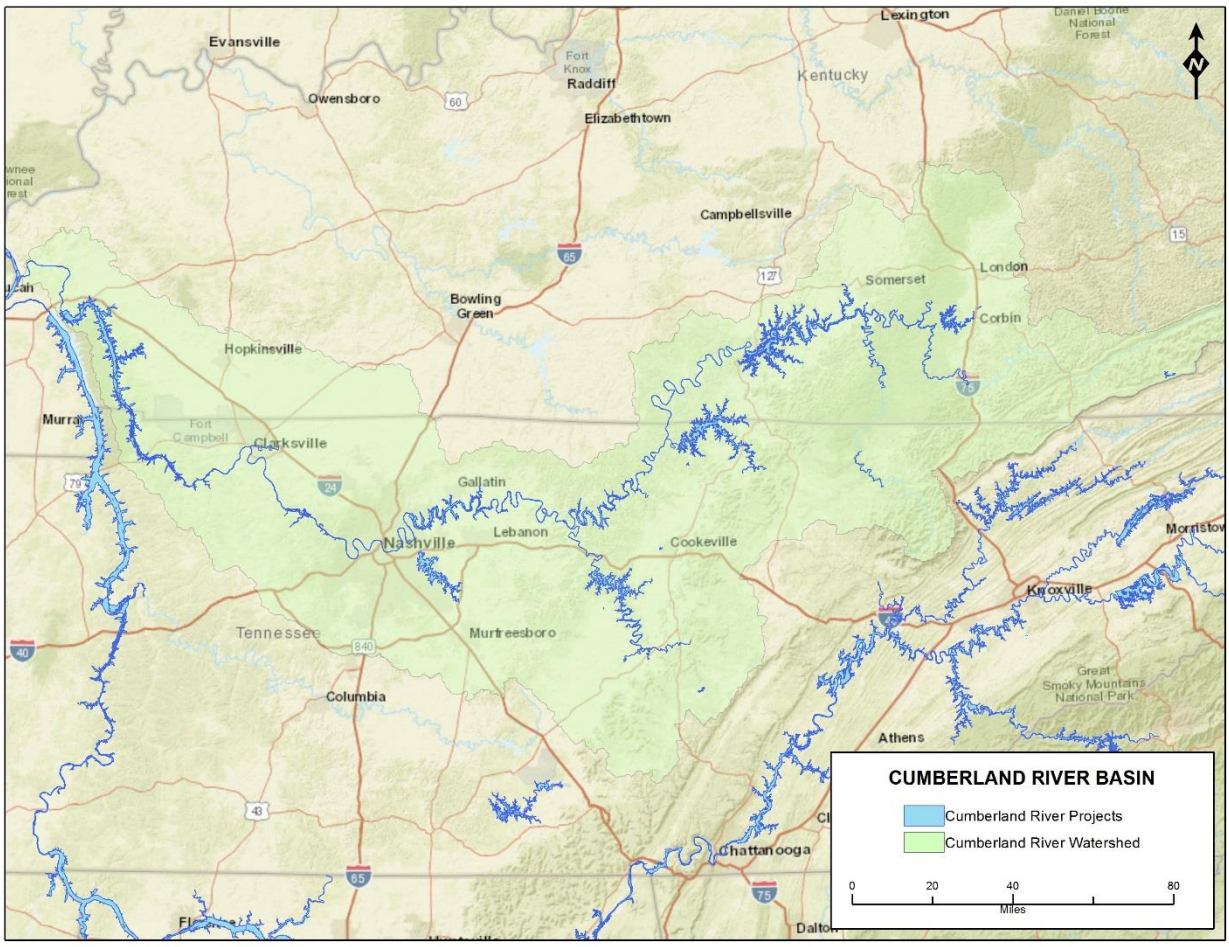

Figure 1.2 - The Cumberland River Basin

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).

Barkley Lock and Dam is the western most Project on the Cumberland River, located in Livingston and Lyon Counties, 30.6 miles above its confluence with the Ohio River. The Lake Barkley impoundment lies in Livingston, Lyon, and Trigg Counties in Kentucky and Stewart, Montgomery, Houston, Cheatham and Dickson Counties in Tennessee. The lake extends 118.1 river miles from Barkley Lock and Dam to Cheatham Lock and Dam near Ashland City, Tennessee. It has 1,004 miles of shoreline with a local, uncontrolled drainage area of 3,438 square miles.

Lake Barkley is a "flood control" lake which experiences annual pool fluctuations of 5 feet with the potential fluctuation, during flood periods, of 21 feet. The entire Project encompasses a total of 61,081 acres of fee property, 27,662 acres of flowage easement and 7,293 acres of riverbed. With a normal pool elevation of 359 feet above mean sea level (AMSL), Lake Barkley has a surface area of 54,308 acres and at maximum pool (375 feet AMSL), the surface area of the lake increases to 93,430 acres. The total flood control storage for Lake Barkley is 2,082,000 acre feet. 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 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 Recreation Development at Corps Projects in compliance with Section 4 of that Act. In December 1962, a Master Plan for recreation development at Lake Barkley, Design Memoranda (DM) 12, had been prepared and approved for implementation. In August 1964, a supplement to DM 12, 5D and 5G, titled a "Report on Commercial Boat Dock Development and Supplemental Land Acquisition," was approved. This report presented plans for the acquisition of supplemental lands for the establishment of commercial boat dock facilities. Since that time, portions of the Master Plan have been reevaluated on a site-by-site basis in response to particular development needs or opportunities. A complete update was conducted in 1983. Supplements have been prepared and added to the Master Plan addressing changes in land classifications (i.e. Grand Rivers Park and Cannon Springs) and lease expansions (i.e. Green Turtle Bay Marina).

1-06 Special Notes

Table 1.1 lists various land and water surface acreages from different sources including the Operations Management Business Information Link (OMBIL), the Real Estate Management Information System (REMIS) and GIS mapping software. Since the impoundment of Lake Barkley, 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 (AMSL) based on the National Geodetic Vertical Datum of 1929 (NGVD29).

Table 1.1 - Lake Barkley Acreages

Statistic	OMBIL Data	OMBIL Data (updated)	GIS Data	REMIS Data
Total Area (Fee, Easement, River Bed)	108,963	101,862	96,039	98,629
Total Pool (Fee & Easement)	50,820	50,820	47,015	NA
Total Fee Pool	43,595	43,595	44,133	NA
Total Easement Pool	7,225	7,225	2,882	NA
Total Fee Lands	69,627	62,526	61,081	67,142
Fee Lands above normal pool	26,032	18,931	16,948	NA
Flowage Easement Lands	32,236	32,236	27,662	24,387
River Bed	7,100	7,100	7,293	7,100
Total Water Area	57,920	57,920	54,308	NA

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.

History of Barkley Lock and Dam Project

- Barkley Lock and Dam was authorized for construction by the Flood Control Act of 1938 and the Rivers and Harbors Act of 1946.
- Construction of the Barkley Lock and Dam Project began in June of 1957.
- In July of 1964, the lock was opened to navigation.
- In February of 1966, the Lake Barkley project became fully effective for flood control.
- In March of 1966, the project was completed and fully operational when the last power unit was placed into operation.

Table 1.2 - Project Statistics

Landbase	
Total Fee Property	61,081 acres
Total Easement Property	27,662 acres
Shoreline Miles	1,004 miles

Pool	
Backwater Length (Barkley to Cheatham)	118.1 miles
Maximum Pool Elevation (375 feet AMSL)	93,430 acres
Minimum Pool Elevation (354 feet AMSL)	45,210 acres
Normal Pool Elevation (359 feet AMSL)	54,308 acres
Total Storage Capacity (375 feet AMSL)	2,082,000 acre-feet
Canal between Lake Barkley and Kentucky Lake	
Total Length	1.75 miles
Bottom Width	400 feet
Depth at Minimum Pool (346 feet AMSL)	11 feet
Barkley Lock	
Chamber Dimensions	110 feet X 800 feet
Normal Lift (302-359 feet AMSL)	57 feet
Chamber Volume	37,000,000 gallons
Lock Wall Elevation	382 feet AMSL
Average Tonnage of Commodities	2,800,000 tons
Barkley Dam	
Type	Concrete-gravity and earth fill
Height (above lowest foundation)	157 feet
Total Length	10,180 feet
Lock Section	221 feet
Spillway Section	804 feet
Gates	12-Tainter
Gate Size (width X height)	55 feet X 50 feet
Discharge Capacity at Max Pool (375 feet AMSL)	520,000 cfs
Earth Embankments	8,725 feet
Barkley Powerhouse	
Number and Capacity of Units	4 @ 32,500 kw
Total Installed Capacity	130,000 kw

Chapter 2 - PROJECT SETTING AND FACTORS INFLUENCING MANGEMENT AND DEVELOPMENT

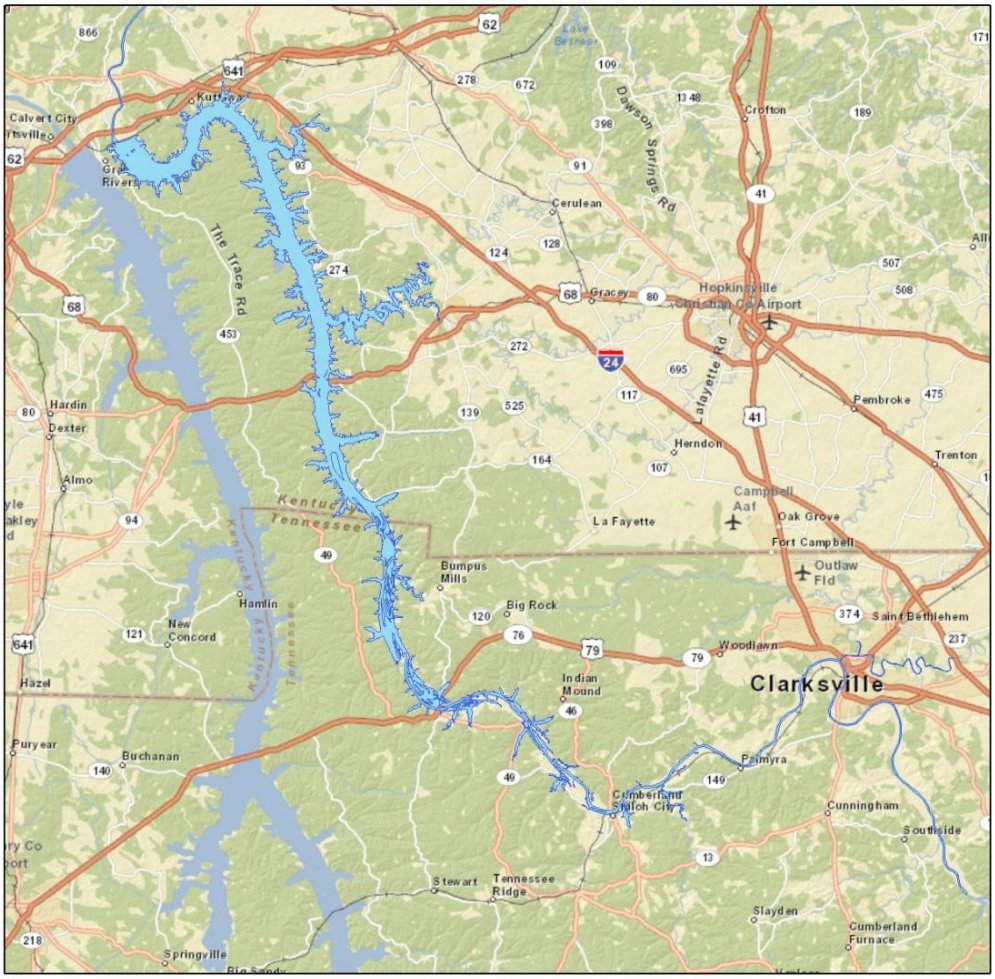

Figure 2.1 - Map of Lake Barkley

2-01 Description of the Reservoir and Navigation Pool

Barkley Lock and Dam, which impounds Lake Barkley, is located in southwest Kentucky near Grand Rivers. Kentucky Lake is located to the west of Lake Barkley. The two lakes lie roughly parallel to each other for approximately fifty miles and are separated by the Land Between the Lakes National Recreation Area. Lake Barkley and Kentucky Lake are connected by a 1.75 mile navigation canal located approximately three miles upstream of each dam.

Barkley Dam has a total drainage area of 17,598 square miles. The local, uncontrolled drainage area downstream of Cheatham Dam is 3,438 square miles. Lake Barkley's total flood control storage is

2,082,000 acre feet. The water surface area of Lake Barkley at an elevation of 359 feet AMSL is 57, 920 acres with a shoreline length of 1,004 miles. The average depth of Lake Barkley is 15 feet at an elevation of 359 AMSL. The deepest part of the lake, approximately 70 feet, is in the old river channel, also called the thalweg, near the dam. Thalweg depths in the upper part of the lake, between Clarksville and Cheatham Dam, are approximately 25-30 feet deep. The average annual outflow from Barkley Dam is approximately 35,000 cubic feet per second (cfs).

2-02 Hydrology

Lake Barkley is hydrologically diverse, as are other main stem Cumberland River Basin projects with lock and dam configurations. The reservoir's thalweg is composed of the flooded main channel but also has extensive shallow areas composed of inundated floodplain. In addition there are numerous large embayments formed by the inundation of tributaries which function hydrologically in a markedly different manner than the lake's main channel.

Operation of Lake Barkley fulfills three primary purposes: navigation, flood control and power production. Additional operating purposes include recreation, fish and wildlife, water quality and water supply. Since Lake Barkley and Kentucky Lake are connected with an open canal, the two projects are operated at essentially the same water levels. The targeted water surface elevation for Lake Barkley from December 1st until April 1st is 354 feet AMSL, increasing to 357 feet AMSL by April 15th, and climbing to 359 feet AMSL by May 1st. Lake Barkley remains at elevation 359 feet AMSL until July 1st, declining to 355 feet AMSL by Oct 1st and returning to 354 feet AMSL by Dec 1st. The maximum elevation for flood control is 375 feet AMSL. The water surface elevations are measured at the dam. Higher levels will occur upstream in the reservoir depending on the location and volume of flows.

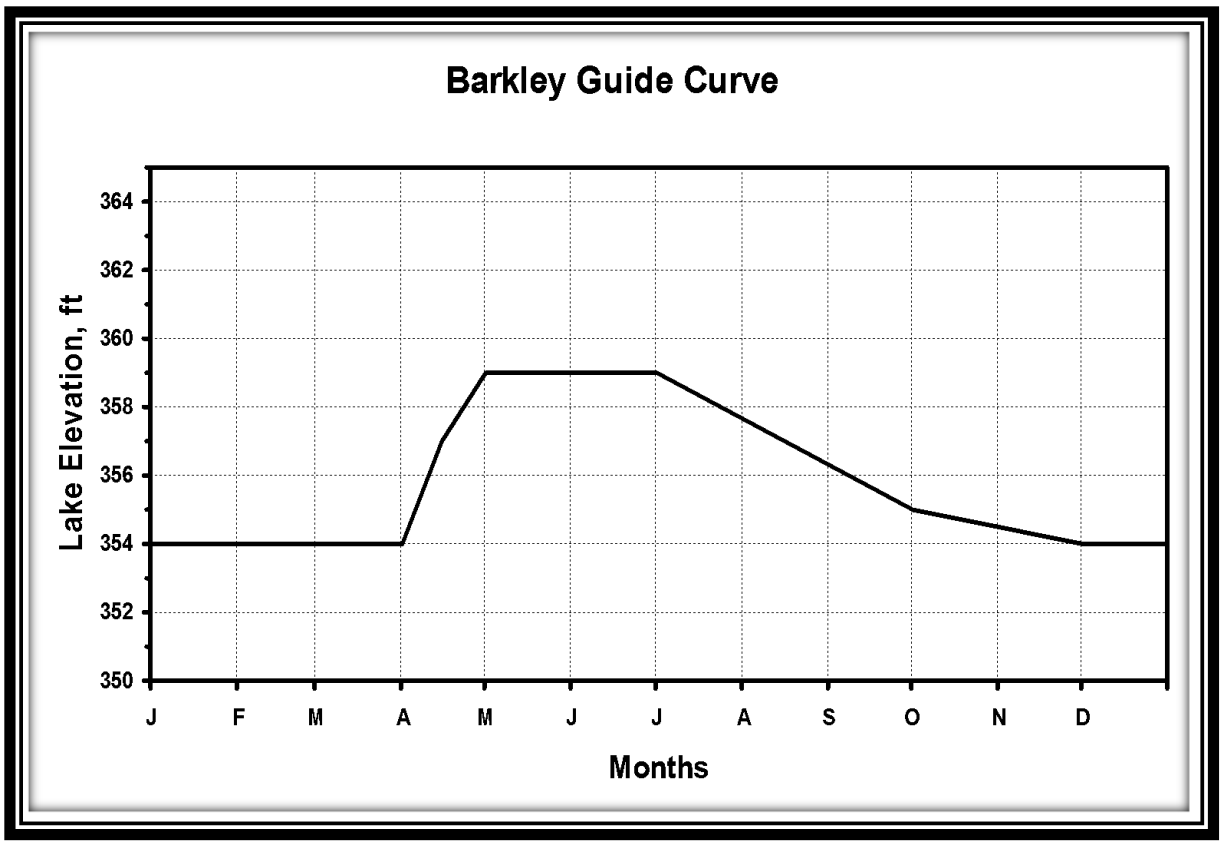

Figure 2.2 - Lake Barkley Water Level Guide Curve

Barkley Dam releases water from four turbine generators and twelve spillway gates. The minimum release rate is 6,000 cfs to ensure sufficient tailwater depth for commercial navigation. A minimum tailwater elevation of 302 feet AMSL is required to facilitate navigation. Elevations above that are common if higher water releases are necessary. More detailed information regarding reservoir operation is referenced in the Barkley Water Control Manual available from the Water Management Section of the Nashville District Corps of Engineers.

Groundwater in the Lake Barkley Watershed is contained in permeable soil and within sinkholes, sinking creeks, springs and other features associated with underground drainage in karst limestone formations. Shallow wells in the area are widely used for domestic water supply. Deeper wells in confined aquifers provide abundant water for industrial, municipal and domestic use.

2-03 Sedimentation and Shoreline Erosion

The total drainage area of the Cumberland River basin above Barkley Dam at CRM 30.6 is 17,598 square miles. However, local runoff comes from only 3,438 square miles below Cheatham Dam at CRM 148.7. The local drainage area has been subject to light development pressure with the largest communities being Clarksville, Tennessee, population 132,929 in 2010, and Hopkinsville,

Kentucky, population 31,577 in 2010. But most of the land is either wooded or agricultural. The terrain ranges from flat floodplains to gently rolling hills with the latter predominating. There is a small amount of karst terrain in the basin. The major tributaries into Lake Barkley are the Red River which drains 1,454 square miles and flows into the upper end of the lake at Cumberland River mile 125.3 and the Little River which drains 605 square miles and flows into the lower end of the lake at Cumberland River mile 59.0.

Thirty-five sedimentation range lines were established for Lake Barkley in April 1966, shortly after the project was constructed. A full resurvey of these ranges was performed in April-May 1974 and again in August 1984. Analysis of data collected during these resurveys indicates the average annual sediment deposition rate during the first 18 years of the reservoir's existence was 0.412 acre-feet per square mile. The design sedimentation rate for the reservoir was 0.333 acre-feet per square mile. Thus, the actual rate has been higher than the design rate which is notable since the design rate didn't take into account J. Percy Priest dam that controls 892 square miles. However, it would still take 294 years for the inactive pool to be filled if this sedimentation rate continues. Due to funding constraints, only one partial survey has been done since 1984. This partial survey was performed in 1995 and covered only 13 of the 35 sediment ranges therefore no calculations were performed. A full resurvey will be scheduled when funding becomes available.

Lake Barkley has 1,004 shoreline miles, the most of any of the Nashville District's projects. The lake is long and narrow with many small side embayments along its length. It is just 1.6 miles across at its widest point upstream of the dam. The upper end of the lake is rather sinuous but the lower end of the lake is straighter, aligned along an almost north-south axis. Fetch lengths, the lengths of water over which wind blows, are limited by the lake's narrowness, the presence of hilly terrain surrounding the lake, and the wooded Land Between the Lakes National Recreation Area along the western shore of the widest portion of the lake. Therefore, natural wave action is rather limited. However, the lake is heavily used by recreational boaters and by commercial barge traffic, which can cause significant wave action with the potential to cause erosion of vulnerable stretches of shoreline. Localized bank protection has been constructed by property owners and long stretches of shoreline within the Cross Creeks National Wildlife Refuge and Bear Creek Wildlife Management Areas have been protected with foreshore dikes. However, the vast majority of the lakeshore remains natural.

The reservoir is operated for flood control with a summer pool elevation of 359 feet AMSL, five feet higher than the winter pool elevation of 354 feet AMSL. The top of the flood control pool is at an elevation of 375 feet AMSL but it rarely approaches this elevation. During the spring 2011 flooding, the lake reached a record pool elevation of 372.5 AMSL. This is the only time the lake elevation exceeded 370 feet AMSL. The highest elevations on Lake Barkley occur during floods on the Ohio and/or Mississippi Rivers, when the reservoir's roughly one million acre-feet of flood storage is

utilized to delay discharges from the Cumberland River. Also, Lake Barkley must be operated in conjunction with the Tennessee Valley Authority's (TVA) Kentucky Lake on the Tennessee River since this lake is connected to Lake Barkley by an uncontrolled navigation canal. The level in these two reservoirs must be closely coordinated to prevent violent flows from occurring in the 1.75 mile canal just upstream of the two dams.

Thus, the generally clayey reservoir shoreline is subject to erosion caused by wave action from wind, boat/barge traffic and fluctuating pool levels due to flood control operations and seasonal pools. But this erosion is limited by the short and/or unfavorable fetch, hilly terrain, and mostly wooded shoreline. It is surmised that the majority of sediment entering the reservoir does so due to surface erosion across much of the drainage area, mostly due to agricultural practices. The Cheatham, Old Hickory, and Cordell Hull projects on the Cumberland River upstream of Lake Barkley are operated as run-of-the-river projects and will contain much of the bed load but pass much of the suspended sediment down to Lake Barkley. The J. Percy Priest, Center Hill, and Dale Hollow projects on tributaries and the Wolf Creek project on the Cumberland River, are operated for flood control and will contain all of the bed load and much of the suspended sediment that flows into them.

The sediment resurveys and visual observation show that large deposits of sediment are common at the upper end of side embayments. This is due to local runoff dropping its load of larger sediment particles as flow enters the pool and slows down. Smaller particles entering the lake can settle throughout the lake when floodwaters are being held back or can be passed on through the dam when floodwaters are being discharged. The Nashville District's navigation mission requires the maintenance of a 300 feet wide by 9 feet deep channel along the main Cumberland River channel within Lake Barkley. Maintenance dredging is periodically performed at various locations in the channel, particularly at the Cumberland City Bypass, with the dredged material often disposed of in other areas of the lake. Thus these activities typically affect the distribution but not the volume of sediment within the reservoir. However, environmental concerns may result in future dredged material being disposed of in an upland location.

2-04 Water Quality

The overall water quality of Lake Barkley is generally good. However, several factors contribute to occasional or seasonal water quality degradation. Discharges from Cheatham Dam are the primary source of inflow to Lake Barkley and contribute to upstream degradation as a result of pollution from the Greater Metropolitan Nashville Area. In recent years though, the Cumberland River has seen water quality improvements in the Nashville region. This is a result of a variety of measures to improve waste water treatment and control of dispersed, watershed, non-point source pollution. Other primary sources of pollution are the rapidly growing Clarksville, Tennessee area with its

municipal and industrial discharges, the TVA Cumberland Fossil Plant (primarily large thermal inputs) at Cumberland City, Tennessee, and runoff from agricultural endeavors.

Generally the uppermost portion (approximately 50 miles) of Lake Barkley has a riverine character that transitions to a more lake like nature below Dover, Tennessee (CRM 88.8). In most of this reach, dissolved oxygen levels are usually adequate to support a variety of desirable biological aquatic life. At Cumberland City (CRM 103) thermal discharges from the TVA Cumberland Fossil Plant warm the receiving river and in some circumstances of low river flow and high summertime temperatures, cause exceedances of state water quality criteria for temperature and dissolved oxygen. In extreme circumstances of deficient river flows and high air temperatures, water quality conditions can be degraded in Lake Barkley for approximately 40 to 50 miles downstream from Cumberland City. Further downstream, where Lake Barkley transitions from riverine to lacustrine, low dissolved oxygen concentrations are often observed in the lower depths of the lake during temperature stratification periods of mid to late summer. The amount of stratification related degradation is strongly related to the amount of flow moving through the main channel along with nutrient inputs and high atmospheric temperatures.

Many of the larger embayments of Lake Barkley behave hydraulically more like small sub impoundments and thus reflect a greater influence of thermal stratification on overall water quality. In addition, higher rates of nutrient enrichment and eutrophication resulting from agricultural runoff affect tributary embayments and to some extent the main channel environment. These factors foster excessive growth of algae and in some locations, other aquatic plants.

Phytoplankton samples are collected and examined both to provide a secondary indication of nutrient enrichment and establish a database relevant to the occurrence of Harmful Algal Blooms (HABs). HABs have become a significant public health and economic concern at many USACE reservoir Projects in the Midwest recently. Fortunately, there have been no documented HAB events of public health concern reported at any Nashville District reservoir, even in areas with known nutrient enrichment factors.

Water quality conditions in the Barkley Dam tailwater and downstream are generally of high quality, supporting an excellent fishery and an improving freshwater mussel fauna. The higher quality, for the most part, is a result of the outflow from Barkley Dam.

Water quality data is collected at Lake Barkley by the Corps of Engineers Water Management Section approximately two to three times per year typically during late spring, mid-summer and early fall. An intensive survey of five sampling trips is conducted once every ten years as mandated by Corps of Engineers regulations. Physical, chemical and biological water quality data are collected at multiple locations throughout the lake and also at several significant inflowing rivers and streams

and the dam tailwater. Sediment contaminant samples are collected once every five years at environmentally representative locations in the lake. See Figure 2.3 and Figure 2.4 for maps of water quality sampling locations for Lake Barkley and for the TVA Cumberland Fossil Plant area.

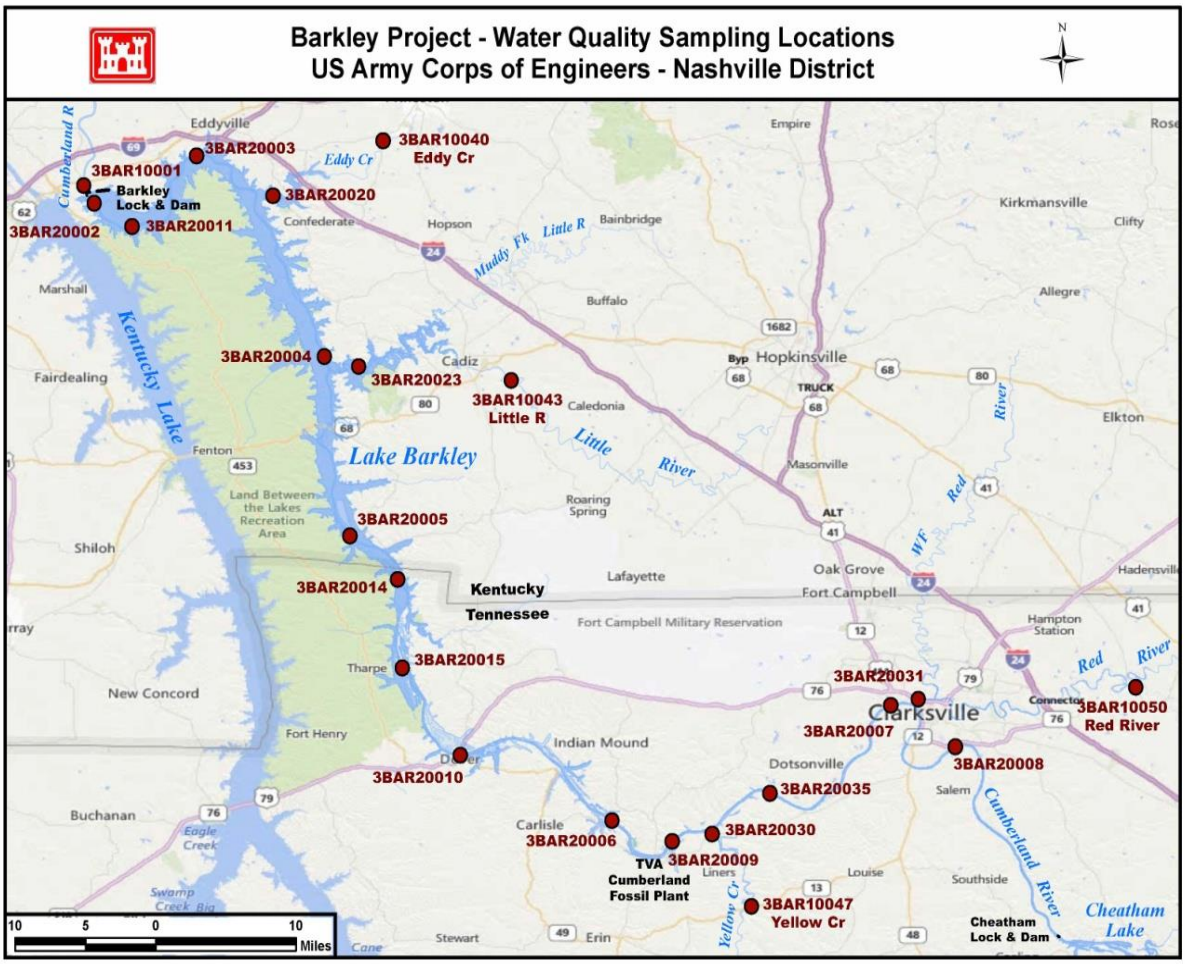

Figure 2.3 - Lake Barkley Water Quality Sampling Locations

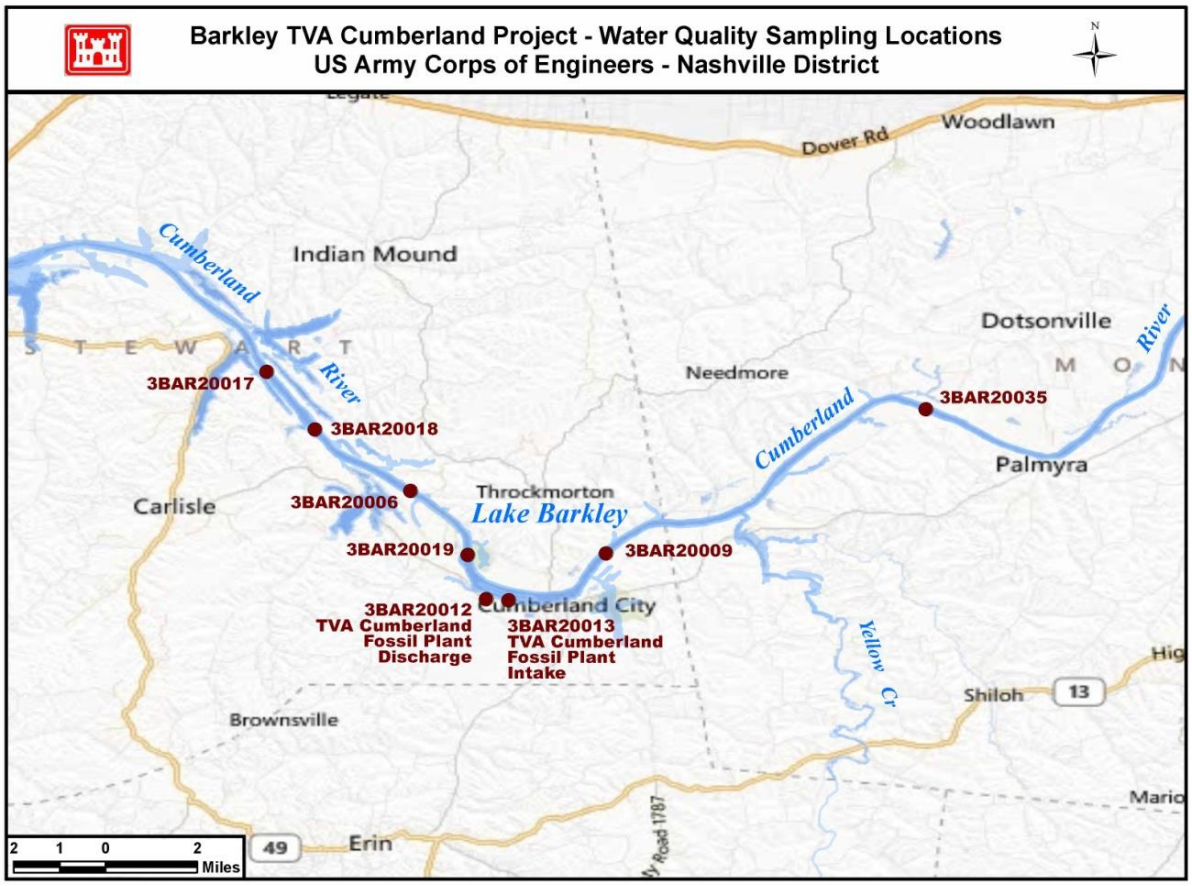

Figure 2.4 - Lake Barkley Water Quality Sampling Locations (Cumberland City Area)

Physical water quality parameters collected include water temperature, dissolved oxygen, specific conductance, pH, and Secchi disk transparency measurements. Chemical samples are typically analyzed for solids, nutrients, metals, sulfate, hardness, chloride and other standard water quality parameters. Phytoplankton (floating algae) and Chlorophyll A samples are collected from the lake stations along with the physical and chemical samples. Benthic macroinvertebrate samples are collected from the lake and inflowing rivers and streams typically once every three years. The attached table describes in more detail the water quality sample collection at each station for Lake Barkley.

Water quality data is collected to provide a snapshot view of conditions at the time of sampling. Repeated, long-term sampling and monitoring of water quality conditions builds a solid base of knowledge guiding improved water management practices and an enabling better understanding of the consequences of various water control actions. Again, the water quality of Lake Barkley is good compared to many other navigable waterways. This is due in part to the relative lack of highly developed adjacent areas and associated industrial and municipal discharges.

The majority of Lake Barkley inflow from Cheatham Dam typically originates from cold releases from upstream storage reservoirs. The temperature of these waters is usually near equilibrium by the time they enter Lake Barkley. Appendix C presents statistical summaries of much of the physical and chemical data collected by the USACE at a variety of locations on Lake Barkley since 1994. The summaries condense a vast amount of information which has been collected over a wide variety of hydraulic (flow) and weather conditions.

Broadly speaking the data collected from these stations indicate surface water temperatures range from near freezing in the winter to a maximum of about 30 ° C (86 ° F). Thermal discharges from TVA Cumberland City Fossil plant skew temperatures somewhat over the middle portion of the reservoir. Physical/chemical data overall reflect a river/reservoir system of vast size and capacity that exhibits overall good water quality conditions. Known water quality degradation does occur from nutrient enrichment, localized sedimentation and ephemeral low flow conditions. Biologically speaking, phytoplankton populations indicate some response to nutrient enrichment but extremes (algal blooms) causing moderate water quality degradation are largely limited to areas lacking vigorous hydraulic regimes, typically certain embayments (Little River, Eddy Creek, et. al.). Benthic macroinvertebrate communities reflect low DO conditions sometimes found in the main channel (thalweg) in the reservoir near the dam but improve in quality in the more riverine portions of the lake. Upper riverine reaches of Lake Barkley support some freshwater mussels, aquatic insects and other desirable aquatic invertebrates.

Zebra mussels are limited in occurrence to suitable hard substrates and have not proven to be a serious biofouling pest either within the aquatic ecosystem or to major water withdrawal systems. Aquatic macrophytes have historically surged in occurrence during low flow, clear water conditions; however these macrophytes seem to occur in limited areas that do not impact project benefits to any significant degree.

Water quality reports, plots and data collected by the Corps of Engineers can be accessed at the following internet site:
http://www.lrn.usace.army.mil/Missions/WaterManagement/WaterQuality.aspx

2-05 Climate

The climate of the Lake Barkley area is moderate. Temperatures range from summer highs (July and August) of 71.3^{o} F to winter lows of 49.3^{o} F in January (US Climate Data, 2015). A record high of 108^{o} F was set in 1942 and tied in June 2012; the record low of minus 15^{o} F was set in January 1985 (National Weather Service, 2015). The average growing season is approximately 200 days, extending from April to October. Annual rainfall for the basin averages 51 inches with an additional seven inches of snow per year (US Climate Data, 2015). Relative humidity for the area ranges from

42% to 93% across the year. Humidity rarely drops below 25%, but does reach 100% at times. Winds predominantly blow from the south or southwest (28 percent of the time); northerly winds occur approximately 20 percent of the time across the watershed. Typical wind speeds are less than 14 miles per hour (mph) (Weatherspark, 2015), with an average speed of 6.8 mph (National Weather Service, 2015).

2-06 Topography

The land surrounding Lake Barkley consists of steep rolling hills and valleys with a range of elevation from 350 feet AMSL to 700 feet AMSL, although the majority of the land around the lake only rose from 350 feet AMSL to 600 feet AMSL. The higher ridges rising above 600 feet are only in Trigg County, Kentucky. The land was formed by platform deposition of sediments in a shallow inland sea, followed by uplift, which created a moderate to deeply dissected surface of ridges, irregular valleys and rolling hills. The ridges and hills are capped with weather resistant rock while the irregular valleys are underlain by karst bedrock.[1]

2-07 Physical Geography

Barkley Dam and Lake Barkley lie in the western portion of the physiographic province Interior Low Plateaus (11) which is also known as the Mississippian Plateau in Kentucky and as the Highland Rim (11c) in Tennessee.[2&3]

[1] Kentucky Geological Society, McGrain and Currents (1978).
[2] Physiographic Regions, United States Geological Survey, 2003, Retrieved 2008.
[3] Fenneman, Nevin M (1931 and 1938) Physiography of Western and Eastern United States. McGraw-Hill

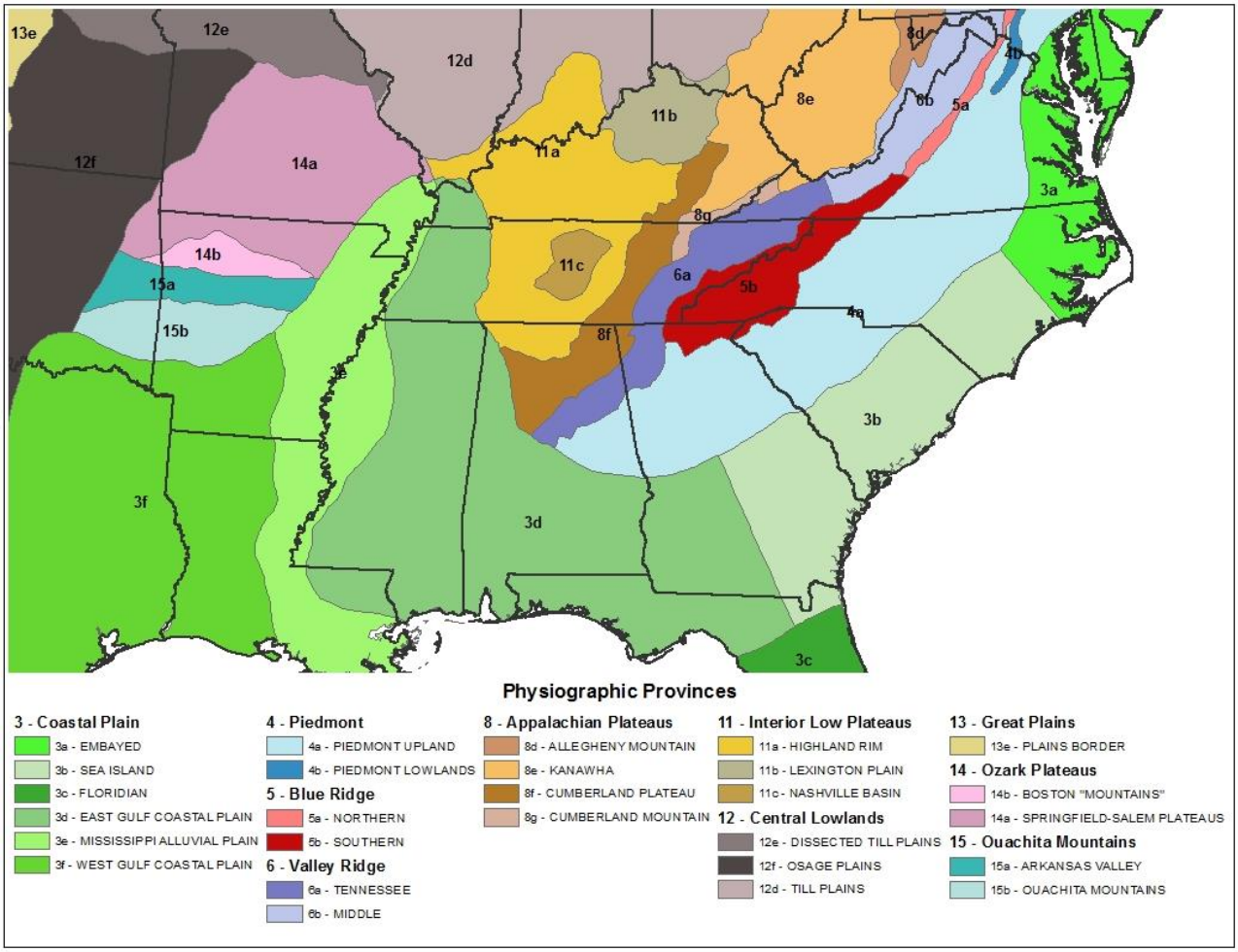

Figure 2.5 - U.S. Physiographic Provinces [2&3]

The lower reaches of the lake are on the edge of the Interior Low Plateau (11) with the Gulf Coastal Plain (3), while the upper reaches of the lake are entirely within the Interior Low Plateaus (11). The Interior Low Plateaus extend across central Kentucky and Tennessee from southern Illinois, Indiana, and Ohio to northern Alabama. The Interior Low Plateaus were never glaciated and are not covered in glacial till allowing the bedrock to be close to the surface and have a dominating influence on the topography. The erosional resistance or susceptibility of the bedrock along with multiple uplift events creating patterns of vertical joints for the down cutting erosion to follow caused the steep ridges, rolling hills, and karst filled valleys of the area. The Mississippian Plateau (light brown in the Kentucky map) and the Highland Rim (light blue) are known for tens of thousands of sinkholes, sinking streams, streamless valleys, springs and caverns.

The dam and the lower reaches of the lake lie on the edge of the Mississippian Plateau with the Jackson Purchase. The Jackson Purchase is the Kentucky part of the larger Mississippi Embayment. The Mississippi Embayment is the northern portion of the Mississippi Alluvial Plain (3e) which comprises about 100,000 square miles in the Coastal Plain. The Coastal Plain (3) extends from the

Gulf of Mexico to the Missouri Bootheel and the southern tip of Illinois and from the tip of Texas to Massachusetts. Specifically, the Mississippi Embayment portion of the Plain follows the failed continental rift system that underlies the Mississippi River.[4] This rift system formed a deep trough that has filled with tens to hundreds of feet of unconsolidated Cretaceous to recent alluvial sediment. The Jackson Purchase has low relief so it is relatively flat lying with numerous lakes, ponds, sloughs, and swamps over the unconsolidated sediments.[5]

2-08 Geology

The bedrock is comprised of the horizontally deposited, carbonate limestone formations that are highly susceptible to karst solutioning. See Table 2.1 for a description of the formations, Quaternary sand, loess and gravel under the dam and lake.[6&7] See Appendix B for corresponding geology plates. In ascending order, the formations present under the dam and lake are the Fort Payne, Warsaw, St. Louis, Salem and St. Genevieve limestones of Mississippian age. The dam is founded on the St. Louis, Warsaw and Fort Payne formations. The left embankment is founded on the St. Louis and Warsaw limestones, the lock is on the Warsaw limestone, and the dam/powerhouse is on the Warsaw and Ft. Payne limestones. The right embankment is founded on ~100+ feet of alluvium. Below the alluvium, at the left end of the embankment with the powerhouse, is the Warsaw formation. The middle portion of the embankment, below the alluvium is the Ft. Payne limestone. At the right end of the embankment, the alluvium overlays the Quaternary sand, loess and gravel. Below these soil deposits, is Warsaw limestone. Along the Cumberland River, the St. Louis and Salem Limestones form steep valley walls.[5]

Frequent faulting across the lake valley raised or lowered the individual limestone layers allowing the upper formations to be eroded away so the lake is founded on different formations than the dam. Moving upstream away from the dam, the lake is founded on alternating layers mainly of St. Louis and Warsaw with minor appearances of Ft. Payne and St. Genevieve limestones.

The Fort Payne yields almost no water where it is unweathered. Where the Ft. Payne limestone has been leached away leaving the chert rubble, wells may produce up to 50 gallons per day. However, where residuum clay is present, little or no water is yielded to wells. The Warsaw limestone is very susceptible to karst solutioning. Wells drilled into this formation, if near a solution feature produce sufficient water for domestic use. However, where karst solutioning has not occurred, Warsaw's

[4] Hildenbrand, Thomas G.; Langenheim, Victoria E.; Schweig, Eugene; Stauffer, Peter H.; Hendley, James W.; "Uncovering Hidden Hazards in the Mississippi Valley", USGS.
[5] Kentucky Geological Survey, 1997-2015.
[6] Fox Jr., Kenneth F., Seeland, David A., Rogers, William B., Weis, Paul L., Theobald, Paul K., Hays, William H., Olive, Wilds W.; U. S. Geological Survey, Geology of the Birmingham, Canton, Eddyville, Grand Rivers, Lamasco, Model, Mont Quadrangles in Kentucky; 1963-1967.
[7] Stearns, Richard G.; Tiedemann, Herbert A.; Wilson Jr., Charles W.; Marcher, Melvin V.; Tennessee Division of Geology; Geologic Map of the Bumpus Mills, Cumberland City, Dover, Needmore, Tharpe Quadrangle, Tennessee; 1965-1968.

yield is insufficient for a bailer or a bucket. The St. Louis and Salem limestones are also very susceptible to karst. These limestones produce numerous springs that discharge from 10 to 100,000 gallons per minute. Most springs are located near minor rivers. In karst area wells produce enough water for domestic used. In non-karst areas, yields are low and wells here are insufficient for domestic use. Springs in this area are seasonal. The Saint Genevieve limestone is also susceptible to karst. And like the Warsaw and St. Louis, in karst areas produce sufficient water for domestic use. Wells outside of solution features are insufficient and often go dry in the summer. Springs in the karst area produce 10 to 1,500 gallons per minute near stream level while springs in the non-karst areas are seasonal.[5]

Table 2.1 - Geology and Soils Column with Map Symbology

Formation/Soil	Symbol	Thickness	Description
Fort Payne	**Mfp**	**600 ft**	**Limestone**-brown to olive gray, fined grained, thin bedded, cherty, silty, argillaceous. 10-50% chert-porcelaneous, medium dark gray, weathered to porous, medium light gray, thin bedded, discontinuous lenses, fossiliferous. Moderately susceptible to karst solutioning; there are fewer features but the features found can be very large. Only produces water when intensely weathered.
Warsaw	**Mw**	**180-240 ft**	**Limestone**, Top bed-thin, dark gray to olive gray, argillaceous, variable thickness, pinches out in places crossbedded with medium light to medium gray, medium to coarse grained, fossiliferous. Upper-middle bed-medium dark gray to dark olive gray, thinly laminated, argillaceous, silty, cherty, interbedded with medium light gray to light olive gray, coarse grained crossbedded bioclastic limestone. Lower-middle bed-light olive gray grains in very light gray chalky matrix, medium to coarse grained, bioclastic, soft, homogenous limestone. Bottom bed-light gray to light olive gray, medium to coarse grained, thick bedded, cherty, silty, interbedded with medium olive gray cherty limestone and light olive gray, coarse grained, bioclastic limestone. 8-15% medium dark gray, dense chert nodules in light gray bioclastic layers. Very susceptible to karst solutioning but features found have been as large as the largest found in the Ft. Payne. Only produces water where karst solutioning occurs.
St. Louis	**Msls**	**430 ft**	**Limestone**, Upper member-light gray, medium grained, thick bedded, bioclastic interbedded with oolitic and light brown-gray dolomite and light gray cherty limestone. Lower member-upper bed-brown-gray dolomitic, abundant nodular chert, interbedded w/ light-brown gray to light gray oolitic limestone. Lower bed-medium gray to medium brown-olive gray, very fined grained, thick to thin bedded dolomite interbedded with brown-gray, very thin bedded, argillaceous limestone and brown-gray, coarse grained, thick bedded, fossiliferous limestone. Abundant dark to medium gray nodular chert and drusy vugs just above lower contact. Karst solutioning produced numerous springs flowing less than 10 gallons per minute or as high as 100,000 gallons per minute. Most springs are situated near minor rivers. Karst area

			produce sufficient water for wells while non-karst areas are inadequate for domestic use.[5]
Salem	**Msu**	**120 ft**	**Limestone**, Upper bed-light brown gray and medium brown gray to dark gray, medium to coarse grained, thick bedded, fossiliferous, interbedded with light brown gray, thick bedded, oolitic limestone and dark gray, very thin bedded, argillaceous limestone. Lower bed-dark gray, very fine grained, laminated, argillaceous limestone with irregular, chert nodules, interbedded with thin layers of medium dark gray, coarse grained, bioclastic limestone. The karst nature and the hydrology of Salem is the same as the St. Louis.
St. Genevieve	**Msg**	**165 ft**	**Limestone**, Upper bed-light gray to light olive gray, fine grained, thick bedded, stylolitic, interbedded with light gray, medium grained and light gray, oolitic limestone. Middle bed-**Sandstone**-light green gray, fine grained calcareous. Lower bed-**Limestone**-very light gray to white, oolitic, stylolitic, minor amounts of light brown gray to light olive gray, fine grained, fossiliferous. Susceptible to karst solutioning which provides good sources of well water or springs but solution features above the perennial streams will run dry in summer months.
Alluvium	**Qal**	**0 – 60 ft**	**Clay, silt, sand, and gravel**-pale brown, yellowish-brown, reddish brown to light-medium gray, unsorted, angular to subrounded chert gravel and quartz sands. Sands and gravels form lenses in clay and silt. In stream valleys, largely derived from local bedrock, generally unconsolidated but occasionally weakly cemented.
Sand	**Qs**	**0 – 10 ft**	**Sand**-brown, well sorted, mostly structureless, more than 90% subangular quartz grains, some chert, minor silt and clay.
Loess		**0 – 6 ft**	**Clay, silt, and fine sand**-brown, wind deposited, thin blanket on hilltops and flat areas.
Gravel	**QTg**	**0 – 10 ft**	**Gravel**-light brown, poorly sorted, well-rounded pebbles, up to 8 inch cobbles, little sand. Mostly chert with minor quartz. Occasionally iron stained. Thin, discontinuous capping on ridge crests and slopes.
McNairy	**Km**	**0 – 15 ft**	**Silt, sand, and clay**-red to reddish brown, poorly to moderately consolidated, poorly exposed, see only in roadcuts and gullies.
Tuscaloosa	**Kt**	**0 – 150 ft**	**Gravel**-white to light pink when fresh, forms very light gray cobble pavements on steep slopes, chert with interstitial sand, silt, and clay. Locally well cemented by silica or hematite. Thin, discontinuous layers to thick, extensive deposits. Iron stained, subrounded to well rounded, ¼ to 4 inch diameter. Mixed with angular chert residuum derived from underlying limestones.

In the upper most reaches of the lake, near Cumberland City, exists a cryptoexplosive structure known as the Wells Creek Structure. The circular basin has a diameter of eight miles with extensive faulting, folding and brecciation. The structure exposes the Devonian, Silurian and Ordovician formations that normally underlie the Ft. Payne limestone. These rocks are composed of limestones and shales with the Knox Dolomite as the floor of the structure. The shatter cones show the structure was caused by meteor impact.

2-09 Soils

There are only two types of dominant soil orders along Lake Barkley: alfisols and ultisols. Alfisols are moderately leached soils that have relatively high native fertility. These soils mainly form under forest and have accumulated clays. Alfisols are very productive soils for both agricultural and forestry use. Ultisols are strongly leached, acid forest soils with relatively low native fertility. They are found on older, stable landscapes. They have undergone intense weathering and the calcium (Ca), magnesium (Mg) and potassium (K) have been leached out. Ultisols have accumulated clays with iron oxide. Ultisols often support productive forests. The high acidity and low quantities of Ca, Mg, and K make them poorly suited for continuous agriculture without the use of fertilizer and lime. However, with fertilizer and lime, Ultisols can be very productive.[8]

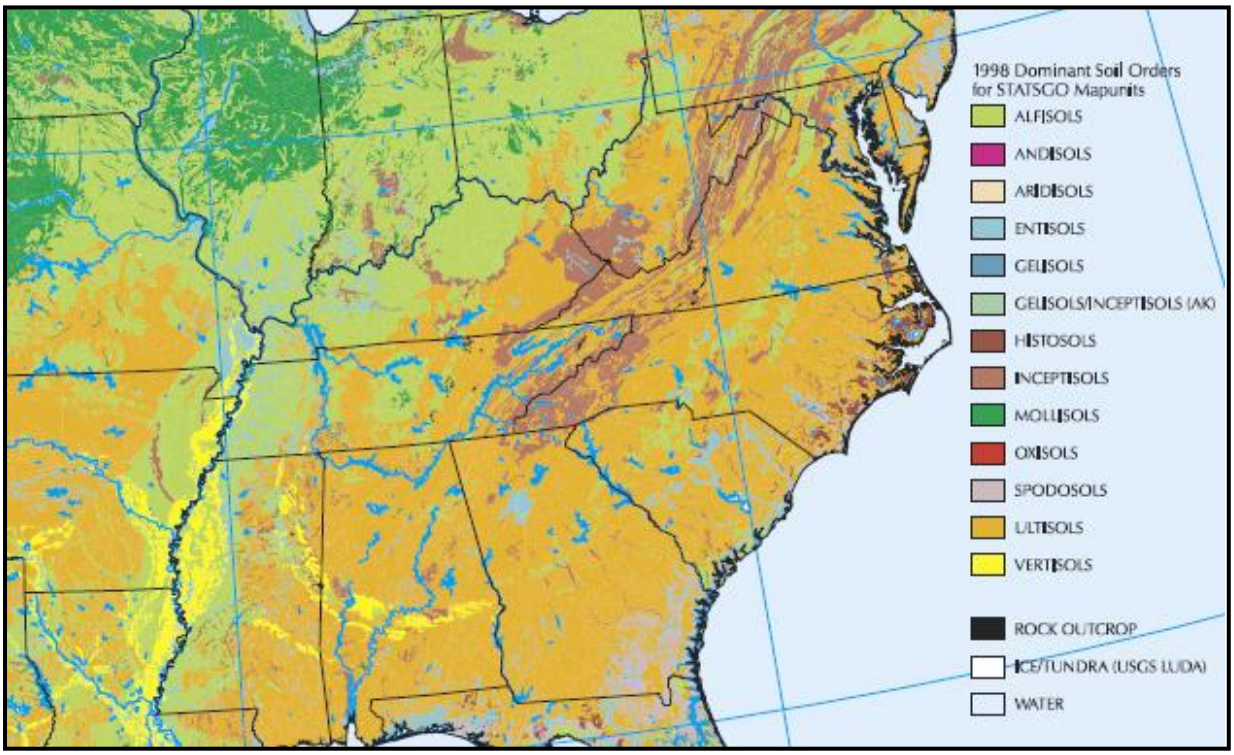

Figure 2.6 - Dominant Soil Order Map[9]

Alluvium occupies the valley bottoms of all major streams and the Cumberland River valley. The alluvium is composed to silts, sands and clays. Residual soils generally blanket the hills, ridges and uplands around the lake. The first of these is a Tertiary/ Quaternary Gravel on the hills near the dam. Below that is the Tuscaloosa Formation, which was derived by the weathering of the underlying rocks and is predominately clays with chert gravels. The Tuscaloosa is of Cretaceous age. On the lower reaches of the lake, the McNairy Formation occasionally occurs between the

[8] McDaniel, Paul; University of Idaho, College of Agricultural and Life Sciences, Soil and Land Resources Division.
[9] USDA Natural Resources Conservation Service.

Gravel and the Tuscaloosa formation. The McNairy and the Tuscaloosa are the only soils that are semi-consolidated.

When the alluvium of the Cumberland River is coarse grained and thick, it yields several hundred gallons per minute. However, if the alluvium is fine grained and thin, it will not yield sufficient water for domestic use. The sand, loess and gravel only yield small quantities of water, around 10 gallons per minutes from the water bearing gravels overlying clay layers. The McNairy yields sufficient water for domestic use when it is exposed near bedrock or has a perched water table. When these conditions are met and the formation is thick, wells yield up to 830 gallons per minute. The Tuscaloosa is not a significant aquifer; wells are only adequate for bailer. The yields are low due to the clayey matrix and poor sorting.[8]

The soil types are further broken down by the National Cooperative Soil Survey in the Web Soil Survey operated by the Natural Resources Conservation Service. A total of 130 soils were mapped on the hills surrounding Lake Barkley.

2-10 Resource Analysis (Level 1 Inventory Data)

2-10.A Fish and Wildlife Resources

2-10.A.1 Terrestrial Fauna

Lake Barkley 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 Bear Creek Wildlife Management Area, provides additional habitat for feeding, nesting and cover.

The state wildlife agencies for Kentucky (KDFWR) and Tennessee (TWRA) have primary jurisdiction for wildlife management on public lands at Lake Barkley for their respective states. In order to implement state management practices on USACE land and water, approximately 2,264 acres are licensed to TWRA and approximately 4,384 acres are licensed to KDFWR. Additionally, other various agencies operate Designated Wildlife Management Areas on public land and water at Lake Barkley. The US Forest Service operates the Land Between the Lakes National Recreation Area (LBL). This is a large, multidiscipline management area consisting of 170,000 acres located on the west side of Lake Barkley. Other areas include: Bear Creek WMA, KDFWR Levee Waterfowl Refuge Area (Duck Island), Lake Barkley WMA (Kentucky Islands), Cross Creeks National Wildlife Refuge and

Barkley WMA (Tennessee). Descriptions of each of these areas are included in the 2005 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 2005 Operational Management Plan, Part I.

2-10.A.2 Aquatic Fauna

A total of 66 fish species from 17 families have been found in Lake Barkley. These species are divided into three categories: rough fish, game fish and forage fish. The rough fish comprise approximately 7 percent by number and forage fish approximately 87 percent by number. The most important game fish species (in terms of sport fishery) appear to be crappie and largemouth bass.

Within the Tennessee portion of Lake Barkley, the black basses (largemouth bass and spotted bass), temperate basses (white bass, striped bass), crappie (white and black) and sauger are the most sought game fish in the lake. Smallmouth bass are found in the lake, but are not common. Striped bass or rock fish are also rare occurrences, although some migration from the Ohio River may occur. The rough fish include the catfish (blue, channel and flathead), bullheads (brown, black and yellow), carp, buffalo (smallmouth, bigmouth and black), drum, gar (spotted, shortnose and longnose), bowfin, redhorse (river, black and golden), carpsuckers, stoneroller, paddlefish and darters. The dominant forage fishes include skipjack herring, gizzard shad and threadfin shad with shiners and minnows comprising lesser abundances.

Within the Kentucky portion of Lake Barkley, the black basses (largemouth bass and spotted bass), temperate basses (white bass and yellow bass), crappie (white and black) and sauger are the most sought game fish in the lake. Smallmouth bass are found in the lake, but are not common. Striped bass or rock fish and the hybrid striped bass are occasionally caught by anglers fishing for temperate bass in the northern reaches of the lake. The rough fish include the catfish (blue, channel, and flathead), bullheads (brown, black, and yellow), carp, buffalo (smallmouth, bigmouth, and black), drum, gar (spotted, shortnose and longnose), bowfin, redhorse (river, black and golden), carpsuckers, stoneroller, paddlefish and darters. The dominant forage fishes include skipjack herring, gizzard shad, and threadfin shad with shiners and minnows comprising lesser abundances. In recent years, the non-native Asian carp species (silver and bighead) have become part of the

rough fish fishery. Rainbow trout have been caught by anglers in the northern reaches of Lake Barkley, although their presence is rare. Rainbow trout found in the lake come from an annual stocking by KDFWR in Casey Creek, part of the Little River drainage of Lake Barkley. A detailed list of species inhabiting Lake Barkley is included in Appendix A of the 2005 Operational Management Plan, Part I.

2-10.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 Lake Barkley.

Table 2.2 - Current Vegetation Composition at Lake Barkley

Vegetation Type	Percent of Project Lands
Non-Vegetated (open water)	66%
Herb Dominated	11%
Shrub Dominated	1%
Tree Dominated – Closed Canopy	13%
Tree Dominated – Open Canopy	9%

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 Forest Management Plan (found in Part 1 of the Operational Management Plan, discussed in Chapters 6), are designed to improve or maintain the vegetation surrounding Lake Barkley.

Four general forest types have been identified within the project boundaries as discussed below and seen in Figure 2.7.

Oak-Hickory Type: The oak-hickory type tends to be "dominant" in Western Kentucky 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.

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.

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.

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.

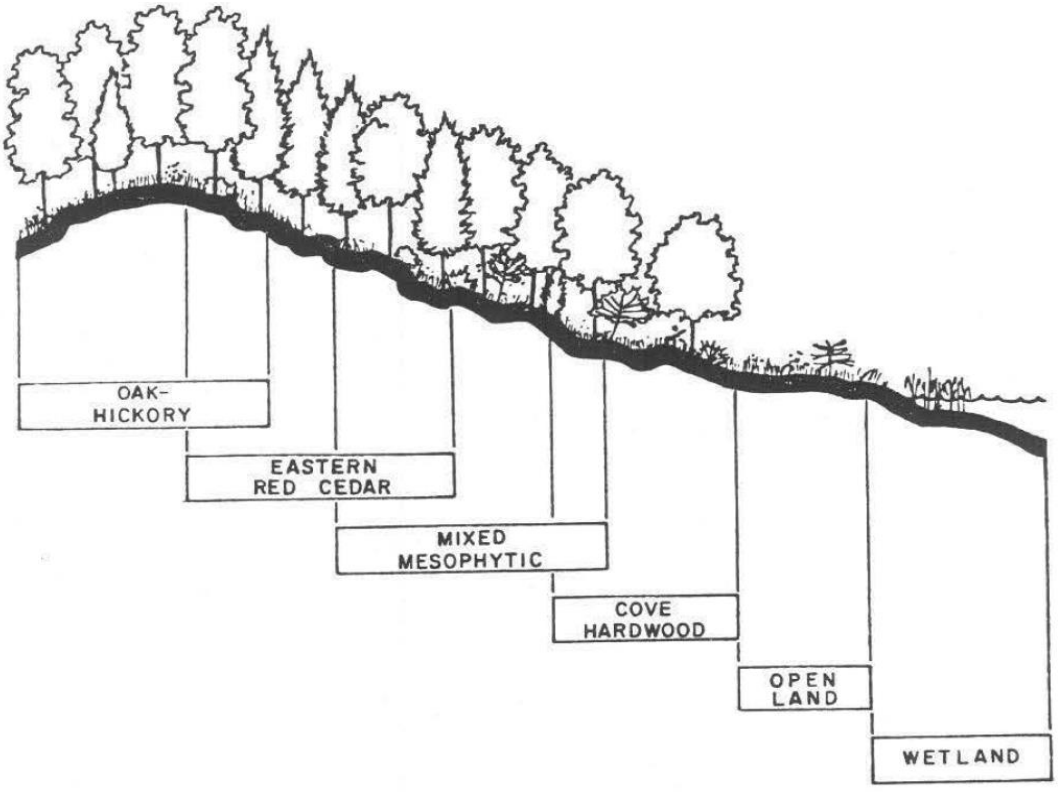

Figure 2.7 - Typical Forest Types at Lake Barkley

The vegetation on Lake Barkley is classified by the National Vegetation Classification Standard (NVCS) (Figure 2.8), 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 percent acreages (Figure 2.8) on Lake Barkley are broken down into vegetated and non-vegetated divisions and descriptions (Table 2.3) of the type of vegetation in each class.[10]

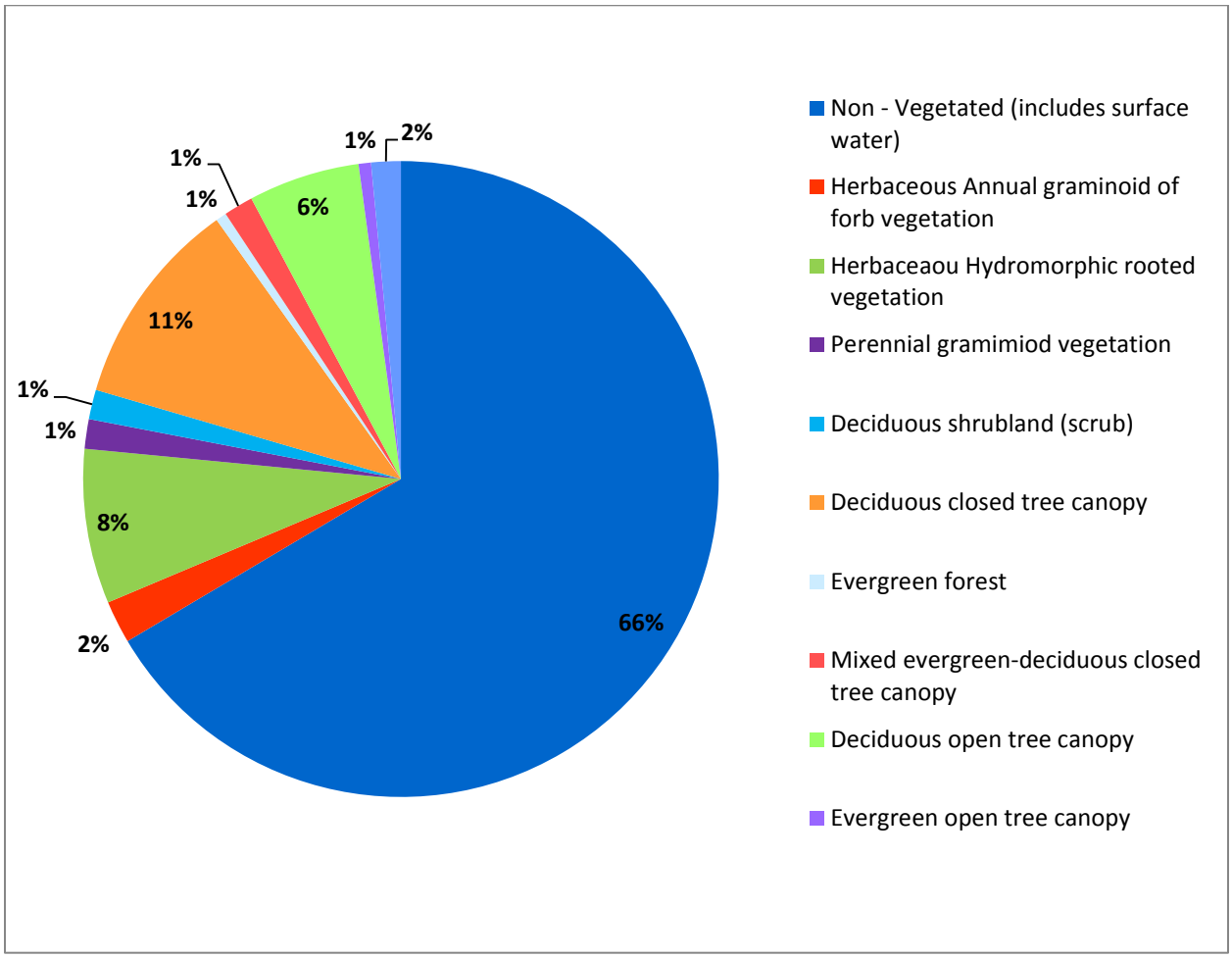

Figure 2.8 - Vegetation Classification Acreage Records for Lake Barkley, as designated by the National Vegetation Classification Standard (NVCS)

Table 2.3 - Definitions of NVCS Classifications

[10] The data was derived from the Federal Multi-Resolution Land Characteristics Consortium (MRLC) Tree Canopy and Land Use datasets, both 2011.

Class\Value	Classification Description
Non-Vegetated	
Developed, Medium Intensity	Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for part of the total cover.
Open Water	Areas of open surface water without vegetative 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.
Shrubland	
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 shrubs, young trees in an early successional stage or trees stunted from environmental conditions.
Herbaceous	
Grassland/ Herbaceous	Areas dominated by gramanoid 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
Forest	
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.
Vegetation Condition Definitions:	
Sustainable	Meeting desired state. The acreage is not significantly impacted by any factors that can be managed and does not require intensive management. The acreage also meets operational goals and objectives set out in project OMP or other applicable management document. These acres are considered healthy and sustainable for future generations. Only minor management practices may be required to maintain the health. *On lands at Lake Barkley, 98% can be described as sustainable.*
Transitioning	Managed to meet desired goals. The acreage is impacted by human or other environmental factors that require management of the acreage to meet goals and objectives outlined in the project OMP or other applicable management document. *On lands at Lake Barkley, 1.5% can be described as transitioning.*
Degraded	Does not meet desired goals. The acreage is significantly impacted by human or other environmental factors that prevent the acreage from meeting desired goals outlined in the project OMP or other management documents. The acreage is not considered healthy. Intense management may be required to

Class\Value	Classification Description
	meet desired goals. *On lands at Lake Barkley, .5% can be described as degraded.*

2-10.C Threatened & Endangered Species

A list of endangered species within the Lake Barkley counties is found in Table 2.4. Bird species such as the peregrine falcon (*Falco peregrinus*) and the bald eagle (*Haliaeetus leucocephalus*), which have been delisted, may migrate through the area. Several of the listed species are mussels, which may still survive in reaches of the river or historically occurred prior to impoundment.

In 2014, the USFWS identified areas within the Corps' area of responsibility at Lake Barkley as critical habitat for Short's bladderpod. Figure 2.9 depicts these areas which are located within Lake Barkley's flowage easement estate. 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.

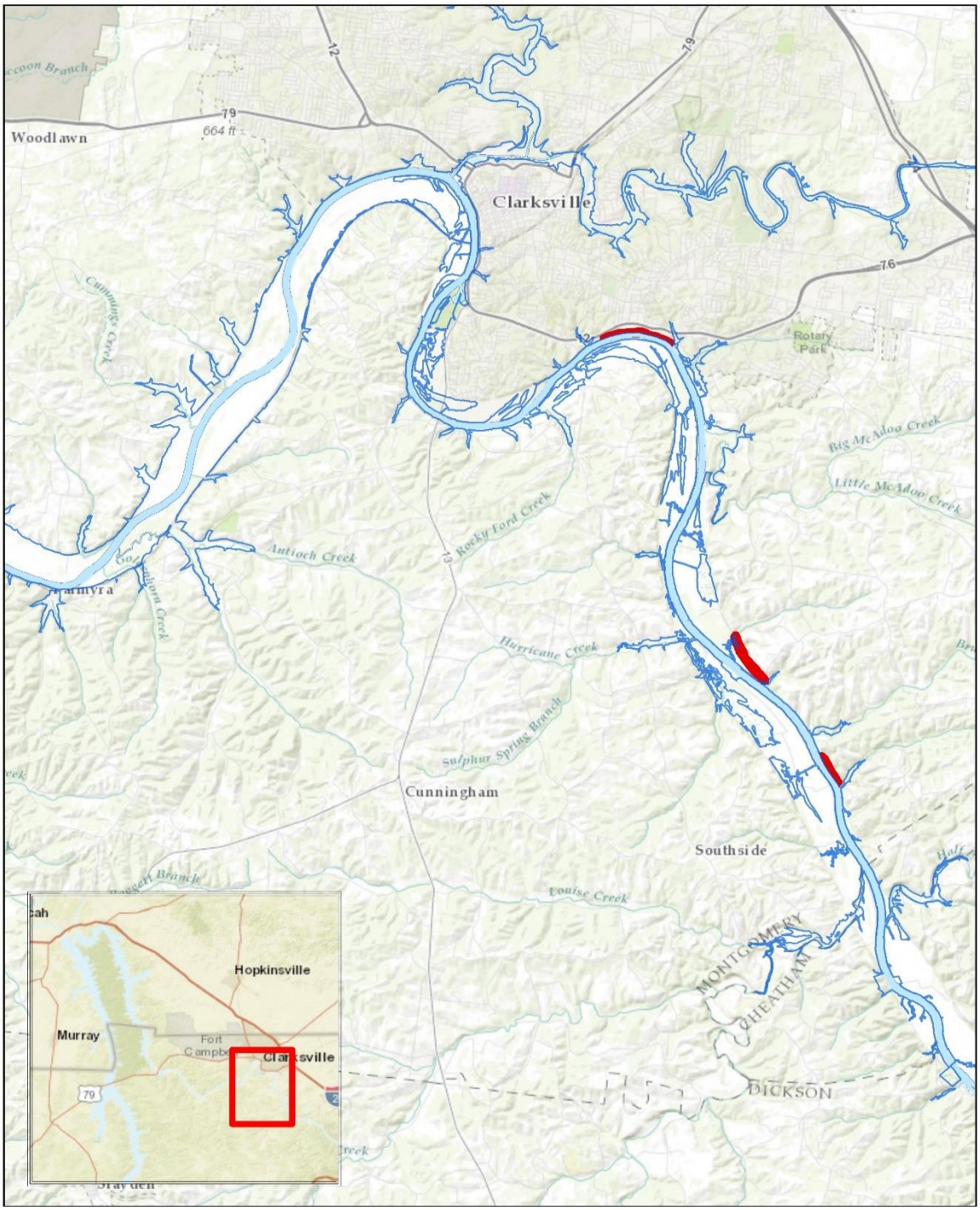

Figure 2.9 - Short's Bladderpod Critical Habitat Areas

Table 2.4 - Federally Listed Species Recorded in the Lake Barkley Project Area

Group	Species	Common Name
Mammals	*Myotis sodalis*	Indiana bat
	Myotis grisescens	Gray bat

Group	Species	Common Name
	Myotis septentrionalis	Northern long-eared bat
Mussels	Epioiblasma florentina walker	Tan riffleshell
	Lampsilis abrupta	Pink mucket
	Obovaria retusa	Ring pink
	Potamilus capax	Fat pocketbook
	Pleurobema clava	Clubshell
	Plethobasus cooperianus	Orangefoot pimpleback
Plants	*Apios priceana*	Price's potato bean
	*Physaria globosa**	Short's bladderpod
Birds	*Sterna antillarum*	Least tern
Insects	*Pseudanophthalums colemanensis*	Coleman cave beetle
	* Critical Habitat Designation	

Source: USFWS website, historic Corps records and consultation with state and federal agencies

2-10.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. Being pro-active and increasing awareness helps lower costs associated with invasive species management.

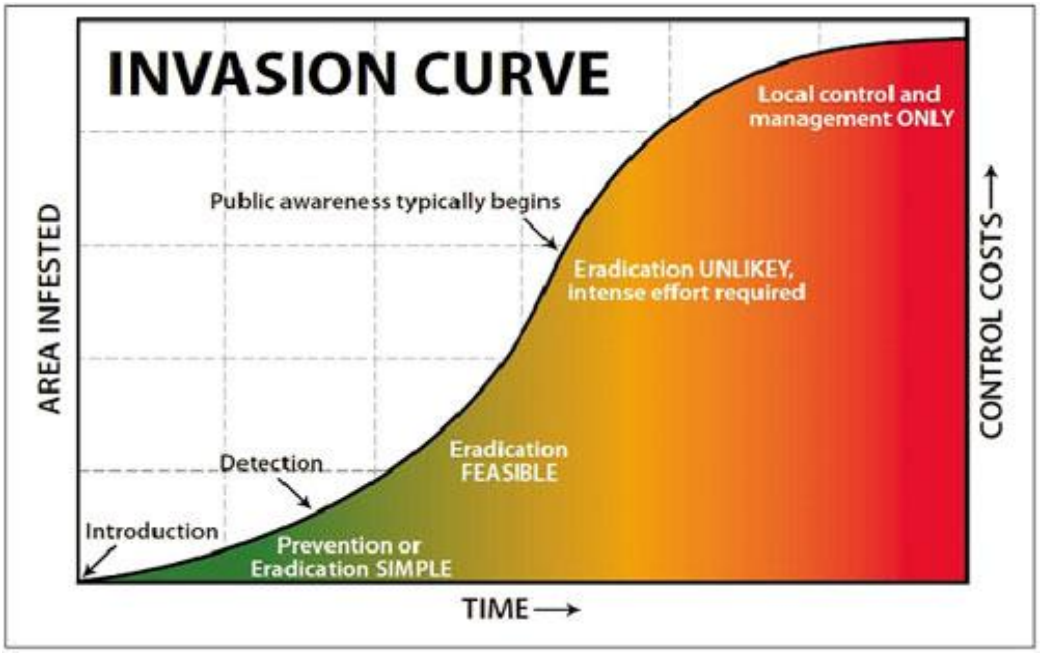

Figure 2.10 - Invasion Curve

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 planipennisi* and *Oobius agrili*, are reared and provided by the USDA as biological control agents for the emerald ash borer.

2-10.D.1 Emerald Ash Borer

The emerald ash borer (EAB), *Agrilus 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 and Kentucky. 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 and Kentucky, 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 thousands of related web sites. In order to prevent the spread of the emerald ash borer, non-local firewood is prohibited in Lake Barkley campgrounds.

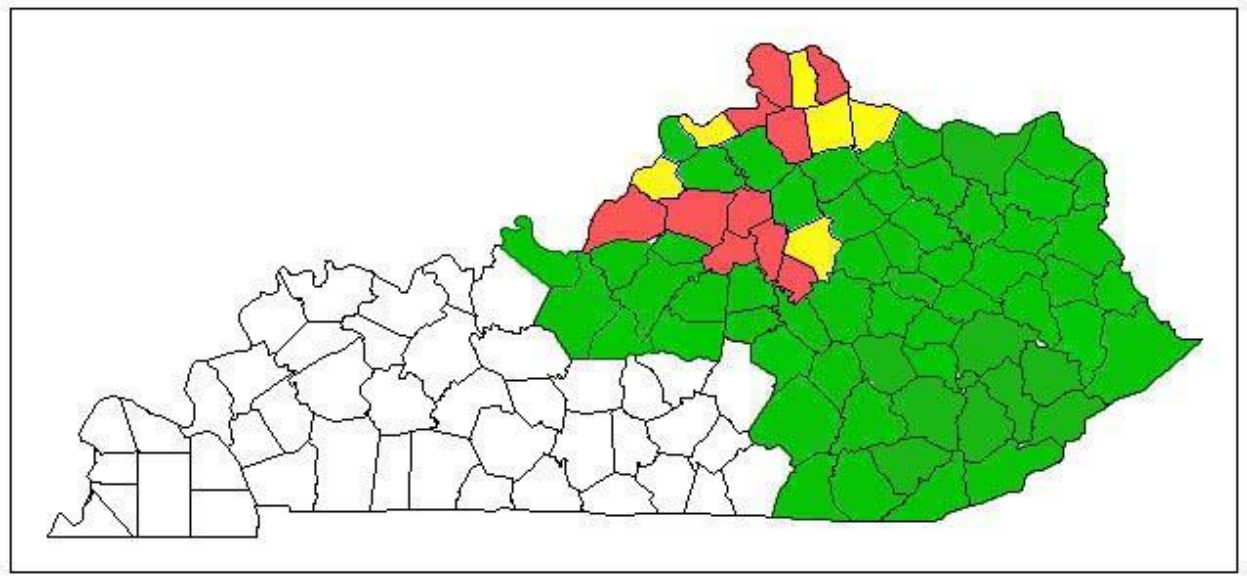

Figure 2.11 - 2016 Estimated Emerald Ash Borer Infestation Levels (Green = Light, Yellow = Moderate, Red = High).

2-10.D.2 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 2.12.

Figure 2.12 - 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/.

In April of 2014, the tailwater area below Barkley Dam experienced a large die off of silver carp. The KDFWR estimated that 300,000 to 500,000 silver carp died as a result of gas bubble disease which occurs when the fish are subjected to high concentrations of gas in the water. However, this event did not significantly affect any other species of fish. The initial cause was thought to be a viral pathogen but multiple laboratory tests ruled out this hypothesis. The KDFWR speculates that a combination of the following events led to the large die-off: 1) high backwater from the Ohio River, 2) larger than normal numbers of silver carp congregating below the dam, 3) the fish were stressed

from recent spawning activity, and 4) possible harsh winter and cool spring conditions compromised the species' immune system.[11] This area will be observed closely for future die-offs of Asian carp to possibly identify a pattern that could be replicated in order to control the spread of this invasive species.

2-10.D.3 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 2.5 includes common invasive plant species found in Tennessee and Kentucky on Lake Barkley.

Table 2.5 - List of Common Invasive Exotic Pest Plants in Tennessee and Kentucky

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

[11] Lake Barkley and Kentucky Lake Tailwaters Asian Carp Die-Offs, Paul Rister, Western District Fisheries Program Director, Kentucky Department of Fish and Wildlife Resources, February 2015.

2-10.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 Lake Barkley 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 classification 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.

Lake Barkley falls primarily within the Western Highland Rim Ecoregion, but also has small portions within the Western Pennyroyal Karst Plain Ecoregion. See Figure 2.12 to reference the locations of the ecoregions in middle Tennessee.

2-10.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 interfluves and in the stream and river valleys. The predominant land uses are hay, pasture and cattle with some cultivation of corn and tobacco.

2-10.E.2 Western Pennyroyal Karst Ecoregion

The Western Pennyroyal Karst (ecoregion 71e) is a flatter area of irregular plains, with fewer perennial streams compared to the open hills of the Western Highland Rim (71f). Small sinkholes and depressions are common. The productive soils of this highly agricultural area formed mostly from a thin loess mantle over Mississippian-age limestones. Most of the region is cultivated or in pasture. Tobacco and livestock are the principal agricultural products, with some corn, soybeans and small grains. The natural vegetation consisted of oak-hickory forest with mosaics of bluestem prairie. The barrens of Kentucky that extended south into Stewart, Montgomery and Robertson counties were once some of the largest grasslands in Tennessee.[12]

[12] TDEC, 2000

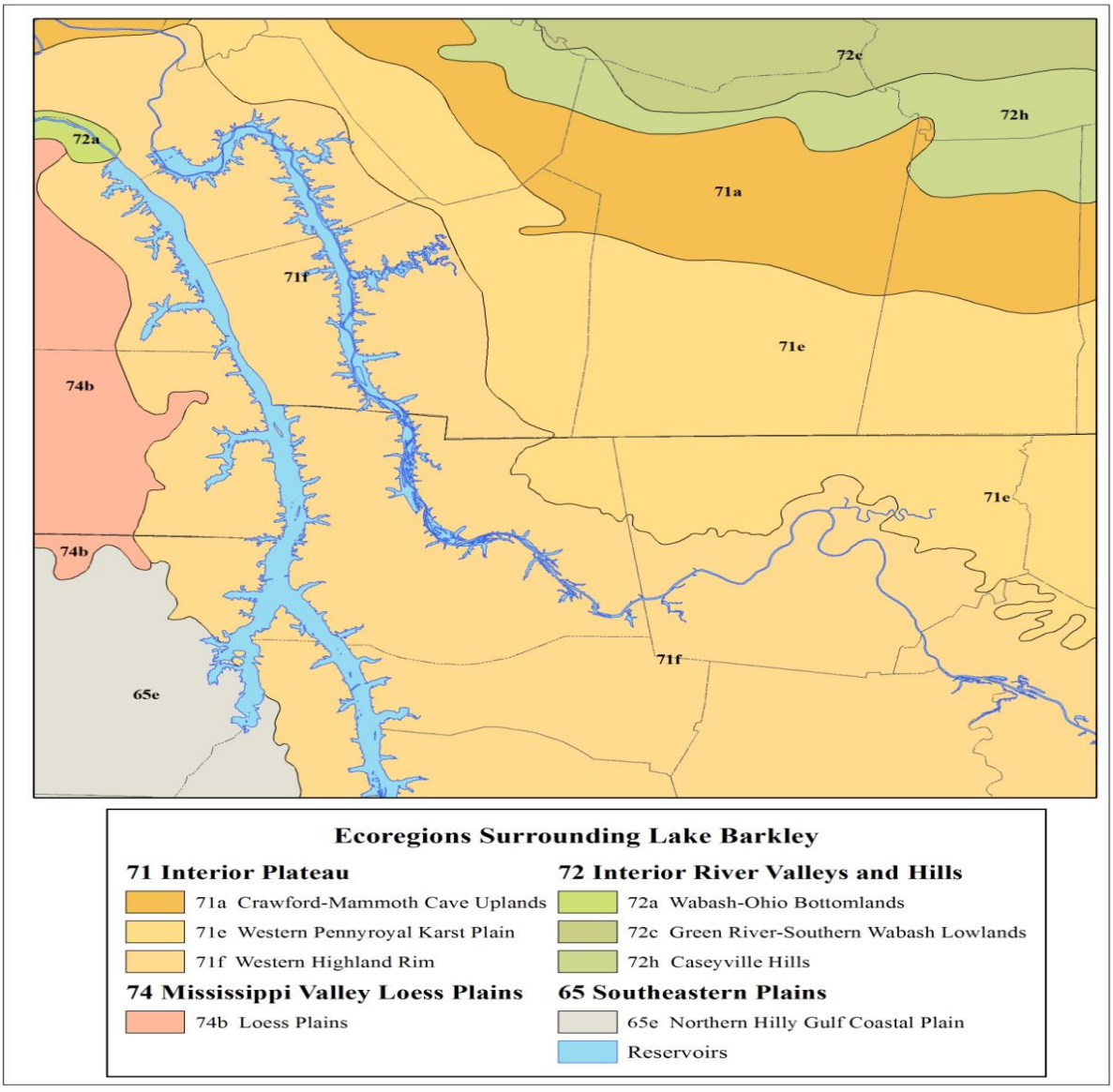

Figure 2.13 - Ecoregions in the Lake Barkley Area, Lake Barkley falling in Ecoregions 71e and 71f
Source: USEPA Ecoregions of Tennessee and Ecoregions of Kentucky Maps

2-10.F Wetlands

According to the US Fish and Wildlife Service's National Wetlands Inventory (NWI) (2014) there are approximately 5,161 acres identified as wetlands, exclusive of the deep water habitat, within the Lake Barkley fee area. The most common classifications, beyond lake, are palustrine forested or scrub-shrub (4,270 acres), palustrine emergent (761 acres) and riverine (67 acres). Approximately 42,302 acres are classified under the Cowardin system as lacustrine (lake). 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 2.6 - Acres of Wetlands by Wetland Classification Type on Lake Barkley

Wetlands and Deepwater Habitats Classification	Acres (approx) on Lake Barkley
Lacustrine, Limnetic, Unconsolidated Bottom	41,454
Lacustrine, Littoral, Unconsolidated Shore	848
Palustrine, Emergent	761
Palustrine, Forested	2,466
Palustrine, Scrub-Shrub	1,804
Palustrine, Unconsolidated Bottom	57
Palustrine, Unconsolidated Shore	2
Riverine, Upper Perennial, Unconsolidated Bottom	67

2-11 Cultural Resources

People have occupied the Cumberland River Basin for over 10,000 years. Archaeological sites dating to the Paleoindian, Archaic, Woodland, Mississippian, and Historic periods are scattered throughout the basin. Pre-inundation surveys of Lake Barkley identified 51 archaeological sites, including several Mississippian villages. Approximately 80 additional sites have been identified on USACE land, and hundreds of additional archaeological sites have also been recorded in the vicinity on Forest Service, Department of Interior and private lands in the last several decades (Gregory et al 2011; Pollack 2008; USACE 2016). In addition, the Lock, Dam and Hydropower Plant are historically significant due to the Engineering and Design work and for the historic development of the region in the late 20th Century (McCroskey and McCormick 2015).

2-12 Demographics

The region of demographic significance considered here is the general market area in which the reservoir is situated and is confined in one geographic area considered the “primary area” counties. The primary area consists of Livingston County, Kentucky; Lyon County, Kentucky; Trigg County, Kentucky; Montgomery County, Tennessee; and Stewart County, Tennessee. The primary area experienced a growth rate of 60% from 1990 to 2010 while the States of Kentucky and Tennessee grew at rates of 17% and 30% respectively for the same time period. This drastic growth was driven largely by Montgomery County, Tennessee’s 71% increase in population between 1990 and 2010. With the exception of Livingston County, Kentucky all the remaining counties growth somewhat mirrored that of their respective state and the Nation as a whole.

Table 2.7 - Historic and Projected Populations for Primary Area Counties

County	1990	2000	2010	2030	2060	% Change from 1990-2010
Livingston, KY	9,062	9,804	9,423	10,230	10,289	4%
Lyon, KY	6,624	8,080	8,170	9,037	9,648	23%
Trigg, KY	10,361	12,597	14,198	16,188	18,877	37%
Montgomery, TN	100,498	134,768	172,331	267,933	414,118	71%
Stewart, TN	9,479	12,370	13,165	14,302	13,988	39%
Primary Area Total	136,024	177,619	217,287	317,690	466,920	60%
State of KY	3,685,296	4,041,769	4,327,238	4,998,884	5,760,010	17%
State of TN	4,877,203	5,689,283	6,338,970	7,433,347	8,492,360	30%
The Nation	248,709,873	281,421,906	308,498,560	363,686,916	417,691,887	24%

Source: U.S. Census Bureau, Proximity One

Table 2.8 displays primary cities in the general market area population changes from 2010 thru 2016 located within the primary area. All these municipalities grew at a slower rate than the States of Kentucky and Tennessee for this time period.

Table 2.8 - Primary City Population Change

City	2010	2016	% Change
Salem, KY	720	735	2.0%
Eddyville, KY	2,350	2,572	9.4%
Cadiz, KY	2,558	2,626	2.6%
Hopkinsville, KY	32,040	31,811	-0.7%
Clarksville, TN	132,929	150,287	13.1%

Source: U.S. Census Bureau

The five counties in the primary area have a tremendous difference between urban and rural dwellers. Montgomery County, Tennessee has predominately urban dwellers, while Lyon County, Kentucky and Stewart County, Tennessee consist of predominately rural dwellers. Table 2.9 displays the breakout of each county's percentage of urban and rural dwellers.

Table 2.9 - Proportion of Urban and Rural Populations in 2012

County	Urban	Rural
Livingston, KY	5%	95%

Lyon, KY	5%	95%
Trigg, KY	21%	79%
Montgomery, TN	80%	20%
Stewart, TN	5%	95%

Source: City-Data.com

The population of the primary area is principally Caucasian (non-Hispanic). Of the just over 217,000 people living in the primary area in 2010, approximately 164,000 (68%) were White. Other races including African-American, Hispanic, Asian and American Indian made up the remaining primary area's population.

The median age of the primary area was 41.9 years in the 2010 census, which is relatively higher than the respective states and national averages of about 35.5. Montgomery County, Tennessee has a median age of 30.0 which is significantly lower than that of the primary area as a whole, likely due to a large military presence located at the Fort Campbell Army Base in the Montgomery County area. Livingston County, Kentucky had the highest median age of 47.9 years.

All counties in the primary area mirrored their respective state and the Nation in terms of high school graduation rates. All counties with the exception of Montgomery County, Tennessee fell significantly below their respective state and the Nation in their population earning a bachelor's degree or higher. Table 2.10 below displays the primary area's percentage of residents 25-years and older who have graduated from high school and those who have a bachelor's degree or higher.

Table 2.10 - Percent of H.S. & Bachelor's Degrees

County	H.S. Graduate or Higher	Bachelor's Degree or Higher
Livingston, KY	82%	11%
Lyon, KY	84%	13%
Trigg, KY	82%	18%
Montgomery, TN	91%	24%
Stewart, TN	84%	12%
State of Kentucky	83%	22%
State of Tennessee	84%	24%
Nation	86%	29%

Source: U.S. Census Bureau

2-13 Economics

Table 2.11 displays the percentage of workers employed by industry in the Primary Area along with the same data for the States of Kentucky and Tennessee. Employment varies within the respective counties, but manufacturing, retail trade, educational services and health care are the major employer in each of the Primary Counties.

Table 2.11 - Kentucky and Tennessee Primary Counties in the Lake Barkley Area, 2013 Employment Percentages by Major Industry

Industry	State of Kentucky	State of Tennessee	Livingston County, KY	Lyon County, KY	Trigg County, KY	Montgomery County, TN	Stewart County, KY
Civilian employed 16 years and older	1,857,767	2,806,948	3,589	2,783	5,346	70,015	4,744
Agriculture, Forestry, Fishing, Hunting, Mining	2.9%	1.1%	6.6%	2.9%	6.3%	0.9%	2.6%
Construction	6.1%	6.5%	7.6%	10.4%	6.7%	6.0%	7.7%
Manufacturing	13.6%	12.7%	9.9%	17.4%	17.2%	11.5%	13.0%
Wholesale Trade	2.7%	2.9%	1.8%	1.0%	2.9%	1.9%	1.4%
Retail Trade	11.7%	12.1%	9.0%	13.0%	10.6%	13.9%	10.4%
Transportation, Warehousing, Utilities	5.9%	6.2%	7.1%	3.6%	4.2%	4.9%	7.6%
Information	1.7%	2.0%	0.2%	2.2%	1.9%	1.9%	1.2%
Finance, Insurance, Real Estate, Rental, Leasing	5.5%	5.8%	3.3%	1.7%	5.7%	4.6%	3.3%
Professional. Scientific, Management, Admin, Waste Management	7.7%	9.2%	3.4%	6.1%	8.3%	8.6%	8.3%
Educational Services, Health Care, Social Assistance	24.4%	22.8%	27.6%	17.2%	22.1%	22.7%	23.5%
Arts, Entertainment, Recreation, Accommodation, Food Services	8.5%	9.2%	10.9%	8.1%	6.1%	10.0%	7.8%
Other Services (except Public Administration)	4.7%	5.0%	9.5%	4.2%	3.8%	4.2%	3.7%
Public Administration (Including government)	4.6%	4.6%	3.2%	12.1%	4.1%	8.9%	9.4%

*Note: Percentages for counties may not total to 100%.

This table shows the top industries in the county, not all industries.

Source: U.S. Census Bureau

Table 2.12 displays historic unemployment rates for the counties within the Primary Area along with the States of Kentucky and Tennessee and the Nation. In general each county's unemployment rate is within a percentage point of its respective state. All counties in the primary area appear to be on the road to recovery from the 2008 economic downfall.

Table 2.12 - Primary Area Historic Unemployment Rates

County	2005	2010	2015
Livingston, KY	5.4%	11.7%	6.6%
Lyon, KY	6.8%	11.6%	5.7%
Trigg, KY	6.9%	14.2%	5.6%
Montgomery, TN	4.9%	8.9%	5.8%
Stewart, TN	7.1%	12.0%	7.5%
State of Kentucky	6.2%	10.0%	5.3%
State of Tennessee	5.9%	9.5%	6.3%
Nation	5.1%	9.6%	5.7%

Source: Bureau of Labor Statistics

The median and per capita income for the primary area are represented in Table 2.13. The counties in the primary area tend to have similar or slightly lower median income and per capita income than that of the state.

Table 2.13 - Primary Area Median & Per Capita Income

County	2000 Median Income	2013 Median Income	2000 Per Capita Income	2013 Per Capita Income
Livingston, KY	31,776	40,313	17,072	19,795
Lyon, KY	31,694	40,112	16,016	22,123
Trigg, KY	33,002	45,629	17,184	25,527
Montgomery, TN	38,981	49,617	17,265	22,380
Stewart, TN	32,316	39,781	16,302	21,701
State of Kentucky	33,672	43,036	18,093	23,462
State of Tennessee	36,360	44,298	19,393	24,409

Source: U.S. Census Bureau

Economic Impacts of Lake Barkley to the Region:

USACE provides water-based recreation opportunities throughout the country which in turn provide economic benefits to the local and regional economies. To estimate the economic impact from recreation related spending at these projects, USACE, in collaboration with researchers at Michigan State University (MSU), developed the Recreation Economics Assessment System (REAS). The REAS

is an economic input-output model that was developed for all USACE projects based on recreation visits in 2012 and a set of economic ratios and multipliers for a region. Using available survey data, the REAS estimates visitor spending at Lake Barkley to be an estimated $69.3 million from 3.2 million visits. Of this spending, 53 percent was captured by the local economy yielding $36.5 million in direct sales to tourism related firms. These sales generated $18.2 million in direct personal income and supported 891 direct jobs. With multiplier effects, visitor spending resulted in $72.2 million in total sales, $24.8 million in total personal income and supported 1,097 jobs.[13]

2-14 Recreation Facilities, Activities and Needs

The recreational opportunities at Lake Barkley are considered to be of great importance to western Kentucky as well as middle and western Tennessee. The project offers many recreational activities such as swimming, boating, water skiing, fishing, hunting, picnicking, camping, enjoying nature and wildlife, and biking.

2-14.A Zones of Influence

Lake Barkley is located within 500 miles, or a day's travel, of the main population base of the United States. Actual public use is comprised of: 1) use from the local area; 2) weekenders from the adjacent communities in the region; and 3) destination users spending days to weeks from the further centers. Historic reports on visitation to Lake Barkley indicate that over 80 percent of visitation to the lake comes from within a 50-mile radius of the project. Even so, there are many visitors to Lake Barkley that travel from further in the region and enjoy the lake as a vacation destination, a weekend retreat or a place for a second home.

[13] Michigan State University and US Army Corps of Engineers, Value to the Nation http://www.corpsresults.us/, 2012.

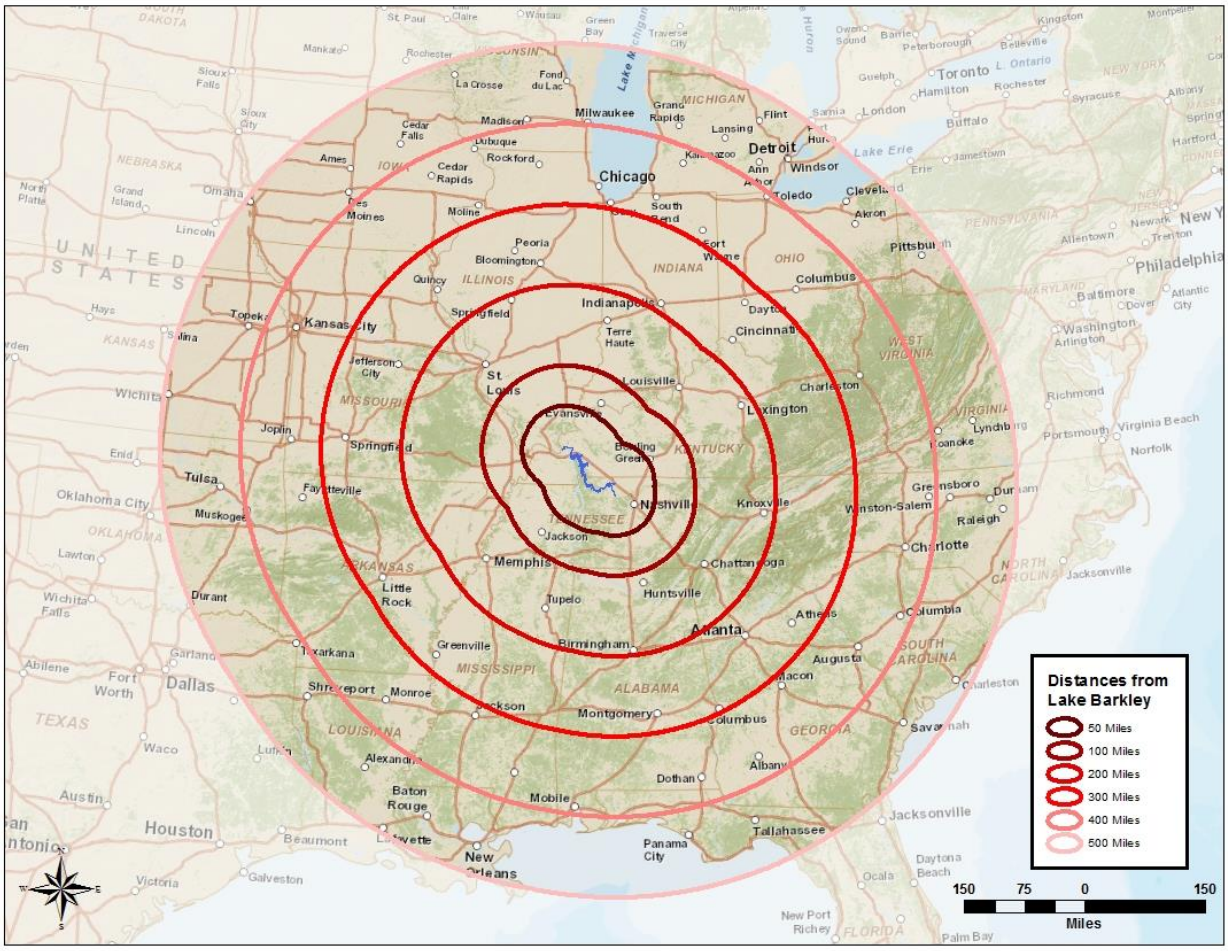

Figure 2.14 - Distances (miles) as the crow flies from Lake Barkley

The five counties in the primary area of influence are Livingston, Lyon and Trigg Counties in Kentucky, and Stewart and Montgomery Counties in Tennessee. Houston, Dickson and Cheatham counties in Tennessee also have small portions of Lake Barkley within the county borders, but very small areas compared to the rest of the lake. The overall trend in population growth is slowly increasing, with Montgomery County increasing the most rapidly. 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 visitation will remain at consistent levels for most of the lake, with the exception of the southern end of the lake, which could likely experience a continual increase in use of recreation facilities. A recent trend for overnight visitors is the availability of renting privately owned vacation homes through companies such as Vacation Rental by Owner (VRBO), AirBnB and HomeAway. These rentals have become a popular option for large families and groups wanting to enjoy the lake together for a weekend.

Several such rentals are available with easy access to Lake Barkley, encouraging visitors to stay for multiple days.

2-14.B Visitation Profile

Lake Barkley visitors are a diverse group ranging from campers who enjoy campgrounds around the lake, full time and part time residents from more than 2,500 private homes that are adjacent the lake, hunters who use the Federal and State Wildlife Management Areas around the lake, day users who picnic and use playgrounds, marina customers and many other user groups. Visitation on Lake Barkley is at its highest during the months of April to November, and is only significantly lower during the colder months of December to March.[14]

Visitation to Lake Barkley is consistently one top twenty-five most visited Corps of Engineers lakes in the nation, ranked the twenty-first 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 sixty miles from the Lake Barkley Dam. Large cities within proximity to Barkley Dam are Nashville, Tennessee, 105 miles; Memphis, Tennessee, 175 miles; Louisville, Kentucky, 192 miles; St. Louis, Missouri, 165 miles; and Evansville, Indiana, 118 miles.

Table 2.14 - Visitation Data by FY (Oct-Sep) from Operations Management Business Information Link (OMBIL)

Fiscal Year (October to September)	Number of Visits to Lake Barkley
FY 1999	4,117,682
FY 2000	3,701,759
FY 2001	2,798,034
FY 2002	3,061,039
FY 2003	2,798,034
FY 2004	2,839,195
FY 2005	3,070,883
FY 2006	3,050,114
FY 2007	3,343,866
FY 2008	3,361,782
FY 2009	3,314,120
FY 2010	3,411,480
FY 2011	3,448,647
FY 2012	3,247,344

[14] Visitation numbers are according to Visitation Data in the Operations Management Business Information Link (OMBIL)

2-14.C Recreation Analysis

The State of Kentucky conducted a survey in 2008 as part of the development process for the Kentucky Statewide Comprehensive Outdoor Recreation Plan (SCORP). The results of the survey found that 92% of the surveyed population of Kentucky rate outdoor recreation importance as desirable or essential. Respondents also reported a 25% increase in time involved in outdoor recreation.[15] The Tennessee 2020 SCORP (2009), stated, "Access to nearby parks and recreation centers, like fire and police protection, is essential to the wellbeing of every resident."[16] 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. These two statewide recreation plans indicate 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.

Lake Barkley and the surrounding area provide a unique hub for outdoor recreation, with several federal and state agencies managing public lands and waters in this area. Kentucky Lake is managed by the Tennessee Valley Authority (TVA), and runs parallel to the west of Lake Barkley. Kentucky Lake is connected to Lake Barkley by a canal, and offers many of the same recreational opportunities as Lake Barkley including; boating, marinas, wildlife watching, fishing, camping, etc. Located between Kentucky Lake and Lake Barkley is the Land Between the Lakes National Recreation Area, managed by the US Forest Service (USFS). It runs a length of about 40 miles between the two rivers and is the location of many structures of pre-impoundment farming communities. Now Land Between the Lakes offers camping, birding, fishing, hunting, water and boating access, swimming, hunting and target shooting, trails (for biking, hiking, off-highway vehicles and horses) and historic sites. The lakes bordering Land Between the Lakes create a peaceful park that is removed from busy towns and cities. Another federal land area on Lake Barkley is the Fort Donelson National Battlefield located in Dover, Tennessee. Managed by the National Park Service, this area commemorates the Battle of Fort Donelson in 1862. The last federal land area in the Lake Barkley area is the Cross Creeks National Wildlife Refuge between the towns of Dover and Cumberland City. The area is managed habitat for many species of plants and animals and is especially desirable for migratory birds. Certain areas are open to hunting, fishing, boating, and wildlife watching. The two state parks that the Corps leases to the Kentucky Department of Parks are Mineral Mounds State Park and Lake Barkley State Resort Park. They offer numerous opportunities for land and water based recreation and will be discussed thoroughly in the site description chapter of this Master Plan. The abundance of opportunity to enjoy water and land based recreation at Lake Barkley and the surrounding area makes this lake unique compared to many other Corps of Engineers lakes.

[15] Outdoor Recreation in Kentucky: Assessment, Policies, and Actions. Kentucky Statewide Outdoor Recreation Plan. Steve Beshear, Governor. Tony Wilder, Commissioner. October, 2008.
[16] Tennessee 2020: Vision for Parks, People & Landscapes. Tennessee Department of Environment and Conservation, 2009

2-14.D Recreational Carrying Capacity

Lake Barkley is consistently in the top visited Corps of Engineers lakes in the nation. This means that there is a constant public desire to enjoy the parks and waters of Lake Barkley, and often, especially weekends during hot summer months, areas of the lake become very crowded. Figure 2.15 illustrates a gradual increase in campground utilization at Lake Barkley from fiscal year 2012 thru fiscal year 2016.

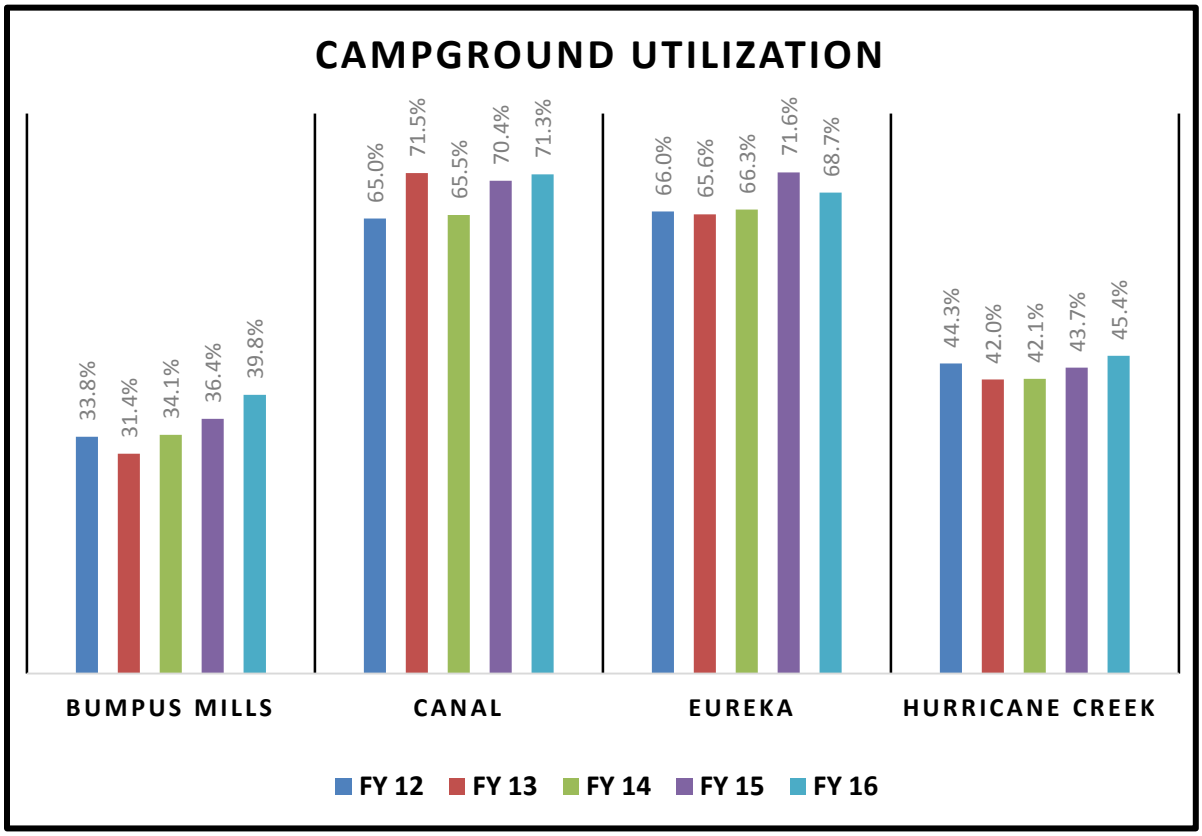

Figure 2.15 - Campground Total Percent Usage (Days Available/Days Occupied) by Fiscal Year

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 reservoir the size of Lake Barkley 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. In general, even though overall use has continued to increase over the years, Lake Barkley is large enough to balance the intense public recreation in some areas with peaceful natural areas in others. 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.

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, 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 little meaningful utility.

2-15 Project Access

Lake Barkley can be accessed by road from many major metropolitan areas. The major interstates in the immediate area are I-24 running along the eastern side of the lake, and I-69 near the northern part of the lake.

From Nashville: Take I-24 West about 100 miles to reach Eddyville, Kentucky on the north end of the lake.

From Memphis: Take US-51 North about 185 miles to reach Eddyville, Kentucky on the north end of the lake.

From Louisville: Take I-65 South to Elizabethtown and from there take the Western Kentucky Parkway until it turns to I-69 South (177 total miles) to reach Eddyville, Kentucky on the north end of the lake.

From St. Louis: Take I-64 East to Mount Vernon. There take I-57 South to Pulleys Mill. There take I-24 East (205 total miles) to reach Eddyville, Kentucky on the north end of the lake.

Lake Barkley State Park and Kentucky Dam Village State Resort Park have small regional airports that provide easy access to the recreational amenities at the state parks as well as the Lake Barkley area. The Princeton-Caldwell County Airport is another regional airport that is within easy access to the lake and surrounding areas.

Barkley Lock is the last lock on the Cumberland River before flowing into the Ohio River and joining the Mississippi River shortly thereafter. This, and the additional easy access to the Tennessee River via the canal between Kentucky Lake and Lake Barkley makes waterway transportation an ideal way to access the project not just for commercial purposes, but also for recreation.

Figure 2.16 - Project Access Map

2-16 Related Recreational, Historical, and Cultural Areas

Lake Barkley is rich in prehistory and history with several opportunities for visitors to experience historical areas. There are over 500 recorded archaeological sites on Lake Barkley lands and the surrounding area. However, site location is restricted to aid their preservation. The Lake Barkley Lock, Dam and Hydropower Plant are historically significant for the engineering and design as well as for the development of the region in the late 20th Century. Tours of the powerplant and lock are periodically offered to the public. The National Park Service manages Fort Donelson in Dover, Tennessee. Visitors can walk the grounds of the Fort and Battlefield and learn about the battle and the critical role the Cumberland River played for the Union entry into the south from the interpretive displays. The Land Between the Lake's Homeplace 1850s Working Farm and Living History Museum, also near Dover, allows visitors to experience life in the mid-19th Century. Hopkinsville, Kentucky hosts the Trail of Tears Commemorative Park. A mid-nineteenth century log-cabin serves as the Heritage center and plants and statues commemorate the forced migration of the Cherokee. From the park, official National Park Service signs mark the route of the Trail of Tears can be followed along Route 91.

2-17 Real Estate Acquisition Policy

Land acquisition for the Lake Barkley Project was accomplished under the conservative "Eisenhower Policy" in which the minimum amount of fee land needed for project construction was acquired. Flowage easements were used to obtain additional lands for flood storage purposes. In 1964, the "Report on Commercial Boat Dock Development and Supplemental Land Acquisition" approved the acquisition of additional lands for the development of commercial marina facilities. There are no future plans to acquire additional fee or easement lands.

2-18 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 resources 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 primary goals of the Master Plan 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 Lake Barkley 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 Environmental Operating Principles (EOPs)

The U.S. Army Corps of Engineers has reaffirmed its commitment to the environment by formalizing a set of "Environmental Operating Principles" applicable to all its decision-making and programs. 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.

Sustainability can only be achieved by the combined efforts of federal agencies, tribal, state and local governments, and the private sector; each doing its part, backed by the citizens of the world. These principles help the Corps define its role in that endeavor.

By implementing these principles, the Corps will continue its efforts to develop the scientific, economic and sociological measures to judge the effects of its projects on the environment and to seek better ways of achieving environmentally sustainable solutions. The principles are being integrated into all project management processes throughout the Corps.

The principles are consistent with the National Environmental Policy Act, the Army Strategy for the Environment with its emphasis on sustainability and the triple bottom line of mission, environment and community, other environmental statutes, and the Water Resources Development Acts that govern Corps activities. They require the Corps to:

- Strive to achieve environmental sustainability. An environment maintained in a healthy, diverse and sustainable condition is necessary to support life.

- Recognize the interdependence of life and the physical environment. Proactively consider environmental consequences of Corps programs and act accordingly in all appropriate circumstances.

- Seek balance and synergy among human development activities and natural systems by designing economic and environmental solutions that support and reinforce one another.

- Continue to accept corporate responsibility and accountability under the law for activities and decisions under our control that impact human health and welfare and the continued viability of natural systems.

- Seek ways and means to assess and mitigate cumulative impacts to the environment; bring systems approaches to the full life cycle of our processes and work.

- Build and share an integrated scientific, economic and social knowledge base that supports a greater understanding of the environment and impacts of our work.

- Respect the views of individuals and groups interested in Corps activities, listen to them actively and learn from their perspective in the search to find innovative win-win solutions to the nation's problems that also protect and enhance the environment.

3-03 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, Lake Barkley 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. Recreational and natural resources carrying capacities are also accounted for during development of the objectives found in this Master Plan. Both the Kentucky and Tennessee State Comprehensive Outdoor Recreation Plans (SCORP) 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 Lake Barkley.

3-03.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 an equal recreational opportunity for a spectrum of public use, providing equal opportunity for all, including individuals, families, groups, youth, elderly and handicapped, with a variety of recreational facilities. Goal A, C, E

- Evaluate demand for commercial facilities on public lands and waters. Goal A, C

- Consider flood/conservation pool to address potential impact to recreational facilities (i.e. campsites, docks, etc.); note that water level management is not within the scope of the Master Plan. Goal A, B, C, D

- Ensure consistency with USACE Recreation Strategic Plan. 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 Statewide Comprehensive Outdoor Recreation Plan and the Kentucky Statewide Comprehensive Outdoor Recreation Plan to ensure consistency in achieving recreation goals. Goal E

3-03.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

3-03.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 Section 106 and 110 of the National Historic Preservation Act, the Archeological Resources Protection Act and the Native American Graves Protection and Repatriation Act on 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

3-03.D Economic Impact Objectives

- Balance economic and environmental interests involving Lake Barkley. Goal A, B, C, D, E

- Evaluate the type and extent of additional commercial development that is compatible with national Corps' policy on both recreation and non-recreational outgrants and that may be sustained on public lands classified for High Density Recreation or Multiple Resource - Future/Inactive Recreation Areas. 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

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 (i.e., navigation, flood control, hydropower, etc.)

Lands acquired for the congressionally authorized purpose of operating the project. All of the land on Lake Barkley 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, Flood Control 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." Lake Barkley 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." Lake Barkley 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 Lake Barkley 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 D. Acreages for each classification are noted in Table 4.1.

4-02.A Project Operations

This category includes those lands required for the dam, spillway, switchyard, earth dam, offices, maintenance facilities and other areas that are used solely for the operation of the project. There are 195 acres specifically classified for these features on Lake Barkley.

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. Lake Barkley has 3,898 acres classified as High Density Recreation.

4-02.C Mitigation

This classification will only be used for lands acquired specifically for the purposes of offsetting losses associated with development of the project. Lake Barkley does not have any lands classified for this use.

4-02.D 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 statues. 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.

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.

4-02.E 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.E.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.).

4-02.E.2 Wildlife Management

Lands designated for stewardship of fish and wildlife resources. Most, but not all, lands in this classification are outgranted to the Tennessee Wildlife Resources Agency (TWRA) and the Kentucky Department of Fish and Wildlife Resources (KDFWR) for the purposes of active wildlife management and public hunting or fishing. The 2015 Tennessee State Wildlife Action Plan (SWAP), a comprehensive wildlife conservation strategy developed by TWRA and The Nature Conservancy, a non-profit organization, identified lands surrounding Lake Barkley in Tennessee as a Conservation Opportunity Area (COA). Specifically, the Tennessee portion of Lake Barkley falls within the Lower Tennessee River/Lower Cumberland River COA. The 2015 Tennessee SWAP identified COA's as priority areas that are significate for protecting and restoring species of flora and fauna under the greatest conservation needs, also referred to as GCN populations. COA's were identified across the state by TWRA/Nature Conservancy when considering GCN habitat priority, problems affecting GCN species and opportunity to implement conservation actions. Given that a portion of Corps lands on Lake Barkley in Tennessee is outgranted to TWRA for wildlife management, future opportunities may exist to enhance GCN populations under measures identified in the SWAP.

4-02.E.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.

4-02.E.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.

Table 4.1 - Land Classification Acreage

Classification	Acreage	Percentage of Fee Land (above normal pool)
Project Operations	195	1%
High Density Recreation	3,887	23%
Environmentally Sensitive Areas	4,058	24%
Multiple Resource Management Lands Vegetative Management	4,221	25%
Multiple Resource Management Lands Wildlife Management	3,694	22%
Multiple Resource Management Lands Low Density Recreation	402	2%
Multiple Resource Management Lands Future/Inactive Recreation Area	491	3%
Total Land Acres	**16,948**	**100%**

4-02.F Water Surface

Lake Barkley 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 (359 feet AMSL)

Classification	Acreage	Percentage of Water Area

Restricted	6	< 1%
Designated No-Wake	313	< 1%
Fish and Wildlife Sanctuary	3,583	6%
Open Recreation	50,406	93%
Total Water Surface Acres	**54,308**	**100%**

4-02.F.1 Restricted

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

4-02.F.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.

4-02.F.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 Lake Barkley include Fulton and Honker Bays and portions of the adjacent main lake which have a boating restriction from November 1st thru March 15th. This 3,583 acre area is currently licensed to the Kentucky Department of Fish and Wildlife Resources Agency and is managed as a wildlife refuge.

4-02.F.4 Open Recreation

The remainder of the lake is 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 Lake Barkley 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.

4-03.A Operations Easement

These would be easements the Corps of Engineers purchased for the purpose of project operations. There are no operations easements at Lake Barkley.

4-03.B 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 27,662 acres of flowage easement lands (above normal pool) located at Lake Barkley.

4-03.C Conservation Easement

These are easements the Corps of Engineers purchased for the purpose of protecting wildlife, fisheries, recreation, vegetation, archeological, endangered species or other environmental benefits. There are 4.62 acres of conservation easement land in Livingston County that was acquired to provide access to Canal Campground in Livingston County, Kentucky.

Chapter 5 - RESOURCE PLAN

This chapter further describes specific classifications for all Lake Barkley 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, 195 acres, include all restricted access zones around Barkley Lock and Dam (i.e. powerhouse, switchyard, warehouses, lock operations buildings, fleet yard and resource shop compound) and the Dover sub-base 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, 3,887 acres, are developed and managed for intensive recreational activities including campgrounds, day use/recreation areas, secondary access areas (i.e. boat ramps and overlooks), commercial marinas and state parks. 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 Tailwater 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 Livingston County directly adjacent to Lake Barkley Lock and Dam. Convenient paved access from Interstate 24 and U.S. Hwy 62 make this area popular for sightseers and birdwatchers.

Description: This 135 acre recreation area is unique in that it provides excellent viewing of the Barkley Lock and Dam structure as well as access to the lake (headwater) and river (tailwater). With the exception of a single hill that provides a location for the Operations Office and Visitor Center, topography is relatively flat. White-tailed deer, mink, foxes, wild turkeys, bald eagles, ospreys, pelicans and numerous gull species are common sites in this area.

Access to the lake is provided via Double Creek Access Area which includes a single lane boat ramp, courtesy dock and paved parking area with 26 car/trailer spaces. Access to the Cumberland River is provided by 5 sets of concrete steps leading across the riprap bank to the water's edge. Other amenities include 3 single table mini shelters, a group picnic shelter, 4 parking areas with 236 spaces and a 10 target archery range with an elevated platform. An outdated restroom facility has been closed due to maintenance and vandalism issues. If funding allows, a new restroom, large picnic shelter, playground facilities and a concrete/paved walking trail will be constructed in this area. The Lake Barkley Resource Management Office and Visitor Center is also located at this site which has excellent views of the lock and dam and surrounding areas.

Area Use: This area receives moderate to heavy use from both water-oriented and land based activities. The area is frequented by walkers and sightseers as well as fishermen and boaters during a majority of the year.

Site-Specific Objectives:

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

Development Needs:

- Expand boat ramp parking area to accommodate more users
- Replace outdated (closed) public restroom
- Provide a large picnic shelter and playground facilities
- Provide additional picnic sites
- Provide concrete walking trail along roadway

5-02.A.2 Tailwater 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 Tailwater Area is located in Lyon County directly adjacent to Lake Barkley Powerhouse. This area has convenient access from Interstate 24 and U.S. Highway 62.

Description: This recreation area contains 126 acres of flat bottom land. Approximately 27 acres have developed facilities and manicured grounds. These improvements include a single lane boat ramp and parking lot with 42 car/trailer spaces which provide river access. The area has a group picnic shelter, a single table mini shelter, a restroom, handicap accessible fishing platform and 3 more parking areas with 103 car spaces. There are also 3 sets of concrete steps that lead across the riprap bank to the water's edge. The remaining area consists of native warm-season grass fields and bottomland forest. This area contains abundant wildlife including White-tailed deer, mink, osprey, bobwhite quail, eastern meadowlarks and numerous other bird species.

Area Use: Typically the area is heavily used by both boat and bank fishermen. The fishing platform is very popular, especially with bow fishermen. This is also a popular area for walking/exercise and wildlife viewing.

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:

- Replace outdated restroom
- Additional picnic sites
- Continue to improve bank fishing access facilities (steps and sidewalk repairs)
- Install interpretive signs for native grassland area
- Install additional osprey nesting towers/platforms

Special Considerations: As a result of recent legislation (Freedom to Fish), boat fishing in this area is only 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 Barkley Dam. Additionally, the tailwater boat ramp will be closed when spillway gates are open or when the river elevation rises above the top of the boat ramp.

With the increase in bow fishing popularity, there has been an increase in the dumping of large dead fish and trash on the bank. The resulting odor and visual impact is becoming a management issue. Additional signage, increased patrols and better coordination with local enforcement agencies is a priority.

5-02.A.3 Grand Rivers Park, Site No. 103

Management Agency: City of Grand Rivers, Kentucky

Land Classification: High Density Recreation

Rationale: A Master Plan Supplement in 1992 changed this area's classification from Forest Reserve Land to Intensive Recreation. The area currently supports a classification of High Density Recreation because of existing recreation facilities, aesthetic qualities and convenient access to downtown Grand Rivers, Kentucky. This area receives significant use during the summer recreation season as result of the surrounding tourist attractions.

Location: Located in the heart of Grand Rivers, Kentucky, this area has convenient access from Interstate 24 via Hwy 453 (Trace).

Description: Grand Rivers City Park encompasses 31 acres of relatively flat bottomland that surrounds a 9 acre backwater area connected to Lake Barkley by culvert pipe. Even with its proximity to downtown Grand Rivers, it is not uncommon to see White-tailed deer using this area along with squirrels, opossums and Canada geese. Improvements made by the City include a multipurpose community building, picnic shelter, basketball court, volleyball court, playground equipment, lighted concrete walking trail, 6 picnic sites, a boat ramp and multiple parking areas.

Area Use: Area receives moderate use from locals and tourists. Community building is used to host special events and entertainment shows. The park is also used for other local events like fishing rodeos and arts and crafts festivals.

Site-Specific Objectives:

- Provide day use opportunities
- Improve tourism in local community

Development Needs:

- Based on City's development plans

5-02.A.4 Eureka Campground/Recreation Area, Site No. 104

Management Agency: USACE

Land Classification: High Density Recreation

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

Location: Eureka is located in Lyon County approximately 2.5 miles off U.S. Hwy 62 via Hwy 810 South and Hwy 1271, respectively.

Description: Eureka is a 109 acre multipurpose area that consists of a day use area and campground. The campground development is located adjacent to the shoreline on low lying lands. Scattered tree cover includes oaks, hickories, sweetgum, hackberry, red cedar and maple. The day use portion of Eureka is at a slightly higher elevation and includes many of the same tree species. Wildlife in the area includes White-tailed deer, raccoons, foxes, skunks, opossums, Canada geese and numerous song birds. Bald eagles and osprey are also common sights.

The day use area improvements include 2 picnic sites, a group shelter, a single lane boat ramp and parking area with 31 car/trailer spaces and a courtesy dock. The day use area also has an overflow parking area with 50 car spaces. Future development for this area will include a handicap accessible fishing dock.

The campground improvements include a sanitary dump station, 26 campsites with water and 50 amp electric hookups, 1 park attendant site, a restroom with showers, a swimming beach, playground equipment, a fee booth, a single lane boat ramp and 2 parking lots with 14 car spaces and 25 car/trailer spaces.

Figure 5.1 - Eureka Site 10

Area Use: The campground has heavy usage with an occupancy rate of nearly 70%. Approximately 56% of users utilize either the Golden Age/Access or the America the Beautiful Senior/Access Pass. The campground is typically full most weekends during the summer season. The day use area has a low to moderate usage rate but the usage occurs year round to meet the needs of hunters and fishermen. Eureka also has the trailhead for the 2.5 mile Chestnut Oak Trail that connects to Hwy 810 South. The land classification for the trail area is Multiple Resource - Low Density Recreation.

Site-Specific Objectives:

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

Development Needs:

- Replace outdated restroom/shower house
- Additional restroom
- Upgrade existing campsites
- Provide additional campsites
- Improve/Expand Chestnut Oak Trail
- Install handicap accessible fishing dock

Special Considerations: The outdated, inaccessible restroom/washhouse is a limiting factor for this campground.

5-02.A.5 Canal Campground, Site No. 105

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 occupancy rates.

Location: Canal Campground is located in Livingston and Lyon Counties just north of the Canal connecting Lake Barkley with Kentucky Lake. Convenient access from Interstate 24 is provided by Hwy 453 (Trace).

Description: This 141 acre area is mainly wooded with a small mix of early successional habitat. Dominant tree species include oaks, hickories, green ash, persimmon, elm and hackberry. The topography is relatively flat with some moderate to steep slope on the eastern side of the area. Abundant wildlife including White-tailed deer, wild turkeys, squirrels, cottontails, raccoons and skunks inhabit the area. Numerous Neotropical songbirds, as well as bald eagles, can be seen in the area.

With 118 campsites, 2 park attendant sites and 7 sites for volunteer workers, Canal is the largest Corps' managed campground on Lake Barkley. All sites include water and electric service and 21 sites are equipped with sewer facilities. Other amenities in the area include a 2-lane boat ramp with courtesy dock, a group camping shelter, fishing dock, walking trail, a swimming beach, playground equipment, 3 sanitary dump stations, 4 restrooms with showers, a fee booth and 8 parking lots with 70 car spaces and 56 car/trailer spaces.

Area Use: With an average occupancy rate of nearly 70%, Canal is the most heavily used campground on Lake Barkley with June, July and October being the busiest months. A majority of

the users (over 70%) utilize either the Golden Age/Access or the America the Beautiful Senior/Access Pass. The boat ramp also receives light use from non-camping day users.

Site-Specific Objectives:

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

Development Needs:

- Upgrade electrical service on primitive loop
- Install additional sewer facilities
- Provide an additional restroom
- Provide additional campsites (developed and primitive)
- Install multipurpose court
- Make repairs to boat ramp

Special Considerations: Canal's Volunteer Village Loop contains 7 campsites designated for full and part-time volunteers who provide essential benefits to Lake Barkley's recreation and environmental stewardship programs. Volunteers perform various maintenance and administrative tasks including splitting wood, mowing, landscaping, painting, cleaning, interpretive programs and visitor center hosts. In 2015, volunteers on Lake Barkley provided over 9,100 hours of work valued at over $211,000. Construction of additional volunteer sites will be based on future workloads and funding levels.

5-02.A.6 Old Kuttawa Recreation Area, Site No. 115

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: Old Kuttawa Recreation Area is located on Hwy 295, approximately 2.5 miles from Interstate 24 (exit 40) in Kuttawa, Kentucky. It is nestled among the quaint homes of the city of "old" Kuttawa and is directly adjacent to Kuttawa Harbor Marina.

Description: This 37 acre waterfront area features gentle sloping topography near Highway 295 with steeper terrain and a rocky bluff on the south side adjacent to the original river channel. The area has a typical "park" characteristic with scattered trees and no understory. Dominant species include oak, hickory, maple, hackberry and elm. Several native trees were planted along the

concrete Anderson-Woodland Trail. Common wildlife in the area includes squirrels, Canada geese, songbirds, herons and other wading birds. Approximately 12 of the 37 acres are located in two separate areas across Hwy 295 and to the west of the small shelter, respectively. These areas have been leased to the City of Kuttawa. The City currently maintains a paved walking trail on portions of this property and uses the remaining turf areas for overflow parking during community special events.

Figure 5.2 - Old Kuttawa Playground

The area features 2 group picnic shelters, a large amphitheater with covered stage (maintained by the City under a Challenge Partnership), a swimming beach, a park attendant campsite, basketball and volleyball courts, horseshoe pits, 26 picnic sites, 2 restrooms, a walking trail and 5 parking lots with 102 car spaces.

Area Usage: This area experiences heavy visitation during the recreation season and moderate use by walkers, sightseers and fishermen during the off season. This area is commonly used as a location for special events hosted by local municipalities or tourist commissions. These events may include fishing tournament weigh-ins, fireworks displays, festivals and parades. Combined, the 2 group shelters are reserved approximately 45 days each year. However, they are frequently used on a first-come first-served basis as well.

Site-Specific Objectives:

- Provide facilities for quality day use recreational opportunities
- Improve tourism for local community

Development Needs:

- Replace or update lower restroom
- Improve the Anderson-Woodland Trail
- Install additional picnic sites and group shelter
- Fishing jetty/gazebo
- Additional parking

Figure 5.3 - Old Kuttawa Picnic Site

5-02.A.7 Old Eddyville Recreation Area, Site No. 116

Management Agency: USACE

Land Classification: High Density Recreation

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

Location: Old Eddyville Recreation Area is located on Highway 730 near the Kentucky State Penitentiary, approximately 3 miles from Interstate 24 (exit 45). This area is adjacent to the Old Lock F site that existed prior to the impoundment of Lake Barkley.

Description: This 11 acre, water front area features a low lying picnic area and parking lot with a gentle slope to the water's edge. The area has a typical "park" characteristic with scattered trees and minimal understory. Some small patches of thick scrub vegetation have developed as a result of reduced frequency of mowing. Resident Canada geese, White-tailed deer, squirrels, rabbits and common songbirds are frequently sighted in the area. Old Eddyville Recreation Area also includes a parking lot and boat ramp at a slightly higher elevation with a moderate to steep, riprap slope to the water's edge. Area facilities include 2 parking lots with a total of 24 spaces and 20 car/trailer spaces, a single lane boat ramp and 14 picnic sites. The restroom building was closed in 2004 as a result of funding limitations.

This area contains multiple easements issued to the City of Eddyville for various facilities including a municipal water intake and water supply lines, sewage lift station and force main lines and roads.

Area Usage: This area experiences low to moderate use during the summer recreation season.

Site-Specific Objectives:

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

Development Needs:

- No development is currently proposed by USACE
- Outgrant or partnership with the local county or municipal government would be beneficial

Special Considerations: This area was selected as a part of the Recreation Excellence at Army Lakes (REAL) program in 2004, at which time the restroom was closed and the mowing frequency was reduced. All asbestos containing materials (ACMs) were removed from the restroom to facilitate

demolition in the future. In 2006, plans to lease the area were submitted by the City of Eddyville and Lyon County Historical Society, but this outgrant was never executed.

5-02.A.8 Hurricane Creek Campground, Site No. 124

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 occupancy rates.

Location: Hurricane Creek Campground is located near the boundary of Lyon and Trigg Counties on Hwy 274. It is approximately 7.75 miles from Interstate 24 (exit 56) via Hwy 139 and Hwy 276.

Description: This 35 acre campground features rolling topography with a gentle slope to the water's edge. A central portion of the campground consists mainly of large maple, ash, sweetgum, and elm trees with minimal understory. The eastern portion of the campground, near the beach, is mainly open grassy area while the western portion is mainly wooded with moderate understory. Common wildlife to the area includes White-tailed deer, raccoons, squirrels, skunks, Canada geese and songbirds.

Figure 5.5 - Hurricane Creek Playground

Figure 5.4 - Hurricane Creek Campsites

The campground has a total of 51 campsites as well as 1 park attendant site. Of the 51 sites, 45 are equipped with 50 amp electric service while the remaining 6 "walk-in" tent sites have water service only. Other campground improvements include a fee booth, sanitary dump station, swimming beach, playground equipment, restroom with showers, single lane boat ramp, courtesy dock and 2 parking lots with 20 car spaces and 7 car/trailer spaces.

Area Usage: Hurricane Creek Campground has moderate to heavy use during the recreation season with an average occupancy rate near 45%. Approximately 50% of users utilize either the Golden Age/Access or the America the Beautiful Pass. All usage is from registered campers and their guests since there is no designated day use area.

Site-Specific Objectives:

- Provide recreation facilities for a quality camping experience

Development Needs:

- Replace existing restroom/shower house
- Replace fee booth
- Repave roads and parking areas
- Expand parking
- Replace courtesy dock
- Rehab existing campsites
- Provide electric service to tent sites

Special Considerations: Minimal parking and an outdated restroom/shower house are limiting factors for this campground.

5-02.A.9 Rockcastle Recreation Area, Site No. 125

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: Rockcastle is located at the end of Prizer Point Road off of Hwy 274. It is approximately 9.5 miles from Interstate 24 (exit 56) via Hwy 139 and Hwy 276.

Description: This 5.2 acre recreation area features gentle sloping topography to southern and eastern shorelines with a cliff face on the western shoreline. The area is wooded with a clear understory and grass groundcover throughout. The dominant tree species include maple, elm, hackberry and sweetgum. White-tailed deer, Canada geese, squirrels, osprey and songbirds can be seen using the area.

Area improvements include a group picnic shelter, 4 picnic sites, a swimming beach, single lane boat ramp, courtesy dock and a parking lot with 10 car spaces and 17 car/trailer spaces. The area is typically serviced with a portable chemical toilet.

Area Usage: This area experiences moderate to heavy visitation during the spring and summer recreation season from boaters and day users. Car/trailer parking is a limiting factor. 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

Development Needs:

- New restroom
- Playground equipment

5-02.A.10 Cadiz Recreation Area, Site No. 130

Management Agency: USACE (portion of the area is leased to the City of Cadiz)

Land Classification: High Density Recreation

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

Location: Cadiz Recreation Area is located on Hwy 139 within the city limits of Cadiz, Kentucky, approximately 3 blocks from the courthouse. The area is approximately 6.25 miles from Interstate 24 (exit 65) via US68/KY80 to Main Street.

Description: Nearly 40 acres of this 98 acre site are developed for intensive recreation. The remaining 58 acres are heavily wooded with no developed recreational facilities. The topography is relatively flat and is bordered on three sides by Little River. 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. The area also features a small pond that connects to Little River during high water levels. Common wildlife to the area includes White-tailed deer, squirrels, raccoons and various songbirds.
This area features extensive recreational facilities including restrooms, a group picnic shelter, playground equipment, 18 picnic sites, a single lane boat ramp and 4 parking lots with 68 car spaces and 18 car/trailer spaces.

Figure 5.6 - Cadiz Playground

Figure 5.7 - Cadiz Restroom

Area Usage: Due to its easily accessible location, this area experiences heavy visitation during the recreation season and moderate use by walkers, sightseers and fishermen during the off season. This area is commonly used as a location for special events hosted by local municipalities or tourist commissions. These events may include youth fishing rodeos, Easter egg hunts, historical reenactments and festivals. The group shelter is typically reserved 25-30 days per year but it is also commonly used by individuals without making a reservation.

Site-Specific Objectives:

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

Development Needs:

- Additional picnic sites
- Additional picnic shelter
- Install recreation courts or fields (with City partnership/lease)

- Additional parking
- Partner to install disc golf course

Special Considerations: The City of Cadiz currently leases approximately 18 acres on the southeastern side of Main Street. This area contains a wooden platform that overlooks the river as well as a nature walking trail. The City leases an additional 23 acres east of Hwy 139. Development plans for this area include parking, nature trails and an amphitheater. Opportunities for future partnerships and/or cost sharing with the City should be pursued in accordance with the Corp's Recreation Strategy.

5-02.A.11 Linton Recreation Area, Site No. 139

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: Linton Recreation Area is located along Hwy 164 just south of Cadiz, Kentucky. The area is approximately 22 miles from Interstate 24 (exit 65) via US68/KY80 and Hwy 139.

Description: Approximately 7 acres of this 30 acre site have been developed for intensive recreational use by the Corps. The Trigg County Fiscal Court leases 4.5 acres on the north side of Hwy 164 for the purpose of operating a volunteer fire station. The remaining 18.5 undeveloped acres, to the south and west, are densely wooded.

The general topography of the area is flat with a gentle slope to the water's edge. The developed portion of the recreation area is open with scattered trees throughout. Primary tree species include red oak, sweetgum, elm and cedar. Common wildlife to the area includes White-tailed deer, squirrels, Canada geese and various songbirds. Recreation facilities include a group picnic shelter, playground equipment, swimming beach, 4 picnic sites, restrooms, a 2-lane boat ramp, courtesy dock and 2 parking lots with 27 car spaces and 19 car/trailer spaces.

Area Usage: Despite its remote location, Linton Recreation Area experiences moderate to heavy visitation. The group shelter is reserved approximately 10 days per year, but it is often used on a first-come first-served basis as well. Much of the use comes from local residents and personnel from nearby Fort Campbell.

Site-Specific Objectives:

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

Development Needs:

- Replace restroom
- Replace picnic shelter
- Additional parking
- Additional picnic sites
- Install a park host campsite

Figure 5.8 - Linton Playground

Special Considerations: In an effort to support the Army's training mission, this area is frequently used by Fort Campbell units for amphibious training exercises. Due to safety concerns, some of these training exercises require the area to be closed to the public for limited periods of time.

5-02.A.12 Bumpus Mills Campground/Recreation Area, Site No. 145

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 occupancy rates.

Location: Bumpus Mills Recreation Area is approximately 4 miles from Hwy 120 in Bumpus Mills, Tennessee, which is midway between Cadiz, Kentucky and Dover, Tennessee.

Description: Of the 270 total acres, approximately 55 acres have been developed for camping and day use recreation. During the 2004 REAL Program, a 30 acre portion of the area, including 18 campsites and a restroom with showers, was permanently closed. The remaining 25 developed acres includes 15 campsites with water and electric facilities, a park attendant site with sewer, fee booth, restroom with showers, sanitary dump station, swimming beach, walking trail, single lane boat ramp, courtesy dock and 2 parking lots with 16 car spaces and 29 car/trailer spaces. Water for the area is supplied by a well and treatment facility operated by the Corps.

Much of the area, approximately 215 acres, is forested with mature oak and hickory species. The topography varies from moderate to steeply sloping upland forest to low lying, gently sloping bottomlands. Abundant wildlife including White-tailed deer, wild turkey, squirrels, raccoons,

opossums and multiple songbirds can been seen using the area. The nine banded armadillo has also been documented in this area.

Area Usage: Due to its remote location, Bumpus Mills receives light to moderate visitation during the recreation season and is closed from October through April. Most of the day use visitors are local residents or personnel from Fort Campbell. Campground occupancy rates average 34% with approximately 45% of users utilizing either the Golden Age/Access or the America the Beautiful Pass. This is the only Corps campground located in the Tennessee portion of Lake Barkley.

Site-Specific Objectives:

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

Development Needs:

- Nature trail(s)
- Install playground equipment
- Rehab existing campsites

5-02.A.13 Dyers Creek Recreation Area, Site No. 151

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: Dyers Creek Recreation Area is located just over the Hwy 79, Cumberland River Bridge from downtown Dover, Tennessee. The area is conveniently accessed from Paris and Clarksville via Hwy 79.

Description: Only 16 acres of this 244 acre site have been developed for recreation. The developed acreage 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 undeveloped area is mostly bottomland forest to include 2 islands. A small portion of the area to the northeast of the access road is mesophytic oak/hickory woodland with a moderate slope. 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.

Figure 5.9 - Dyers Creek Shelter

Recreation improvements include a restroom, 2 group picnic shelters, 13 picnic sites, playground equipment, horseshoe pits, volleyball court, a 2-lane boat ramp, courtesy dock and 3 parking lots with 83 car spaces and 20 car/trailer spaces.

Area Usage: This area receives moderate to heavy visitation and is the busiest Corps' managed recreation area in the Tennessee portion of Lake Barkley. Much of the use comes from local residents and personnel from nearby Fort Campbell.

Site-Specific Objectives:

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

Development Needs:

- Swimming beach
- Nature trail(s)
- Additional picnic sites
- Install park host campsite

Special Considerations: The gently sloping terrain and calm waters make this area favorable for a potential commercial marina site pending a market analysis. The major limiting factor for this type of development is the narrow access channel which could restrict larger boat access.

5-02.A.14 Lick Creek Recreation Area, Site No. 153

Management Agency: City of Dover, Tennessee
Land Classification: High Density Recreation

Rationale: This area supports the High Density Recreation classification because of the extensive recreational development and operational services provided by the City of Dover.

Location: Lick Creek Recreation Area (also referred to as Dover City Park) is located on Hwy 49 approximately .5 miles from downtown Dover, Tennessee. The area is conveniently accessed from Paris and Clarksville via Hwy 79.

Description: This 55 acre park is leased to the City of Dover for recreational development. Recreational improvements include 24 picnic sites, 3 tennis courts, a basketball court, a volleyball court, playground equipment, a picnic shelter with restrooms, a 2-lane boat ramp, a courtesy dock, a fishing dock, a hiking trail and 2 parking lots with 27 car spaces and 20 car/trailer spaces.

The topography of the area ranges from moderately sloping wooded areas to relatively flat open areas near the water's edge. Various wildlife, including White-tailed deer, wild turkeys, squirrels, raccoons and opossums, can be seen in this area.

Area Usage: This area receives moderate to heavy usage with the majority of users coming from Dover and the surrounding rural areas. Individuals and local organization use the area for picnics, boat launching and other outdoor recreation activities. The area is also routinely used for community special events such as Eagle Fest.

Site-Specific Objectives:

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

Development Needs:

- Based on the City's development plan

5-02.A.15 Guices Creek Recreation Area, Site No. 158

Management Agency: Cumberland City, Tennessee

Land Classification: High Density Recreation

Rationale: The area supports a High Density Recreation classification because of moderate visitation and operational services provided by Cumberland City.

Location: Guices Creek is located on Hwy 149 in Cumberland City, Tennessee, approximately 19 miles from Clarksville and Dover, respectively.

Description: Guices Creek is an 80 acre recreation area lease to Cumberland City, Tennessee. The topography of this area is generally a flat bottomland with a mixture of open areas and forested areas. Dominate tree species include sugar maple, hackberry, sweetgum and box elder. White-tailed deer, squirrels, raccoons, skunks, various songbirds, Canada geese and other waterfowl often frequent the area. Minimal recreational development in this area includes 3 picnic sites, a single lane boat ramp and 2 parking lots with 10 car spaces and 30 car/trailer spaces.

Area Usage: This area receives light to moderate use primarily from local fishermen and hunters.

Site-Specific Objectives:

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

Development Needs:

- Based on the City's development plan

5-02.A.16 Trice Landing Park, Site No. 163

Management Agency: City of Clarksville, Tennessee

Land Classification: High Density Recreation

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

Location: The area is located approximately 2 miles outside of downtown Clarksville off of Hwy 41A.

Description: Trice Landing is a 33 acre recreation area leased to the City of Clarksville, Tennessee for recreational development. Area improvements include a restroom (currently closed), swing set, group picnic shelter, 7 picnic sites, a single lane boat ramp, a courtesy dock and 2 parking lots with 20 car spaces and 13 car/trailer spaces.

The area is primarily open with forested edges. Dominate tree species include oak, elm, hackberry and sweetgum. A majority of the area has a moderate slope that levels out near the boat ramp parking area.

Area Usage: This area receives moderate usage primarily from local boaters and fishermen.

Site-Specific Objectives:

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

Development Needs:

- Based on the City's development plan

5-02.A.17 McGregor Park, Site No. 164

Management Agency: City of Clarksville, Tennessee

Land Classification: High Density Recreation

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

Location: McGregor Park is located on the riverfront in downtown Clarksville, Tennessee.

Description: McGregor Park encompasses 3.5 acres of Corps property that is leased to the City of Clarksville, Tennessee for recreational development. The area includes .5 miles of the Cumberland River shoreline. Topography in the area is relatively flat and the vegetation consists of sparsely scattered ornamental trees.

Recreational improvements include a single lane boat ramp, courtesy float, 4 picnic sites, a .5 mile multipurpose trail and 2 parking lots with 34 car spaces and 13 car/trailer spaces. Other facilities that are not located on Corps property include a large riverfront amphitheater, restrooms, additional picnic sites and parking, and a playground.

Area Usage: Because of its urban location, McGregor Park experiences high usage. Typical user groups include boaters, sightseers, exercise enthusiasts and general tourists. The area is also routinely used for local special events.

Site-Specific Objectives:

- Provide day use recreation opportunities

- Provide lake access for boating, fishing and hunting
- Support local tourism

Development Needs:

- Based on the City's development plan

5-02.A.18 Dover Recreation Area, Site No. 166

Management Agency: USACE

Land Classification: High Density Recreation

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

Location: Dover Recreation Area is located within the City of Dover, approximately .5 miles from Hwy 79. The boat ramp is across the Cumberland River from Dyers Creek.

Description: This 10 acre site currently has 5 picnic sites, a group picnic shelter, playground swings, a single lane boat ramp, courtesy dock, and parking lot with 12 car spaces and 19 car/trailer spaces. The area has a moderate slope down to a drainage area with a 4 foot wide walking bridge. The upland portions of the area contain oak and maple trees while the lower portions and drainage area have sweetgum, box elder and hackberry trees. Raccoons, squirrels, and various songbirds are commonly seen in the area.

Area Usage: The area experiences moderate usage from local boaters and picnickers. While the group picnic shelter is used sporadically, it is rarely reserved.

Site-Specific Objectives:

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

Development Needs:

- Additional picnic sites
- Updated playground equipment

5-02.B Access Areas

There are 17 access areas on Lake Barkley 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 number, managing agency, acreage and development needs. All areas include a parking area (gravel or paved) and a concrete boat ramp (except for Canal Overlook). Many of these areas include a courtesy dock as well. 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.

Three of these areas, Boyd's Landing, Devil's Elbow and Hickman Creek, are adjacent to separately classified Future/Inactive Recreation Areas. In the event that these areas are ever developed and/or leased to a local government, organization or commercial business, the current access areas could be incorporated into the outgrant. Any future development would require an environmental review and comment period.

Table 5.1 - Access Areas

Site #	Site Name	Managing Agency	Area (Acres)	Development Needs
108	Boyd's Landing Access Area	USACE	14.6	
134	Devil's Elbow Access Area	USACE	25	Expanded parking
152	Hickman Creek Access Area	USACE	126	
205	Canal Overlook *	USACE	14	
213	Poplar Creek Access Area	USACE	7.6	Expanded parking
214	Kuttawa Boat Ramp	Lyon County Tourism	8.1	
220	Coleman Bridge Access Area	USACE	3.7	Install courtesy dock
223	Dryden Creek Access Area	USACE	23.4	Expanded parking
228	Rivers End Access Area	USACE	2.8	Expanded parking
236	Calhoun Hill Access Area	USACE	5	
229	Little River Access Area	USACE	33	Ramp repairs
243	Tobacco Port Access Area	USACE	9.2	Dredging
245	Saline Creek Access Area	USACE	9.4	Parking improvements
262	Smith's Branch Access Area	TWRA	38.6	
263	Blue Creek Access Area	USACE	65	Parking improvements
269	Yellow Creek Access Area	TWRA	5.5	
270	Old Lock B South Access Area	TWRA	15.6	

* No boat ramp access. Overlook only.

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. In fact, 75 percent of all lease payments made to the Corps is returned to the county in which the marina is located. The services may include slip rentals, on-water fuel docks, restaurant/snack bar, boat rentals and cabin rentals.

5-02.C.1 Green Turtle Bay Resort and Marina, Site No. 301

Located 1 mile upstream of Barkley Dam, Green Turtle Bay Marina and Resort has a lease area of 116 acres of land and 84 acres of water. The facilities offered to visitors by this marina include 500 wet slips, 180 dry slips, 30 transient slips, boat rentals, fuel dock, a boat ramp, lodge/inn, cabin/condo rentals, laundry building, 4 restroom/shower houses, 3 swimming pools, 2 restaurants, snack bar, ship store, 2 playgrounds, volleyball court, tennis court, activity center, and boat repair facility. All facilities are located on government property.

5-02.C.2 Buzzard Rock Resort and Marina, Site No. 302

Located 9 miles upstream of the dam on Poplar Creek, Buzzard Rock Resort and Marina has a lease area of 147 acres of land and water. Amenities provided to the public include rental cabins, 2 boat ramps, lodge/inn, 285 wet slips, 8 transient slips, courtesy dock, boat rentals, fuel dock, full service restaurant, a ship store, a swimming pool, a laundry building, a fish cleaning station, a hiking trail, and a marine repair shop.

5-02.C.3 Kuttawa Harbor Marina, Site No. 303

Located 10.5 miles upstream of the dam, Kuttawa Harbor Marina has a lease area of approximately 25 acres. Existing facilities include 221 wet slips, 16 transient slips, restroom facilities, boat rentals, fuel dock, a 2-lane boat ramp, courtesy float, and full service restaurant.

5-02.C.4 Eddy Creek Marina Resort, Site No. 304

Located 18 miles upstream of the dam in Eddy Creek, this site has a lease area of 85.7 acres of land and 31 acres of water. Eddy Creek Resort and Marina offers the following facilities: 216 wet slips, 64 dry slips, 12 transient slips, 2 boat ramps, boat rentals, fuel dock, fish cleaning station, laundry building, campsites, a dump station, rental cabins, a full service restaurant, a ship store, restroom/shower facilities, picnic sites, playground, and basketball court.

5-02.C.5 Prizer Point Marina and Resort, Site No. 305

Located 24 miles upstream of the dam on Hurricane Creek, Prizer Point Marina and Resort currently has a lease area of 98.8 acres. This marina offers visitors the following amenities: 222 wet slips, 30 dry slips, 4 transient slips, a 2-lane boat ramp, boat rentals, fuel dock, restaurant, cabin rentals, campsites, restroom/shower houses, laundry building, dump station, 2 swimming pools, playground equipment, walking trail, bicycle trail, activity center, soccer field, volleyball court and basketball court.

5-02.C.6 Moon River Marina and Resort, Site No. 307

Located 28.5 miles upstream of the dam on Little River at Little River Mile 9.2, Moon River Marina has a lease area of 2 acres of land and 6 acres of water. This site offers the following facilities within the lease area: 77 wet slips, 8 transient slips and a fuel dock. This site is unique in that most facilities are located on private property, including an office, ship store, restaurant, rental cabins and campsites.

The Corps managed Little River Access Area, located on the northern bank of Little River from the marina, was previously included in this lease agreement. However, it was removed at the request of the marina operator. If the marina is ever sold, efforts may be made to place the Little River Access Area back into the lease area.

5-02.C.7 Bumpus Mills Marina, Site No. 308

Located 47.5 miles upstream of the dam near the mouth of Saline Creek, Bumpus Mills Marina has a lease area of 28 acres of land and 21 acres of water. Facilities offered by this site include 40 wet slips, 2 transient slips, a boat ramp, courtesy dock, boat rentals, fuel dock, ship store, restroom/shower house, campsites, cabin rentals, and fish cleaning station.

5-02.C.8 Liberty Park, Site No. 309

Located 97 miles upstream of the dam near Clarksville, Tennessee, Liberty Park has a lease area of 9 acres of land and approximately 2 acres of water (low water mark of Cumberland River). The park is managed by the City of Clarksville which has a sublease with a private company to operate Clarksville Marina. However, the marina is not located on fee property. Facilities provided on fee property within the lease area include a 4-lane boat ramp, restroom facilities, event/activity center and a large parking lot. Other facilities provided outside the lease area include an amphitheater, an exercise park, playground, dog park, restrooms, picnic shelters and several multipurpose trails.

5-02.D State Parks

5-02.D.1 Lake Barkley State Resort Park, Site No. 306

Lake Barkley State Resort Park is located 28.5 miles upstream of the dam on Little River at Little River Mile 3.5. The Kentucky Department of Parks (KDOP) leases approximately 1,670 acres from the Corps of Engineers. Within the lease area, the park offers a full range of resort and day use opportunities including 2 boat ramps, a swimming beach, 2 swimming pools, a fitness center, rental cabins, campsites, a sanitary dump station, restroom/shower houses, a full service lodge with a restaurant and convention center, laundry facilities, picnic sites, multipurpose trails, tennis courts,

an amphitheater and playground equipment. KDOP subleases the operation of a full service marina with 246 wet slips, 24 transient slips, boat rentals, a fuel dock, and a ship store. The park also features an 18-hole golf course and clubhouse on the adjacent State owned property.

5-02.D.2 Mineral Mounds State Park, Site No. 180

Mineral Mounds State Park is located between Hammond and Lick Creeks in Lyon County, Kentucky. Vehicle access is granted via Gregory Road off of Hwy 93 South. The park is comprised of three primary tracts totaling 536 acres. The park features an 18-hole golf course with clubhouse, a raw water intake, a 2-lane boat ramp and a parking area. While most of the developed facilities are not on Corps of Engineer's property, the Kentucky Department of Parks does have a lease for 8.5 acres and a consent to easement for 2.2 acres. This lease and consent authorizes the operation and maintenance of portions of the golf course and the water intake. The boat ramp and courtesy dock are permitted under a Department of Army Permit.

5-03 Environmentally Sensitive Areas

The following sites, totaling 4,058 acres, have been identified to contain unique ecological, cultural or aesthetic features that justify an Environmentally Sensitive Area land classification. Many of these areas contain hundreds of acres of unbroken forested habitat and will be managed to meet the natural and cultural resource management objectives identified in Chapter 3 with a primary goal to protect unique or sensitive habitat and minimize activities which disturb the scenic beauty and aesthetics of the lake. Justifications for these areas are supported by vertebrate and botanical surveys and reports provided by Michael P. Guilfoyle, Ph.D.[17] and Pamela Bailey, Ph.D.[18] of the Engineer Research and Development Center (ERDC) in Vicksburg, Mississippi. Several of these areas provide unique and diverse habitats for various wildlife species including Neotropical migrants of conservation concern and the endangered gray bat (*Myotis grisescens*). However, unless specifically prohibited, low impact recreational activities such as hiking, wildlife viewing and hunting will be permitted within these Environmentally Sensitive Areas.

5-03.A.1 Islands, Site No. 650

Lake Barkley contains 1,046 acres of islands. Although many of these islands are licensed to KDFWR (381 acres) and TWRA (192 acres) 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

[17] Vertebrate Surveys on U.S. Army Corps of Engineers Lake Barkley, KY-TN, Nashville District, Michael P. Guilfoyle, Ph.D., Engineer Research and Development Center, January 2016.
[18] Botanical Survey at Lake Barkley, Pamela Bailey, Ph.D., Engineer Research and Development Center, September 2015.

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 Lake Barkley 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. One example is the Lake Barkley Rookery State Natural Area which is an island in Trigg County that is one of only two known nesting sites in Kentucky for the black-crowned night-heron and great egret.

5-03.A.2 Poplar Creek Tract, Site No. 651

This 25 acre site is located just north of US Hwy 62 in Lyon County. The area routinely holds backwater created by beaver dams which creates an aesthetically pleasing wildlife area. A majority of the Poplar Creek Tract is wetland with bottomland marsh and shrub-swamp plant communities that provide important water quality functions. This area provides habitat for eight Central Hardwoods Bird Conservation Region (CHBCR) Priority Species and five KDFWR bird species of conservation concern, including the Kentucky warbler and wood thrush. The area also provides excellent habitat for amphibians including the southern leopard frog, a KDFWR species of conservation concern.

5-03.A.3 Pilfer Creek Tract, Site No. 652

This 185 acre tract of bottomland hardwood forest provides an excellent riparian buffer for runoff into Pilfer Creek which feeds the larger Eddy Creek. The area has a diverse forest community with large oak and hickory species scattered throughout the area. This area supports considerable populations of Neotropical migrants including six CHBCR Priority Species and two KDFWR species of conservation concern.

5-03.A.4 Eddy Creek Tract, Site No. 653

Located in the upper reaches of Eddy Creek, this 145 acre site surrounds the Hallaway Hills Future/Inactive Recreation Area. The plant community is characterized as bottomland hardwood forest and although plant diversity is limited, this area does effectively buffer runoff reducing sedimentation in Eddy Creek. Five CHBCR Priority Species and two KDFWR bird species of conservation concern were documented in the area. The southern leopard frog, a KDFWR species of conservation concern, was also documented in this area.

5-03.A.5 Ingram Shoals Tract, Site No. 654

Ingram Shoals is a 208 acre tract of fee property located at the end of Commerce Landing Road in Lyon County. This area is primarily bottomland hardwood forest with a mixture of species including oak, hickory, sweetgum and maple. Ingram Shoals provides an aesthetic buffer from adjacent residential development as well as diverse habitat for various species of wildlife. Point counts identified 30 different bird species including 7 CHBCR Priority Species and 4 KDFWR species of conservation concern, including the worm-eating warbler and wood thrush. Anabat® surveys identified the presence of four bat species including the federally endangered gray bat (*Myotis grisescens*).

5-03.A.6 Cannon Springs Wood State Natural Area, Site No. 655

Cannon Springs is a 282 acre peninsula that was originally developed as a boat ramp and picnicking area with the potential to be a future marina site. However, the area was closed in late 1980's as a result of low usage. In 2002, the Kentucky State Nature Preserves Commission and the Corps of Engineers registered this area as Cannon Springs Wood State Natural Area to protect the recovering subxeric, calcareous forest dominated by upland oak and hickory species. Primary canopy and sub-canopy species include white oak, pignut hickory, beech and sugar maple. The area has a diverse, mature forest that provides excellent habitat for Neotropical migrants including five CHBCR Priority Species and three KDFWR species of conservation concern. Two species of particular concern (i.e. worm-eating warbler and wood thrush) were identified in this area. The southern leopard frog, a KDFWR species of conservation concern, was also documented at this site.

This peninsula splits the north and south forks of Dryden Creek. The limited development, large public land holdings and quality habitat in the Dryden Creek embayment provides a unique aesthetic appeal that should be protected.

5-03.A.7 Worthington Tract, Site No. 656

This 47 acre tract is located in Worthington I Subdivision on Dryden Bay in southern Lyon County. The bottomland hardwood forest plant community is fairly diverse with 33 different species documented during the summer/fall botanical survey. Combined, the Worthington Tract and Site No. 655 provide nearly 330 acres of unbroken mature forest within Dryden Bay making it one of the most naturally aesthetic bays on the eastern side of the lake.

5-03.A.8 Motley Creek Tract, Site No. 657

The head of Motley Creek is a 15 acre tract of bottomland hardwood forest with multiple, small streams emptying into the creek. The botanical survey conducted by ERDC documented 40 species

of plants growing in the area. This indicates high diversity, especially since the survey was conducted from late June to early September when many of the early flowering plants were not captured. Point counts identified five CHBCR Priority Species, including the Swainson's warbler, and three KDFWR bird species of conservation concern, including the Louisiana waterthrush). Several amphibians including the southern leopard frog were documented in the area.

5-03.A.9 Little River Tract, Site No. 658

This 376 acre tract of bottomland forest stretches from Cadiz Recreation Area to a point approximately one mile from Little River's junction with Muddy Fork. This area encompasses all fee property along both sides of the river with the exception of the Coyote Ridge WMA and a small parcel (1.5 acres) that is outgranted to the City of Hopkinsville for a municipal water intake. This area serves as an important riparian buffer between adjacent agricultural lands to filter sediment and phosphates thereby improving water quality. Primary canopy species include black willow, silver maple and cottonwood. Several pockets of shallow water areas and emergent wetlands are interspersed within the forested habitat providing excellent habitat for birds and amphibians.

5-03.A.10 Coyote Ridge Wetland Mitigation Area, Site No. 658(M)

The Coyote Ridge Wetland Mitigation area is included in this site. The 9 acre mitigation area was established to offset the loss of wetlands as a result the US68/KY80 expansion through Land Between the Lakes. The area was planted with a stock of several oak species. Natural recruitment of black willow, cottonwood and sycamore is also occurring. Ludwigia and Rice-cut grass are the dominant herbaceous species. This area provides unique habitat that is not present anywhere else on fee property. If protected, this area will continue to develop into a diverse wetland providing essential water filtration and wildlife habitat. Point counts in this area identified five CHBCR Priority Species and three KDFWR species of conservation concern, including the great egret.

5-03.A.11 Terrapin Creek Tract, Site No. 659

This 20 acre tract is located at the head of Terrapin Creek just east of Old Lock E Road. The plant community in this area is primarily bottomland hardwood forest with a scrub/shrub wetland at the water's edge. This area provides important benefits as runoff buffer to prevent sediment and phosphates from entering the lake. The diverse plant community provide valuable habitat for various avian and mammal species. Seven CHBCR Priority Species and two KDFWR species of conservation concern have been documented in the area. Anabat® surveys identified the presence three bat species including the federally endangered gray bat (*Myotis grisescens*).

5-03.A.12 Donaldson Creek Tract, Site No. 660

This 230 acre tract is located in the back of Donaldson Bay near Hwy 164 in Trigg County, Kentucky. Typical plant community is bottomland hardwood forest. This area provides an important buffer to protect water quality from surrounding agricultural lands. The northern portion of this tract is a uniform, early successional woodland with small canopy openings throughout. The eastern portion is a more diverse, densely vegetated area. Point counts in this area identified 34 different bird species including 10 CHBCR Priority Species and five KDFWR species of conservation concern. Three species of particular concern (i.e. cerulean warbler, wood thrush and Kentucky warbler) were identified in this area. Seven individual southern leopard frogs, a KDFWR species of conservation concern, were also documented at this site.

5-03.A.13 Dry Creek Tract, Site No. 661

At 1,100 acres, the Dry Creek Tract is the largest Environmentally Sensitive Area on Lake Barkley. Historically this area was used as an Off-Road Vehicle (ORV) area. In 2008, this area was closed to ORV use because of environment damage, vandalism and complaints from adjacent landowners. Currently the area is passively managed and supports hiking, hunting and wildlife viewing activities. The Dry Creek Tract also lies within a planned wildlife conservation corridor project to connect Ft. Campbell with the Land Between the Lakes National Recreation Area. The corridor will provide benefits such as habitat connectivity, protection of federally listed endangered species, watershed improvements and possible increased outdoor recreation and education opportunities.

The varying elevation and slope aspects of this area create conditions suitable for a diverse variety of plant species including mature, large trees. The plant community is classified as bottomland hardwood forest and bottomland ridge/terrace forest. The northern portion of the area provides an excellent buffer to prevent sediment from entering the lake. Point count surveys in this area identified 33 different species of birds including 10 CHBCR Priority Species and six KDFWR species of conservation concern. Of particular interest is the presence of cerulean warbler, worm-eating warbler, Kentucky warbler and wood thrush. Anabat® surveys in this area identified the presence of five species of bat including the endangered gray bat (*Myotis grisescens*). Amphibian surveys also identified the presence of southern leopard frogs, a KDFWR species of conservation concern.

5-03.A.14 Saline Creek Tract, Site No. 662

This 149 acre tract is located 1 mile upstream of Bumpus Mills Campground in Saline Creek. The area is bottomland ridge/terrace forest with a diverse mix of mature trees including oak, hickory and beech. Due to difficult access, point counts were taken in Bumpus Mills Campground as a proxy for birds likely to be detected on the Saline Creek Tract. These counts identified 21 bird species including the Kentucky warbler and the worm-eating warbler. An Anabat® survey conducted

immediately adjacent to this area identified four species of bat including the endangered gray bat (*Myotis grisescens*). Amphibian surveys also identified the presence of southern leopard frogs, a KDFWR species of conservation concern. In addition, the Saline Creek Track is located within the proposed wildlife conservation corridor referenced in Section 5-03(13).

5-03.A.15 Dyers Creek Tract, Site No. 663

This 142 acre tract is located just upstream of the Hwy 79 Bridge in Dover, Tennessee. This area was classified as High Density Recreation in the 1983 Master Plan, but due to a low elevation, it was never developed. According to the National Wetlands Inventory, approximately 90% of the area is a forested/shrub wetland. The area serves as a functioning buffer to improve water quality as well as provide important fish and wildlife habitat. Point counts in this area identified 18 species of birds including five CHBCR Priority Species. An important cultural site is also located on this tract. In addition, the Dyers Creek Tract is located within the proposed wildlife conservation corridor referenced in Section 5-03(13).

5-03.A.16 Lick Creek Tract, Site No. 664

This 89 acre tract of fee property is located where Lick Creek empties into Lake Barkley in Dover, Tennessee. This area functions as an excellent riparian buffer to prevent sediment and phosphates from entering the lake. Botanical surveys documented 48 different plant species in three plots (one plot was located on adjacent private property). The plant community is classified as bottomland forest with the dominant canopy species of oak, beech and loblolly pine. Point counts identified the presence of six CHBCR Priority Species and Anabat® surveys identified the presence of three bat species including the federally endangered gray bat (*Myotis grisescens*).

5-04 Multiple Resource Management Lands

Lands in this classification will have a predominate sub-classification with the understanding that other compatible Multiple Resource Management sub-classification type 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 402 acres classified as Low Density Recreation on Lake Barkley. These areas are managed primarily to meet the recreational and natural resource management objectives identified in Chapter 3. Specific areas are referenced below.

In addition to these sites, the areas in the Shoreline Management Plan (SMP) allocated for Limited Development have a secondary sub-classification of Low Density Recreation due to the passive recreation that occurs in these areas. The predominate sub-classification in those areas will remain Vegetation Management. See Section 5-04.C for a description of those areas and consult the Lake Barkley SMP for specific information about shoreline use and associated permits.

5-04.A.1 Chestnut Oak Trail Tract, Site No. 206

This section of Corps property was classified as Low Density Recreation in the 1983 Master Plan. Encompassing 316 acres, the area stretches nearly 2 miles from Eureka Campground south to Boyd's Landing Access Area. It is somewhat unique because the distance from the water's edge to the boundary line averages over 200 yards for entire length of the area. It also includes the 2.5 mile Chestnut Oak Trail that begins in Eureka Recreation Area and follows the old Intercontinental Railroad bed to Hwy 810 South. The topography ranges from flat bottomland to moderate, wooded slopes. The area is commonly used by big game and waterfowl hunters. Primary access to the area is Green Road which terminates at Corps property just south of the old railroad bed. This area is well suited for expansion of the Chestnut Oak Trail to connect Eureka and Boyd's Landing. Opportunities to partner with mountain biking groups and other organizations should be pursued to facilitate this development and future operation and maintenance.

5-04.A.2 Old Ferry Landing Tract, Site No. 240

This 12.1 acre area was previously classified with Linton Recreation Area as High Density Recreation. The Old Ferry road bed provides convenient access to the lake. The area receives moderate use from bank fishermen and day users. No active management activities are planned for this area.

5-04.A.3 Old Lock C, Site No. 268

The Old Lock C site includes 27 acres on both banks of the Cumberland River just upstream of Guices Creek. The right descending bank has visual remnants of the old lock wall and an old boat ramp that is usable for much of the year. This area does receive light usage from boaters and fishermen. In the past, this area has been used by the Army to transport equipment on the Cumberland River. The area on the left descending bank is currently outgranted to the City of Erin for a municipal water intake. No active management activities or improvements are currently planned for this area.

5-04.A.4 Fort Donelson National Battlefield, Site No. 718

This area, approximately 1 acre, includes a thin strip of Corps property around the National Park Service site. This area was classified as Forest Reserve Lands in the 1983 Master Plan, but due to

the number of visitors and the nature of activities at Fort Donelson National Battlefield, this area is now classified as Low Density Recreation.

5-04.B Wildlife Management

These lands, approximately 3,694 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 Lake Barkley is conducted primarily by two state agencies: the Tennessee Wildlife Resources Agency (TWRA) and the Kentucky Department of Fish and Wildlife Resources (KDFWR). These lands are managed with secondary sub-classifications of Low Density Recreation and Vegetative Management. Passive recreation like wildlife watching, hunting, paddling and hiking may occur in these areas. The plant communities in this area are critical to providing suitable habitat for native wildlife. Cross Creeks National Wildlife Refuge, owned and operated by the U.S. Fish and Wildlife Service, also provides over 8,800 acres of managed wildlife habitat in Tennessee.

5-04.B.1 Barkley WMA (TN), Site No. 601

Barkley Wildlife Management Area (WMA) consists of two units totaling 2,264 acres of land that are licensed to TWRA for fish and wildlife activities. This area includes all lands west of the river channel (with the exception of Saline Creek) from the Kentucky/Tennessee state line southward to HWY 79 in Dover, Tennessee. Yellow Creek Access Area, Smith Branch Access Area and Lock B South Access Area, located in Montgomery County, are also included in this outgrant. However, the ramp portions of these areas are classified as High Density Recreation. Additionally, 193 acres of islands, included in the TWRA license, are classified as Environmentally Sensitive and are described in Section 5-03(1).

Habitat management activities are focused on improving wetland habitats through row crop agriculture and manipulated wetlands. Approximately 850 acres are planted by contract farmers 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. Unit 1 provides 25 permanent blind locations that are permitted through an annual drawing while Unit 2 provides temporary hunting opportunities. 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.B.2 Kentucky Waterfowl Refuge Area (Duck Island), Site No. 603

Duck Island is a KDFWR managed portion of the Lake Barkley WMA that functions as a waterfowl refuge from October 15 – March 15. The island is approximately 420 acres in size bounded by a manmade levee. The area is primarily managed for use by migratory waterfowl. Manipulation of water levels within the island is critical for successful management of the natural and planted habitat resources. Water is commonly pumped out of the island to maximize the acreage available for early successional vegetative habitats. Common crops planted on Duck Island include corn, milo, and occasionally Japanese millet. At times, "moist-soil management" is the best solution for providing the largest amount of food resources.

The northern half of the island is primarily open water. This area is used as a stockpile for water that can be gravity flowed to the central impoundment when desired in the fall. Growing season flood events are rather common and will occur approximately 2-3 out of every 5 years based on more recent water level data. Levees armored with riprap are common on the island and are necessary to maintain a reasonable level of control of water levels. Future development includes reshaping and armoring the central levee.

The KDFWR also manages 381 acres of islands between CRM 38 and CRM 74.7. While these islands are licensed to KDRWR for management, they will be classified as Environmentally Sensitive Areas along with all other islands in Lake Barkley (with the exception of the Duck Island). See Section 5-03(1) for a description of these areas.

5-04.B.3 Coyote Ridge WMA, Site No. 604

This 148 acre site is located on Little River just downstream from Cadiz Park in Trigg County. Access to the area is provided via Coyote Ridge Road just off Hwy 274. Coyote Ridge WMA is a fill offset mitigation site established to offset flood storage impacts associated with the expansion of US68/KY80 thru the Land Between the Lakes National Recreation Area (LBL). The area contains 2 impoundments, totaling 14 acres, which can be manipulated by 4 water control structures. The remaining area consists of forested wetland dominated by black willow, silver maple and cottonwood trees. A small portion of the area, approximately 9 acres, is a wetland mitigation site and has been classified as an Environmentally Sensitive Area (see 5-03 for ESA descriptions).

While Coyote Ridge is currently managed by the Corps, partnerships and volunteer agreements with local organizations and individuals will be pursued to reduce operational and maintenance costs. The primary objective for this area is to manage and protect quality wildlife habitat while providing quality hunting and fishing opportunities.

5-04.B.4 Bear Creek WMA, Site No. 605

Bear Creek is an 864 acre Corps managed area that extends from CRM 86.2 to CRM 80.2 on the left descending bank of Lake Barkley in Stewart County, Tennessee. Management includes an active farming program on approximately 300 acres, utilizing a lease agreement with area farmers for rotational row crops. A portion of the crops are unharvested to provide food and cover for wildlife. There are four moist soil units that that are flooded during the winter to provide waterfowl with resting and forage habitat. Permits for hunting blinds are issued at an annual drawing that takes place in late summer. While hunting and fishing make up a large part of the user base, many bird watchers and wildlife enthusiasts frequent the area to observe the large wintering population of pelicans as well as herons, egrets, bitterns and various migratory songbirds. The bottomland hardwood forest provides a biological and ecological biome diversity made up of rich alluvial soils. Forested areas contain cypress, oak, hickory, gum, maple, willow, cottonwood, box elder and pecan, while the edges are predominantly black willow and honey locust.

5-04.B.5 Guices Creek Tract, Site No. 606

This 191 acre tract of bottomland forest is located just upstream of the mouth of Guices Creek. Dominate canopy species include silver maple, sugar maple, hackberry, sycamore and box elder. Previous Master Plans classified this area as High Density Recreation but this tract is separated from the existing recreation area by a railroad bed and is currently only accessible by boat. A majority of this tract is also subject to inundation during high water levels. Due to accessibility constraints, active management will be limited. However, this area could be outgranted to TWRA if mutually agreeable.

5-04.C Vegetative Management

Encompassing 4,221 acres, Vegetative Management is the largest sub-classification of Multiple Resource Management Lands on Lake Barkley. 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 Lake Barkley 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 and mixed commercial 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. The following site is discussed in further detail to provide historical information.

5-04.C.1 McAdoo Creek, Site No. 401

The 120 acre McAdoo Creek site is located at CRM 136 in Montgomery County on the right descending bank. Originally, the area was to be developed as a youth and adult recreation/education center operated jointly between the Tennessee Wildlife Resources Agency and the Two Rivers Gun Club. This venture never came to fruition and the area was never developed. The area is generally inaccessible except from the Cumberland River. A portion of the area is currently in an agricultural lease for hay. The remainder of the area will be passively managed.

5-04.D Future/Inactive Recreation Areas

These are areas that were classified for recreation but were never developed or were developed and have subsequently been abandoned. There are 491 acres with the sub-classification of Future/Inactive Recreation Areas. Although there may not be an immediate need for additional recreation facilities within the location of these areas, it can be difficult to accurately predict future recreational trends or population growth within any given area. Even though federal recreation funding is limited, these sites could be leased to other agencies or local governments, or they could be advertised as potential commercial marina sites. The process for awarding a new marina site on Lake Barkley would require the issuance of a Notice of Availability (NOA) after an extensive study to determine the need and feasibility for additional commercial concessions. This process is subject to change based on policy and procedural changes that may occur in the future. Lands classified as Future/Inactive Recreation Areas should be given extra consideration, but proposals located elsewhere will be evaluated as well. Until there is a need and/or opportunity to develop or reopen these areas, they will be managed for multiple resources including low density recreation and wildlife management in order to meet the natural resource management objective. The following list contains specific details for Future/Inactive Recreation Areas.

5-04.D.1 Boyd's Landing, Site No. 108

The campground portion of Boyd's Landing, approximately 34 acres, is classified as a Future/Inactive Recreation Area because it was closed during the 2004 REAL Program. The closure was a result of low occupancy rates with the expectation that Eureka Campground, located just a few miles away, could accommodate the visitors who would normally use Boyd's Landing. The closed portion of the area is wooded with moderate to thick understory and a moderate to steep slope. The area includes the following closed facilities: 14 campsites, a restroom, a fee booth and a

swimming beach. The Corps of Engineers is receptive to outgranting this area under the applicable authorities and procedures.

The portion of Boyd's Landing that remains open and is classified as High Density Recreation includes a single lane boat ramp, 2 picnic sites and 2 parking lots with 23 car spaces and 22 car/trailer spaces. Proposals to lease and develop this area will also be considered by the Corps.

5-04.D.2 Hallaway Hills, Site No. 219

This 4 acre site is located on the upper reaches of Eddy Creek in the Saratoga community. The area consists of a small, gravel lot and a concrete boat ramp. While the area is not currently maintained by the Corps, it does receive some limited use by fishermen, hunters, and kayakers. KDFWR removes mud and debris from the boat ramp periodically and it appears that local residents keep the litter and trash picked up. Opportunities to outgrant this area to KDFWR or the local county should be pursued further.

5-04.D.3 Devil's Elbow, Site No. 134

Similar to Boyd's Landing, the 9 acre campground portion Devil's Elbow is classified as a Future/Inactive Recreation Area because it was closed during the 2004 REAL Program. The closure was a result of low occupancy rates. The area includes the following closed facilities: 20 campsites, a restroom, a fee booth and parking area. The Corps of Engineers is receptive to outgranting this area under the applicable authorities and procedures. Convenient access to a major highway and adequate water depth makes this area suitable for a future marina site.

The portion of Devil's Elbow that remains open, and is classified as High Density Recreation, includes a 2-lane boat ramp and a parking lot with 40 car/trailer spaces. Proposals to lease and develop this area in conjunction with the inactive campground will also be considered by the Corps.

5-04.D.4 Donaldson Creek, Site No. 237

Donaldson Creek is a 132 acre site located on the south side of Donaldson Creek bay. Since the 1983 Master Plan, this area was closed as a result of low visitor use and poor access. During the expansion of US68/KY80 through LBL, this site was identified as a fill material offset mitigation site. As a result the old boat ramp was removed and a new boat ramp and gravel parking area were constructed at a higher elevation. The new ramp receives minimal visitation, primarily used by local residents. The remaining 122 acres of rugged, oak-hickory forest area is commonly used by hunters.

This area has been identified as a potential marina site. However, the remote location, poor vehicular access and difficult terrain will present development challenges. Until further interest for development occurs, the area will be managed for low density recreation and wildlife management.

5-04.D.5 Hickman Creek, Site No. 152

Hickman Creek is a 118 acre area located on the northern shore of Hickman Creek just north of Dover, Tennessee via Hwy 49 (The Trace). This area was closed in 1983 due to low usages and excessive maintenance costs. The area is heavily vegetated with early successional species including hackberry, green ash, boxelder and sweetgum. The terrain features a moderate slope from ridge tops in the north central portion to the relatively low lying bottoms near the water's edge. This area offers excellent views of Fort Donelson National Military Park across the bay to the south.

Hickman Creek has been identified as a potential marina site. However, shallow water and cultural resource issues related to the Fort Donelson view shed may present development challenges. Until further interest for development occurs, the area will be managed for low density recreation and wildlife management.

5-04.D.6 Rivers Bend, Site No. 255

This 120 acre area is located adjacent to the southern end of Cross Creeks National Wildlife Refuge. Facilities were reduced to launching only in 1983 due to difficulty of access, low usage and continuing maintenance concerns. The original 10 picnic sites were removed following closure but the launching ramp was left in place. Currently there are no O&M services provided. Boat launching still occurs but the frequency is very low. The area is thickly vegetated with early successional species like box elder, hackberry, sweet gum and silver maple. The terrain is relatively flat with little change in topography.

5-04.D.7 Hematite, Site No. 261

Hematite is comprised of 32 acres; it's located on Budd's Creek at Cumberland River Mile 116 on the left descending bank. Access by land is made via Hwy 149 east of Palmyra, Tennessee. The area originally provided boat launching and picnicking opportunities but was closed in 1983 due to lack of use. The five picnic sites were removed. There are no O&M services performed in this area.

5-04.D.8 Mayberry Branch, Site No. 267

The 33 acre Mayberry Branch site is located at CRM 146.5 on the left descending bank. It can be accessed via Hunley Branch Road and Old Ferry Road in Cheatham County, Tennessee. The area

was closed in 1983 due to lack of use. Since that time, the area has become thickly vegetated with early successional species such as eastern red cedar, green ash and redbud. There are no facilities at this location except for remnants of the old boat ramp, which is unusable for boat launching. Some local residents use the old road to access the river bank.

5-05 Water Surface

Water surface area designations are described earlier in Section 4-02.F. The Resource Manager's office maintains over 350 secondary channel markers and regulatory buoys on Lake Barkley. Coordination will be made with the KDFWR, Division of Law of Enforcement and 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.

Additionally, the KDFWR maintains a 3,583 acre water refuge area which includes Fulton and Honker Bays and portions of the main lake west of the river channel. Boating is restricted in this area from November 1st thru March 15th.

5-06 Project Easement Lands

5-06.A Flowage Easement

The 27,662 acres of flowage easement on Lake Barkley were purchased to give the Corps of Engineers the right to inundate these lands during flood risk management operations to provide adequate storage capacity for flood waters. The flowage easement on Lake Barkley extends up to an elevation of 378 feet AMSL. 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.

5-06.B Conservation Easement

The Corps purchased a 4.62 acre conservation easement to construct and maintain an access road to Canal Campground. Presently this road also provides access to the Marina Village Subdivision.

Chapter 6 - SPECIAL TOPICS/ISSUES/CONSIDERATIONS

6-01 Lake Levels

While water level management is not affected by the Master Plan revision process, it is an interesting subject that has generated much debate since the impoundment of the Lake Barkley. Water levels are managed according to a set "Guide Curve" designed to meet the primary authorized purposes of flood control, navigation and hydropower. Lake Barkley adopted TVA's Kentucky Lake Guide Curve because both lake elevations must be kept within six inches to avoid dangerous currents in the unregulated canal. Lake Barkley is also unique because it is the only Nashville District Project on the main stem of the Cumberland River that has a scheduled winter drawdown.

The original Guide Curve specified a winter pool elevation of 354 feet AMSL from December 1st to April 1st. Water levels were then allowed to rise to a summer pool elevation of 359 feet AMSL from April 1st to May 1st. Water levels were then maintained until June 15th, when the pool levels made a sudden drop to control mosquitoes. In 1980, the guide curve was changed to extend summer pool until July 1st as a result of requests from recreation interests. An alternative proposal to extend summer pool until July 15th was rejected at that time. In 1990, a second request by recreation interests proposed a "stair step" drawdown. The premise of this drawdown was that holding pool levels steady for short periods of time in late summer would increase recreational boating opportunities. The "stair step" drawdown was proposed on a 3-year trial basis but was abandoned because of negative impacts to wading birds, water quality issues, loss of hydroelectric power generation revenues, an increased potential for fish kills below the dam and increased flooding risks on the lower Ohio and Mississippi Rivers. In 2005, Congressman Ed Whitfield (R-1-KY) requested the U.S. Army Corps of Engineers to explore an adjustment to the guide curve which would extend summer pool until July 15th. An Environmental Assessment (EA) conducted by the Nashville District determined that summer pools levels should not be extended until July 15th without the completion of an Environmental Impact Study (EIS) to investigate impacts to the lower Ohio and Mississippi Rivers.

Most tourism proponents still contend that increasing the summer pool duration on Lake Barkley would have a positive impact on the local economy. However, natural resource proponents maintain that extending summer pool will have negative impacts to the environment. Until further studies are completed to determine all impacts, Lake Barkley will continue to operate under the current Guide Curve to meet originally authorized purposes.

6-02 Land Between the Lakes National Recreation Area

At 171,280 acres and 40 miles long, the Land Between the Lakes National Recreation Area (LBL) is one of the largest blocks of undeveloped forest in the eastern United States. When Lake Barkley was impounded, the U.S. Army Corps of Engineers owned the lands in the eastern section of LBL that were below elevation 378 feet AMSL. These lands were permitted to TVA as part of the LBL National Demonstration Area. In 1998, LBL and the permit were transferred to the U.S. Forest Service (USFS) in compliance with the LBL Protection Act, P.L. 105-277, Title V (reference b.) A short time later, the USFS determined that the Corps' permit did not grant sufficient interest for the operation of LBL as a uniform unit. As a result, the Corps transferred 7,518 acres of land, lying between elevations 359 and 378 feet AMSL, to the USFS.

LBL boasts extensive recreation facilities including 1500 campsites, 30 boat ramps, 5 environmental educations facilities and over 500 miles of hiking, biking, horse and off-highway vehicle trails. The USFS manages nearly 170 miles of Lake Barkley's western shoreline. A portion of LBL's 1.4 million annual visitors can use one of the 14 boat ramps to access Lake Barkley. The USFS also operates several developed and back country camping sites that are directly adjacent to Lake Barkley.

6-03 Floating Cabins

Section 1148 of the Water Resources Development Act of 2016 (WRDA 2016) allows for floating cabins within the Cumberland River Basin provided they meet policy. The Corps implementation guidance for Section 1148 of WRDA 2016, establishes consistent policies, procedures, and responsibilities to evaluate requests for the addition of floating cabins and associated moorings/slips in the Cumberland River Basin. This policy is only applicable to floating cabins within outgranted marina areas in the Cumberland River Basin, and that are in compliance with regulations for recreational vessels issued under chapter 43 of title 46, United States Code, and section 312 of the Federal Water Pollution Control Act (33 U.S.C. 1322).

6-04 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. In FY 14, volunteers provided nearly 7,800 hours of service valued at $176,000. Future partnership and volunteer opportunities will be pursued in accordance with the USACE Recreation Strategic Plan.

6-05 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.

6-06 Shoreline Management Plan

The Shoreline Management Plan (SMP) is an appendix to the Lake Barkley 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 Lake Barkley. This plan can be viewed at: http://cdm16021.contentdm.oclc.org/cdm/ref/collection/p16021coll7/id/2338.

6-07 Water Safety

With over 370 million annual visits, the Corps is 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, Lake Barkley 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 Lake Barkley 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 Lake Barkley 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.

6-08 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 Lake Barkley 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 vandalism 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 Lake Barkley Shoreline Management Plan referenced in Section 6-05.

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.

6-09 Cultural Resource Vandalism

Archaeological sites are present throughout Lake Barkley. 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-hours-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.

6-10 Metal Detecting

Due to the potential to destroy archaeological sites and other natural resources, metal detecting is permitted in designated use areas only. The designated metal detecting use areas for Lake Barkley are the sand beach and playground areas within the Old Kuttawa Recreation Area, Cadiz Recreation Area, Rockcastle Recreation Area and Linton Recreation Area. Metal detecting is prohibited in all other terrestrial and marine areas of Lake Barkley.

6-11 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.

6-12 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 occurred. Such action shall be deemed to have occurred 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.

6-13 Environmental Compliance

Lake Barkley 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.

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

6-14 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, one of which is on Lake Barkley. 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

6-15 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. On Lake Barkley, the Corps of Engineers purchased a flowage easement estate that extends to 378 feet AMSL. 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 (375 feet AMSL) 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.

6-16 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.

6-17 Mixed Commercial Concession Lease

A mixed commercial concession lease is typically a short-term outgrant issued for the purpose of providing recreational facilities on Corps lands and waters that support an adjacent private campground and/or lodging facility. Lake Barkley has six mixed commercial leases and future requests for additional facilities are expected. The facilities in the areas are very similar to a condominium or subdivision community dock association. They are generally limited in size and are often located directly adjacent to residential neighborhoods. Therefore, lands adjacent to a mixed commercial concession lease will be classified as Multiple Resource Management – Vegetative Management.

Chapter 7 - AGENCY AND PUBLIC COORDINATION

7-01 Stakeholder Input/Comment Process

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 Lake Barkley 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 and minutes of the June 24, 2015 and September 9, 2015 meetings are provided below in this chapter. Written questions/comments from stakeholders are included in Appendix A. 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.A.1 Stakeholder Meeting Minutes - June 24, 2015

SUBJECT: Lake Barkley MP Revision – Stakeholder Meeting Minutes

Purpose: Kickoff to inform Lake Barkley Stakeholders about the Master Plan Revision process and information that would be helpful to the master plan process.

1. The following participants attended the meeting Wednesday, June 24, 2015:

Attendee Name	Attendee Office
Wade White	Lyon Co. Fiscal Court
Steve Long	City of Kuttawa
Bill Gary	Kentucky Marina Association, Green Turtle Bay Resort and Marina
Dan Fuqua	TWRA
Greg Batts	Kentucky Marina Association, Prizer Point Marina and Resort

Barron Crawford	US Fish & Wildlife, Cross Creeks National Wildlife Refuge
Pat Hahs	KDFWR
Jed Grubbs	Cumberland River Compact
Allison Walker	USACE Nashville District Office
Andreas Patterson	USACE Nashville District Office
Kathryn Firsching	USACE Nashville District Office
Lee McCollum	City of Kuttawa
Matthew Granstaff	USACE Nashville District Office
Wes Davenport	USACE Lake Barkley
Kayl Kite	USACE Lake Barkley
Not able to attend, but still participating in Stakeholder input	
Terry A. Watson	Town of Dover
Shannon McLeary	Kentucky Division of Water
Steve Bloemer	US Forest Service (Land Between the Lakes)
Shanna Spurlock	Lake Barkley State Park Resort

2. Meeting Minutes

Discussion Items:

A. **Master Plan Overview Presentation –** Kayl (see powerpoint presentation)
   i. In regards to the SMP relationship to the MP – Q: There is a broad representative of stakeholders here for this meeting, who were the stakeholders for the recent SMP update? A: The public involvement portion of the SMP was done with three full public meetings as opposed to a stakeholder development group followed by public meetings.
   ii. Q: Who are the stakeholders on the OMP? A: No stakeholder/public involvement process is required for the OMP because it serves as a work plan of the MP.
   iii. Q: How often are MPs, SMPs, and OMPs updated? A: MP hasn't been updated since 1983, though is supposed to be done about every 25 years. The OMP is updated as needed, and the SMP is updated consistently every 5 years. The most recent SMP was just completed and is at USACE division for review.
   iv. Q: Is there a percentage of each classification that we're targeting or guided to meet? A: No, but we're trying to balance meeting the needs of the public with protecting lands and habitats
   v. Request for a meeting sooner than the drafting process. Discussion – We welcome comments as the process develops. In the past we've had best luck having a working draft to comment on rather than a blank sheet of paper to throw stuff at.

vi. Questions about funding for a Master Plan? Funding is primarily labor, some supplies, also goes towards other Corps entities outside of Nashville District to provide technical input. Our funding year ends 30 Sept.

B. **General Discussion**

i. There was a reference to Table Rock Lake in Little Rock District that didn't make sense in the draft Master Plan. Response: that was a duplicate from a plan from another district being used as guidance for our plan; it should be deleted.

ii. Q: Why were the Environmentally Sensitive Areas designated in draft? Is it a starting place or does the Corps already know the criteria for an environmental sensitive area are currently being met for those designated area? A: Some of them are proposed because of the large acre size, but some have high bird counts and other unique species or diversity or cultural resources that are known at that location.

iii. Q: Would state data or state designations impact how we classify our lands? A: Yes. State designations would give a lot of information to help us classify lands. The Master Plan is supposed to consider any state and local plans for recreation and planning.

iv. Q: Looking at the "Significant Changes to the Master Plan section", what does the "Increased Outgranting" mean? A: This is a reflection of the current funding environment. When the 1983 Master Plan was developed, the Corps budget reflected more of a "building" phase. Current budgets are continually decreasing and the Corps works more in maintaining existing assets. As a result, this master plan will have more discussion on increased outgranting and work with partners, and less about building new facilities.

v. Downstream Water Quality Improvements: These are a reflection of new environmental regulations that impact our operations since the 1983 MP update

vi. Comment – Floating cabins don't need to be included in the Master Plan, not a Master Plan topic. A: This is new to the WRRDA regulation, and the addition of it in the Master Plan reflects the implementation of WRRDA. More discussion on floating cabins will be done at area meetings

vii. Comment – need to add Restricted Areas to "summary of significant changes"

viii. Comment – are there any areas that could be good for off-road vehicle use? Could get young people and families outside and enjoying the lake. Something to consider as the MP process moves forward… (history on closing the Linton ORV site)

ix. Comment – collection of fees at Old Kuttawa. To be discussed in detail later (not necessarily part of the MP)

Data requests/Action Items:

A. Allison – email the Kentucky SCORP (and Tennessee) to the stakeholders
B. Kayl and Allison - Send out meeting notes to the stakeholder group
C. Kayl - send the stakeholder group the draft plan as it is updated
D. Allison - Send out maps to stakeholder group

Plan Forward

A. Please provide comments to Kayl/Allison at any time. Email works best for us so we have a record of your comments verbatim (as opposed to us trying to paraphrase from a phone call).
B. Allison will send out requested materials to the stakeholders (SCORPS, and Draft Classification Maps)
C. Kayl will send out updated drafts of the Master Plan Revision as appropriate
D. If you'd like a disc of the 1983 Master Plan, please contact Kayl
E. Next Stakeholder Meeting – TENTATIVELY August 28th, 2015, Lake Barkley Resource Office

7-01.A.2 Stakeholder Meeting Minutes - September 9, 2015

SUBJECT: Lake Barkley MP Revision – 2nd Stakeholder Meeting Minutes

Purpose: Second stakeholder meeting is to provide stakeholders with the opportunity to review and respond to any concerns or questions that they have with the draft Master Plan to date.

1. The following participants attended the meeting on Wednesday, September 09, 2015:

Attendee Name	Attendee Office
Wade White	Lyon Co. Fiscal Court
Dan Fuqua	TWRA
Greg Batts	Kentucky Marina Association, Prizer Point Marina and Resort
Barron Crawford	US Fish & Wildlife, Cross Creeks National Wildlife Refuge
Pat Hahs	KDFWR
Allison Walker	USACE Nashville District Office
Andreas Patterson	USACE Nashville District Office
Kathryn Firsching	USACE Nashville District Office
Kim Franklin	USACE Nashville District Office
Kayl Kite	USACE Lake Barkley
Mike Looney	USACE Lake Barkley

2. Meeting Minutes

Discussion Items:

C. **Master Plan - Overview of Changes**
   i. 103 – Grand Rivers Park: previous plan had area as forest reserve, current plan proposed area to be classified as high density recreation (used as a city park for Grand Rivers)
   ii. 108 – Boyd's Landing: area is split as half high density recreation (day use), half inactive area (campground). This campground half was closed as part of the REAL

program. Possibility to reopen would be to someone who would want to lease the land likely as a campground (ex: situation where a private campground owner owns an adjacent area used for camping, and wants to expand his operation to Corps lands…) market analysis and feasibility study would be part of what's needed to evaluate opening the park back up

iii. Mineral Mounds – area around golf course now designated as high density recreation
iv. 219 – Hallaway Hills: Corps currently doesn't do any active maintenance. Locals do a bit of maintenance. Now designated as future/inactive as there is no Corps or Lessee maintenance taking place at this location
v. Environmentally Sensitive Areas – these are a new designation to the Master Plan from the last revision. These are often larger unbroken habitat tracts. Often with good wetlands and other habitat. No restrictions on duck hunting and passive use, just no development or high density rec.
vi. 656 – Cannon Springs North – State Natural Area, 200 acres, designated as Environmentally Sensitive Areas
vii. 604 – Wildlife Management Coyote Ridge – some fill offset as an area for wildlife management through a highway project.
viii. 152 – Hickman Creek: half closed under the REAL program. Area is now split as half high density recreation (no change) and half future/inactive (change to this MP revision)
ix. POSSIBLE CHANGE – 151 Dyers Creek: Possibly changing this from high density rec to environmentally sensitive area. The way the creeks come in, this area is susceptible to flooding. It is not suitable for large development (of the 141 acres, only about 16 acres are developed). If this is changed to Environmentally sensitive, likely, it would divide the area and keep the developed area as high density rec, leaving the rest as Environmentally sensitive
x. 607 – Wildlife Management Guices Creek – Possibly changing this to Environmentally Sensitive from Wildlife Management
xi. 281 – Hematite – hasn't been used in a while, so it is now classified as future/inactive
xii. 401 – McAdoo Creek – for future development, currently has an ag lease on this property
xiii. Water – Restricted – refuge area restricted for certain times of year for animal/migration protection
xiv. Islands – licensed to Kentucky Fish and Wildlife – change to Environmentally Sensitive Areas? And island 603 as wildlife management – leave it as Wildlife Management, just because there's active management practices taking place?
xv. Map 4, vegetative management…. Should this be environmentally sensitive? Not if there are Ag leases. But if ag leases aren't being renewed and no more are issued, at least most of the area could be classified as environmentally sensitive

D. **General Discussion**

i. Are areas currently leased out long term or short term leases? Mostly 20 years with option to renew. Marinas are usually 25 years with the option to renew. Unless

there are issues, renewals go straight to the existing lease holder (no putting it back out to bid)

ii. Discussion on bat surveys and tree removal in relation to protected bat species. Those are national regulations that everyone must follow

iii. Is the Master Plan a NEPA document? The Master Plan has an associated EA with it. When it goes out to full public review, the Master Plan and EA will both be out for review. The alternatives are likely "accept" or "don't accept"

iv. Could a group donate funds to improve stream bank stabilization? Yes, through the contributions plan… we can accept donations, or do an MOU, make sure the goals are in line with the Master Plan, and that there are no conflicting interests. This could be a way to make some improvements

v. Suggestion – Floating Cabins (sec 6.02) – haven't been officially approved yet, but make sure that this is officially, or states "at the time of publication" - discussion sounds like the current text is clear, but policy date referenced may change

vi. Vegetative management – where narrow strips of land usually serving as a buffer between shoreline and residential development

vii. Question about shoreline vegetation management – what can adjacent property owners do to cut back trees to maintain a view? (Shoreline management plan) What if vegetation work is needed at a recreation area? If it's a city park? Can work be done by city workers or prison labor? Yes, coordinate with resource managers office

viii. Asian Carp – Section sounds dated. They're so plentiful now, that we don't need to be reporting sightings of the carp.

ix. Page 82 – Old Kuttawa – text says "install shelter". What does this mean? We're proposing facilities that would be great to add or replace if funds are ever available to do the work. It doesn't mean that it will be done, but if we are ever able through additional funds or partnerships, we want to be able to have a plan for work we'd like to do

x. Dredging – who is responsible for the dredging? Lessees are responsible for their areas, Corps manages the navigation channel, private docks often sit on the bottom of the lake for winter months. Eddyville River Port and Industrial Authority – possibility for cost sharing with LRN Planning Branch

xi. How can we tell what is new and important in the MP? Is there anything that's going to cause a change that the public will notice? The whole document is rewritten, the biggest changes are in the classifications 1) the method of classification due to new scheme in the regs 2) any changes (discussed above), particularly the environmentally sensitive areas, as they would strongly prohibit development (but not limit non-impact recreation)

xii. Metal detecting – what does it mean that metal detecting can only occur in designated areas? District policy says that they can only occur in swim beaches. This section should reference LRN policy document

xiii. Has anyone ever suggested historic signage at shoreline areas? For example, signs where old ferry sites used to be? Not a MP activity, but the project is happy to discuss it with folks that are proposing the signs

xiv. What about historic looting? Should that be addressed in the Cultural Resources section of the MP? Yes, this is an illegal activity, patrolled by rangers. Hard to control because of short staff and violators have to be caught in the act

xv. User Fees – picnic area (Lyon County?) Doesn't generate enough funds to seem like it's reasonable to collect fees when they don't even come close to covering the cost of operation. Response: Congress requires the Corps to charge use fees, where reasonable, to try to offset the cost of operating the parks. While understandable that the park doesn't collect lots of money, the Corps will still take appropriate actions to meet the intent of congress. Day use area fees are low, and there's an even lower annual pass for families that go frequently. We don't anticipate this changing in the foreseeable future

xvi. Boundary line disputes – boundary lines have been in place for so long that we don't resurvey disputes. Adjacent land owners can pay to have areas resurveyed. In recent years, some new boundary line disputes have come up on areas that have had no boundary disputes for decades, the adjacent property owner can have them resurveyed if they feel a survey is needed

xvii. 75% of the fees paid by Marina owners are given to the county; 25% to the Dept. of Treasury's General Fund. Can it be stated that funds give back to the community and enhance the area economically?

Data requests/Action Items:

E. Allison – Re-order maps so they're in the correct order
F. Guices Creek – any updates to the map, make sure they're updated in the summary sheet and the text of the MP. Same with Dyers Creek if it ends up being changed
G. Send copy of the minutes to the stakeholders
H. Send final draft of the MP and EA to the stakeholders before we have public workshops

Plan Forward

F. Please provide comments to Kayl/Allison at any time. Email works best for us so we have a record of your comments verbatim (as opposed to us trying to paraphrase from a phone call).

Desired plan forward is to have the full public meetings with final draft of MP and EA available mid-late October. Likely at two locations, one in Kentucky, one in Tennessee.

7-02 Agency Comment Process

In July 2015, the USACE scent a scoping letter to local governments, agencies, organizations and tribes to initiate the public involvement process associated with Master Plan update and subsequent Environmental Assessment (EA). The initial comments were incorporated into the draft EA and Master Plan prior to posting for public comment. These comments are included in Appendix A.

7-03 Public Comment Process

In an effort to achieve maximum public and agency participation, the USACE hosted two public workshops to initiate the 30 day public review period of the draft Lake Barkley Master Plan and associated EA. The meetings were announced on USACE websites and Facebook pages and news releases were sent to all local media outlets. Invitation letters were also sent to local governments, agencies, organizations and tribes.

The public workshops were held on November 30, 2016 at the Lee S. Jones Convention Center in Lyon County, Kentucky and on December 1, 2016 at the Stewart County Visitor Center in Stewart County, Tennessee. A total of nine participants attended the Stewart County meeting; the Lyon County meeting was unattended. Participants were asked to register and then directed to various tables containing display boards with the following information: 1) Overview of the Lake Barkley Master Plan and Update Process; 2) Land and Water Surface Classification Definitions and Maps; 3) Recreation Area Maps; 4) How to Submit Comments. After a brief overview of the Master Plan and the update process by USACE representatives, several participants voiced concerns about siltation in the lake and its impacts on recreation. This topic, as well as other comments received in writing, are addressed in Appendix A.

7-04 Master Plan Update Timeline

Table 7.1- Master Plan Timeline

DATES	TASK DESCRIPTION
May 7, 2015	Kickoff and Scoping Meeting with Project Delivery Team (PDT)
May 7, 2015	Approval of the Project Management Plan
May 18, 2015	Stakeholder Meeting Invitation Letters Mailed
June, 2015	Draft Scope of Work for ERDC to perform Level 2 Inventories
June 24, 2015	1st Stakeholder Meeting
June 30, 2015	PDT Check-In Meeting
July 6, 2015	Scoping letters to agencies and tribes
July 23, 2015	PDT Check-In Meeting
September 1, 2015	Received ERDC Botanical Report
September 9, 2015	2nd Stakeholder Meeting
September 2015 - June 2016	Pittsburg District completing ICRMP Finalizing Draft MP, classification maps and park plates
March, 2016	Received ERDC Vertebrate Report
March, 2016 - August, 2016	Assemble and Review DRAFT MP to be sent to Stakeholders for review
August 31, 2016	Draft MP sent to stakeholders for review
September, 2016	Edits from Stakeholders incorporated into Draft MP

DATES	TASK DESCRIPTION
November 8, 2016	News release to local media to announce Public workshops Post on Website and Facebook
November 10, 2016	Public workshop and comment period notification letters to congressional representatives, agencies and tribes
November 29, 2016	Public workshop in Lyon County, Kentucky
November 30, 2016	Public workshop in Stewart County, Tennessee
November 8, 2016 - December 30, 2016	Public comment period on DRAFT MP/EA
January, 2017	Review, document and incorporate public and agency comments into MP
August, 2017	District Quality Control (DQC)
September, 2017	Route for Final Signature
October, 2017	Announce and distribute Signed Master Plan as necessary

Chapter 8 - SUMMARY OF RECOMMENDATIONS

8-01 Classification Changes

Table 8.1 - Summary of Classification Changes

Old #	New #	Acreage	Name	Management Agency	1983 Classification NC - No Change Y - Yes, Change from	2016 Classification	Proposed Development
98	98	7.5	Dover Subbase	USACE	NC	Project Operations	
99	99	187.1	Dam Site	USACE	NC	Project Operations	
101	101	135.1	Tailwater Left Bank	USACE	NC	High Density Rec	Replace restroom; additional group shelters; additional picnic sites; playground; walking path; additional parking
102	102	126.7	Tailwater Right Bank	USACE	NC	High Density Rec	Replace restroom; additional picnic sites
NA	103	31.1	Grand River's Park	City of Grand Rivers, KY	NC	High Density Rec	
104	104	109	Eureka Campground/ Rec Area	USACE	NC	High Density Rec	Additional campsites; replace restroom; accessible fishing dock; additional restrooms
105	105	141.5	Canal Campground	USACE	NC	High Density Rec	Additional campsites; additional restrooms; basketball court
108	108	14.6	Boyd's Landing Access Area	USACE	NC	High Density Rec	
108	108	33.7	Boyd's Landing (Campground)	USACE	Y - High Density Rec	Future/Inactive Rec Area	Potential outgrant area
115	115	36.9	Old Kuttawa Rec Area	USACE	NC	High Density Rec	Additional picnic sites; replace lower restroom; additional parking; additional group shelter; fishing dock

Old #	New #	Acreage	Name	Management Agency	1983 Classification NC - No Change Y - Yes, Change from	2016 Classification	Proposed Development
116	116	11.4	Old Eddyville	USACE	NC	High Density Rec	Potential outgrant area
124	124	35.1	Hurricane Creek Campground	USACE	NC	High Density Rec	Replace restroom; replace courtesy dock
125	125	5.2	Rockcastle Rec Area	USACE	NC	High Density Rec	Restroom; playground; additional picnic sites
130	130	97.5	Cadiz Rec Area	USACE/City of Cadiz, KY	NC	High Density Rec	Additional group shelter; additional picnic sites; walking trail; multipurpose courts/fields
134	134	25.1	Devil's Elbow Boat Ramp	USACE	NC	High Density Rec	Expanded parking area; restroom
134	134	8.8	Devil's Elbow (Campground)	USACE	Y - High Density Rec	Future/Inactive Rec Area	Potential marina site
139	139	42.3	Linton Rec Area	USACE	NC	High Density Rec	Replace restroom; volunteer attendant site; additional picnic sites; replace group shelter; additional parking
145	145	270.2	Bumpus Mills Campground/ Rec Area	USACE	NC	High Density Rec	Playground equipment; walking trails
151	151	104.1	Dyers Creek Rec Area	USACE	NC	High Density Rec	Additional picnic sites; volunteer attendant site; swimming beach
152	152	125.6	Hickman Creek Access Area	USACE	NC	High Density Rec	
152	152	117.9	Hickman Creek	USACE	Y - High Density Rec	Future/Inactive Rec Area	Potential marina site
153	153	55.4	Lick Creek Rec Area	City of Dover, TN	NC	High Density Rec	
158	158	78.8	Guices Creek Rec Area	Cumberland City, TN	NC	High Density Rec	
163	163	33	Trice Landing Park	City of Clarksville, TN	NC	High Density Rec	

Old #	New #	Acreage	Name	Management Agency	1983 Classification NC - No Change Y - Yes, Change from	2016 Classification	Proposed Development
164	164	3.5	McGregor Park	City of Clarksville, TN	NC	High Density Rec	
166	166	9.9	Dover Rec Area	USACE	NC	High Density Rec	Replace playground
180	180	32.9	Mineral Mounds State Park	KY Dept. of Parks	Y - Forest Reserve	High Density Rec	
205	205	14	Canal Overlook	USACE	NC	High Density Rec	
NA	206	316.7	Chestnut Oak Trail Tract	USACE	NC	Low Density Rec	Trail expansion
213	213	7.6	Poplar Creek Access Area	USACE	NC	High Density Rec	Expanded parking
NA	214	8.1	Kuttawa Boat Ramp	CP - Lyon Co. Tourism	NC	High Density Rec	
219	219	4.2	Hallaway Hills	USACE	Y - Forest Reserve	Future/Inactive Rec Area	
220	220	3.7	Coleman Bridge Access Area	USACE	NC	High Density Rec	Install courtesy float
123	223	22.4	Dryden Creek Access Area	USACE	NC	High Density Rec	Additional parking
228	228	2.7	Rivers End Access Area	USACE	NC	High Density Rec	
129	229	32.3	Little River Access Area	USACE	NC	High Density Rec	Boat ramp repairs
236	236	4.9	Calhoun Hill Access Area	USACE	NC	High Density Rec	
237	237	132.6	Donaldson Creek	USACE	Y - High Density Rec	Future/Inactive Rec Area	Potential marina site
NA	240	12.1	Old Ferry Landing Tract	USACE	Y – High Density Rec	Low Density Rec	
243	243	9.2	Tobacco Port Access Area	USACE	NC	High Density Rec	Dredging
245	245	9.4	Saline Creek Access Area	USACE	NC	High Density Rec	
255	255	130.5	River's Bend	USACE	Y - High Density Rec	Future/Inactive Rec Area	
261	261	32.2	Hematite	USACE	Y - Forest Reserve	Future/Inactive Rec Area	
262	262	38.7	Smith's Branch Access Area	TWRA	NC	High Density Rec	

Old #	New #	Acreage	Name	Management Agency	1983 Classification NC - No Change Y - Yes, Change from	2016 Classification	Proposed Development
263	263	65.1	Blue Creek Access Area	USACE	NC	High Density Rec	
NA	267	30.8	Mayberry Branch	USACE	Y - Forest Reserve	Future/Inactive Rec Area	
NA	268	26.6	Old Lock C	USACE	Y - Forest Reserve	Low Density Rec	
NA	269	5.5	Yellow Creek Access Area	TWRA	Y - Forest Reserve	High Density Rec	
165	270	15.7	Old Lock B South Access Area	TWRA	Y - Forest Reserve	High Density Rec	
103	301	128.6	Green Turtle Bay Resort and Marina	Concessionaire	NC	High Density Rec	
113	302	93.8	Buzzard Rock Resort and Marina	Concessionaire	NC	High Density Rec	
NA	303	6.1	Kuttawa Harbor Marina	Concessionaire	NC	High Density Rec	
121	304	99.9	Eddy Creek Marina Resort	Concessionaire	NC	High Density Rec	
324	305	97.5	Prizer Point Marina and Resort	Concessionaire	NC	High Density Rec	
131	306	1669.7	Lake Barkley State Resort Park	KY Dept. of Parks	NC	High Density Rec	
129	307	2	Moon River Marina and Resort	Concessionaire	NC	High Density Rec	
NA	308	27.3	Bumpus Mills Marina	Concessionaire	NC	High Density Rec	
504	309	9.4	Liberty Park	City of Clarksville, TN	NC	High Density Rec	
401	401	145.3	McAdoo Creek	USACE	Y - Low Density Rec	Vegetative Management	
601	601	2071	Barkley WMA (TWRA)	TWRA	NC	Wildlife Management	
603	603	419.6	Duck Pond (KDFWR)	KDFWR	NC	Wildlife Management	
NA	604	148.2	Coyote Ridge WMA	USACE	Y - Forest Reserve	Wildlife Management	

Old #	New #	Acreage	Name	Management Agency	1983 Classification NC - No Change Y - Yes, Change from	2016 Classification	Proposed Development
NA	605	864.3	Bear Creek WMA	USACE	NC	Wildlife Management	
158	606	190.8	Guices Creek Tract	USACE	Y - High Density Rec	Wildlife Management	
NA	650	1045.5	Islands	USACE/TWRA/ KDFWR	Y - Wildlife Management	Env. Sensitive Area	
NA	651	25.5	Poplar Creek Tract	USACE	Y - Forest Reserve	Env. Sensitive Area	
NA	652	184.7	Pilfer Creek Tract	USACE	Y - Forest Reserve	Env. Sensitive Area	
NA	653	144.6	Eddy Creek Tract	USACE	Y - Forest Reserve	Env. Sensitive Area	
NA	654	208.1	Ingram Shoals Tract	USACE	Y - Forest Reserve	Env. Sensitive Area	
323	655	281.7	Cannon Springs Wood State Natural Area	USACE	Y - Forest Reserve	Env. Sensitive Area	
NA	656	46.6	Worthington Tract	USACE	Y - Forest Reserve	Env. Sensitive Area	
NA	657	15	Motley Creek Tract	USACE	Y - Forest Reserve	Env. Sensitive Area	
NA	658	367	Little River Tract	USACE	Y - Forest Reserve	Env. Sensitive Area	
NA	658 (M)	8.8	Coyote Ridge Wetland Mitigation Area	USACE	Y - Forest Reserve	Env. Sensitive Area	
NA	659	19.6	Terrapin Creek Tract	USACE	Y - Forest Reserve	Env. Sensitive Area	
NA	660	229.7	Donaldson Creek Tract	USACE	Y - Forest Reserve	Env. Sensitive Area	
141	661	1100.8	Dry Creek Tract	USACE	Y - Limited Use Rec	Env. Sensitive Area	
NA	662	149.2	Saline Creek Tract	USACE	Y - Wildlife Management	Env. Sensitive Area	
NA	663	141.5	Dyers Creek Tract	USACE	Y - High Density Rec	Env. Sensitive Area	
NA	664	89.5	Lick Creek Tract	USACE	Y - Forest Reserve	Env. Sensitive Area	
717	717	6857.6	Cross Creeks Refuge (transferred to USFWS)	USFWS (owner)	NC	NA	

Old #	New #	Acreage	Name	Management Agency	1983 Classification NC - No Change Y - Yes, Change from	2016 Classification	Proposed Development
718	718	46.8	Fort Donelson Mil. Park (NPS)	NPS	Y - Forest Reserve	Low Density Rec	

8-02 Significant Changes in the Revision of the Master Plan

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 on-line. Only the major changes and statements of particular interest have been addressed here and should 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 Lake Barkley.

- **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 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. Classification outlined in EP 1130-2-550 and the corresponding designations for lands on Lake Barkley can be found in Chapter 4.

Table 8.2 - Comparison of Classification Acreage

Pre 1996 guidance (currently in use)	Approximate Acreage	Post 2013 guidance (Proposed for 2017 Update)	Acreage
Project Operations	195	Project Operations	195
Forest Reserve Lands	4077	Multiple Resource - Vegetative Management	4221
Fish and Wildlife Management Lands	2917	Multiple Resource - Wildlife Management	3694
Historic or Natural Areas	0	Environmentally Sensitive Areas	4058
High Density Recreation	4601	High Density Recreation	3887
Low Density Recreation	462	Multiple Resource - Low Density Recreation	402
Limited Use/Proposed Recreation	1101	Multiple Resource - Future/Inactive Recreation	491

- **Off-Road Vehicle Use:** In reviewing E.O. 11644, as amended by E.O. 11989, it was determined that off-road use within the Lake Barkley Project is inconsistent with the typical multiple resource management practices, such as management for hunting, fishing, photography, nature hikes, bird watching, etc.

- **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 2010 Shoreline Management Plan (and was unchanged in the 2015 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 falls on the land owner to get any boundary line disputes surveyed.

- **Floating Cabins, Privately Owned Cabins, and Condos** Section 1148 of the Water Resources Development Act of 2016 (WRDA 2016) and the associated HQ USACE floating cabin

implementation policy, dated May 18, 2017, establish consistent policies, procedures, and responsibilities to facilitate the Corps' evaluation of requests for the addition of floating cabins and their associated moorings/slips in the Cumberland River Basin.

- **User Fees:** Concessionaires are authorized to implement user fees to the public to offset the costs of providing and maintaining recreation facilities and services.

- **Clean Marina Program:** "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 forum for sharing technical guidance on such items as solid and hazardous water management, state and Federal regulations and pollution prevention techniques.

- **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 and National Parking Policies:** This documents Nashville District's requirements for parking and launching facilities for all areas in the District.

- **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. Lake Barkley 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.

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 Lake Barkley 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 Lake Barkley, 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 PO Box 218, Grand Rivers, KY, 42045, phone 270-362-4236 or to the Nashville District Corps of Engineers, Natural Resources Management Branch, 110 9th Avenue South, Nashville, TN 37203, phone 615-736-5115.

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APPENDIX A - SUMMARY OF AGENCY AND PUBLIC COMMENTS

A-01 Stakeholder Group Comments

1. Comment: An issue of concern in Lyon County is at Old Eddyville near the Kentucky State Prison. Has anyone tried to put together a plan to keep the Old Eddyville Park in nicer shape such as using inmates? Didn't know if this had been tried or if it would work within the scope of how you do things.

Response: Old Eddyville Recreation Area (Site #116) is an area that receives minimal usage. As a result of the Recreation Excellence at Army Lakes (REAL) Program in 2004, some operational funds were redirected from this area to be used at areas with higher visitation. This resulted in the restroom closure and reduced mowing services in the area. In light of the current recreation budget environment, the Corps must make tough decisions about where to spend limited recreation funds. However, the Corps is eager to seek partnership opportunities with local city/county governments or organizations to provide higher levels of service in this area. Supervised inmate labor and volunteer services are both viable alternatives to increase services with limited expense. The Corps will also consider leasing the area to a local city/county government or other capable organization.

2. Comment: Vegetative issues seem to cause a lot of problems. We have one problem now where people in Old Eddyville could see the lake for many years now the vegetation between the state highway and the park is so overgrown they can no longer see the lake which is a big deal. No one seems to want to allow it to be cut down by the landowners when they offer. I think this needs to be addressed. Vegetative management is mentioned in the Draft Master Plan under 3-03.b.

Response: As stated above, Old Eddyville is maintained at a lower level because of limited usage. As a result, some the small trees around the edges of the area have grown tall which has impacted the view of some residents. Since this area is a developed recreation area, the Corps will consider proposals from local residents or other volunteers to remove this vegetation from the area. However, proper coordination and approval must be obtained before any work is performed on Corps' property.

3. Comment: I'm interested in the future or inactive recreation areas. How would partnerships between local government and private business work? Is there a way to lease out some of the land like you do to marinas at these inactive locations? Wondering how this works and what process is involved.

Response: Yes, areas classified as Future/Inactive Recreation may be outgranted to local governments or private individuals pending compliance Nashville District outgrant policies. In order

to outgrant an area, the requesting party must submit a conceptual development plan, market analysis, and feasibility study to the Resource Manager.

4. Comment: There is a site on highway 274 that is Corps owned but there is nothing going on there. What is the name and classification of this area?

Response: You are likely referring to the Cannon Springs Area (Site #323). In the 1983 Master Plan, this area was classified as High Density Recreation with plans for a marina complex. However, a market analysis in 1976 determined that is was not economically feasible. This area was permanently closed in 1984. In 2002, the Corps and the Kentucky State Nature Preserves Commission entered into an agreement to place the 219 acre Cannon Springs on the state's Registry of Natural Areas (Cannon Springs Woods State Natural Area). The Master Plan was also supplemented at that time change the classification of this area from High Density Recreation to Multiple Resource Management - Forest Reserve Lands. The current revision of the Master Plan proposes to change the classification to an Environmentally Sensitive Area.

5. Comment: On page 43 about vegetative management between the homes and the water. There are usually a lot of issues with that. Can we talk in depth about this subject - why there are issues that concern so many and what can be done to mitigate this issue?

Response: The 1983 Master Plan classified most of the land adjacent to residential development as Forest Reserve Land. The proposed classification for these lands in the 2015 Master Plan Revision is Multiple Resource Lands - Vegetative Management. Detailed management for these lands is dictated by the Lake Barkley Shoreline Management Plan which seeks to balance private exclusive use with the protection of the natural resources. Many of these management practices (i.e. boundary marking, tree density requirements and erosion control) are required by shoreline management permits that authorize docks and/or mowing privileges.

6. Comment: There was a proposal in 2012 for someone to run electricity and repair Boyd's Landing for camping sites. Why was this turned down? It may help me understand more of what is required for someone to do this at an inactive facility.

Response: There have been some inquiries from private businesses about leasing/operating Boyd's Landing Campground which has been closed since 2004. However, the potential applicants did not provide the documentation needed to advertise the area for lease.

All requests to outgrant public property require the applicant to submit a conceptual development plan, market analysis and feasibility study. The development plan should provide details concerning existing and proposed facilities to determine compliance with District outgrant policies. The market analysis should outline a need for the requested development. This would include regional populations, projected population growth, demographic characteristics, public demand for

recreation facilities and an inventory of similar, existing facilities and resources within a 30-mile radius. The feasibility study should compare potential capital investments and operating costs (i.e. projected maintenance, insurance and labor) with projected income produced by the development.

A-02 Agency and Public Comments

1. Comment: KY DEP Letter (September 24, 2015) – "In response to the revised Lake Barkley Master Plan, there are 5 changes that would affect water quality of the lake. Downstream Water Quality Improvements: increased efforts to monitor lower lake quality will help the Corps determine trends and alert them on potential problems. Off Road Vehicle Use: not designating areas of ATV use will help water quality/bank erosion/sedimentation in certain areas of the lake; it will be difficult to restrict the use of ATVs within the Corps lands. Floating Cabins: restricting floating cabins to areas within out granted marina areas will definitely help maintain water quality of the lake. Clean Marina Program: recognizing marinas as Clean Marinas when exceeding regulatory requirements is a good way to give incentives to the marinas to reduce impacts to water quality. Environmentally Sensitive Areas: establishing sensitive areas will help maintain and possibly improve water quality in those areas of the lake."

Response: USACE concurs with the KY Department of Environmental Protection's comments concerning measures to protect Lake Barkley's water quality. The five changes mentioned in the letter are addressed within the Master Plan text with a goal to protect the natural resources, including water quality.

2. Comment: TDEC Letter (July 16, 2015) – "We are currently reviewing TVA's Floating House Policy Review for a draft Environmental Impact Statement for the TVA lakes. There are over 1,400 floating houses on the TVA system in Tennessee. I do not know how many may be present on Corps of Engineer lakes, but I suspect there are a number of them and any impacts they could have on the water quality of the lakes needs to be considered. We would urge the Corps to develop a plan for dealing with these structures from a sanitation/water quality standpoint as well as the potential safety and navigation hazards."

Response: As stated in Section 6-03 on Floating Cabins: Section 1035 of the Water Resources Reform and Development Act of 2014 (WRRDA 2014) allows for floating cabins within the Cumberland River Basin provided they met policy. The Corps implementation guidance for Section 1035 of WRRDA 2014, establishes consistent policies, procedures, and responsibilities to evaluate requests for the addition of floating cabins and associated moorings/slips in the Cumberland River Basin. This policy is only applicable to floating cabins within outgranted marina areas in the Cumberland River Basin, must be maintained to the required health and safety standards, and is in compliance with regulations for recreational vessels issued under chapter 43 of title 46, United States Code, and section 312 of the Federal Water Pollution Control Act (33 U.S.C. 1322).

3. Comment: TDEC Letter (July 16, 2015) – "There are also two water systems with intakes on Lake Barkley – Dover's intake is at River Mile 88.8 and Erin's intake is at River Mile 108.3. Protection of these two water sources should be considered as a part of the Master Plan."

Response: The purpose of this Master Plan is to develop a strategic land use management document that will guide the comprehensive management and development of Lake Barkley's recreational, natural and cultural resources. In accomplishing that purpose, the lands at the Dover and Erin Water Intakes are classified as Multiple Resource Management Lands. Within that classification, the lands immediately surrounding the Dover Water Intake will predominately be managed for natural vegetative cover. The lands immediately surrounding the Erin Water Intake will predominately be managed for passive public recreational uses such as boating, fishing and wildlife viewing. These uses should not conflict with water withdrawal operations at these two locations.

The USACE shares TDEC's interest in safe guarding a viable water source for the cities of Dover, Tennessee and Erin, Tennessee. To that end, USACE monitors water quality at five locations upstream of the Dover Intake and one location upstream of the Erin Intake. Monitoring stations are located at Cumberland River Mile: 88.8, 100.1, 103.0, 105.5 and 124.0. Physical, chemical and biological data collection occurs three times per year (spring, summer & fall) and has been collected since 1994. All data sets are sent to TDEC for review and comment. A summary of this data is also included as Appendix C of this Master Plan Revision.

4. Comment: TVA Letter (December 23, 2016) – TVA suggests modifying a statement describing the state-permitted ash handling facilities of the Cumberland Fossil Plant.

Response: USACE concurs with the recommendation to remove the last sentence of Section 2-08.

5. Comment: NPS Letter (December 21, 2016) – The National Park Service expressed concerns about how the land classifications of Barkley Wildlife Management Area and Hickman Creek Recreation Area may affect the view-shed of Fort Donelson National Battlefield.

Response: With a proposed classification of Multiple Resource – Wildlife Management, the Barkley Wildlife Management Area will continue to be managed to protect fish and wildlife populations and habitats and to provide recreational hunting and fishing opportunities. Historically, this management has included row cropping approximately 850 acres and water level manipulation for recreational hunting. It is our belief that the resulting landscape will not adversely affect Fort Donelson's view-shed.

Hickman Creek Recreation Area was originally developed with campsites, picnic sites and a launching ramp. However, low usage and significant maintenance costs resulted in the closure of

most of the area with the exception of the boat ramp. The area has been allowed to revegetate with early successional species such as hackberry, ash and sweetgum. This area is currently classified as High Density Recreation, but USACE has no current plans for further development in this area. Any future plans to develop Hickman Creek or Barkley Wildlife Management Area would require an environmental review and public comment period in accordance with NEPA. This review would also evaluate the effects of a development on Fort Donelson's viewshed under Section 106 of the National Historic Preservation Act.

6. Comment(s): Several verbal comments and one written comment concerning siltation and possible dredging of secondary channels in order to restore access to boat ramps.

Response: The Nashville District maintains more than 1,100 miles of navigable river channels on the Cumberland and Tennessee Rivers. The Corps' focus is on the maintenance and dredging of primary river channels to ensure safe water depths for commercial tows and recreational vessels. Constrained funding and resources prevent the Corps from dredging small coves, bays and secondary channels. Commercial navigation dredging is performed as needed but recreational dredging is not part of normal lake operations.

APPENDIX B - GEOLOGY AND SOILS PLATES

APPENDIX C - WATER SAMPLE DATA

APPENDIX D - CLASSIFICATION MAPS

APPENDIX E - PARK PLATES

Plates are numbered according to site numbers referenced in Chapter 5.
In digital copies of the Master Plan, file size requires that Appendix E be broken into three parts: E1 – High Density Recreation Areas, E2 – Low Density Recreation Areas, and E3 – Environmentally Sensitive Areas.

APPENDIX F - NEPA DOCUMENTS