United States Army Corps of Engineers
Louisville District

Green River Lake Integrated Master Plan

2023

View of Green River Lake and Dam

Draft Finding of No Significant Impact for the 2023 Green River Lake Master Plan

Adair and Taylor Counties, Kentucky

The U.S. Army Corps of Engineers, Louisville District (USACE) has conducted an Environmental Assessment (EA) in accordance with the National Environmental Policy Act of 1969, as amended (NEPA), and Engineering Regulation (ER) 200-2-2, *Policy and Procedures for Implementing the NEPA*. As an integrated component of the 2023 Green River Lake Master Plan, the EA evaluated alternatives and environmental impacts from revising and updating the 1981 Green River Lake Master Plan in compliance with guidance in ER 1130-2-550 and Engineering Pamphlet (EP) 1130-2-550, to include revised land classifications and updated resource objectives in the form of an updated Master Plan.

The draft EA evaluated alternatives to revise and update the 1981 Green River Lake Master Plan and considered potential impacts to natural, cultural, and socioeconomic resources. The recommended plan is to adopt and implement the 2023 Green River Lake Master Plan, which includes updates to land classifications and resource objectives of the Green River Lake Project and brings the Resource Management Plan up to date to reflect current ecological, socio-demographic, and outdoor recreation trends that are affecting the Green River Lake Project.

In addition to the recommended plan, a “no action” plan was evaluated. The no action plan would entail the continued use of the 1981 Master Plan and would result in no change from current management direction or level of management intensity.

For both alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the recommended plan are listed in Table 1.

Table 1: Summary of Potential Effects of the Recommended Plan.

Resource/Area of Concern	Insignificant Adverse Effects	Insignificant Effects as a Result of Mitigation	No or Negligible Effects	Beneficial Effect
Reservoir, Pool, and Lake Operation	☐	☐	☒	☐
Climate	☐	☐	☒	☐
Air Quality	☐	☐	☒	☐
Topography, Geology, and Soils	☐	☐	☒	☐
Surface Water Hydrology and Groundwater	☐	☐	☒	☐
Water Quality	☐	☐	☐	☒
Habitats	☐	☐	☐	☒
Listed Species	☐	☐	☒	☐
Demographics and Environmental Justice	☐	☐	☒	☐
Recreation and Visitation	☐	☐	☐	☒
Cultural Resources	☐	☐	☐	☒
Aesthetics and Visual Qualities	☐	☐	☒	☐
Hazardous, Toxic, and Radioactive Waste Materials	☐	☐	☒	☐
Noise	☐	☐	☒	☐

All practical means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. The recommended plan does not include major development of new facilities or other construction activities that could negatively impact the environment. Best management practices (BMPs), as detailed in the EA, will be implemented during continued maintenance activities to minimize impacts.

No compensatory mitigation is required as part of the recommended plan.

A 30-day public review (including public, State, Tribal, local governments, and other relevant agencies) of the draft integrated EA and Finding of No Significant Impact (FONSI) was completed on [**PENDING**]. All comments submitted during the public comment period will be addressed in the final integrated EA and FONSI.

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, the USACE determined that the recommended plan will have no effect on Federally listed species or their designated critical habitat.

Pursuant to Section 106 of the original National Historic Preservation Act of 1966, as amended, the USACE determined that the recommended plan has no potential to cause adverse effects on historic properties.

No discharge of dredged or fill material or any other discharge into waters of the U.S. is associated with the recommended plan. Therefore, a Section 404(b)(1) evaluation and Section 401 water quality certification, pursuant to the Clean Water Act of 1972, are not applicable.

All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State, and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the recommended plan would not significantly affect the human environment; therefore, preparation of an Environmental Impact Statement is not required.

Date

L. Reyn Mann
Colonel, U.S. Army
District Commander

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Appendices

CHAPTER 1 – INTRODUCTION

1.1 AUTHORIZATION

Congress authorized the Green River Lake Project (Project) as part of the general comprehensive flood control plan for the Ohio River Basin adopted by the Flood Control Act of 1938, Pub. L. No. 75-761, 52 Stat. 1215, which states in part as follows:

> "Section 4 – That the following works of improvement for benefits of navigation and control of distinctive flood waters and other purposes are hereby adopted and authorized to be prosecuted under the direction of the Secretary of War and supervision of the Chief of Engineers.
>
> OHIO RIVER BASIN
>
> The General Comprehensive Plan for flood control and other purposes in the Ohio River Basin, as set forth in Flood Control Committee Document Numbered 1, 75th Congress, 1st Session, with such modifications thereof as in the discretion of the Secretary of War and the Chief of Engineers may be advisable, is approved and for the initiation and partial accomplishment of said plan there is hereby authorized $75,000,000 for reservoirs*** the reservoirs to be selected and approved by the Chief of, Engineers."

The improvements listed in the above cited documents include four flood control reservoirs on the Green River and its tributaries, one of which is Green River Lake.

The Louisville District of U.S. Army Corps of Engineers (USACE) designed and built the Project and continues to operate the Project to reduce flood damage downstream of the dam, to conserve fish and wildlife resources, and to provide recreational opportunities. Operation of the Project for purposes of promoting recreation and fish and wildlife enhancement is also authorized by the Federal Water Project Recreation Act, Public Law No. 89-72, 79 Stat. 213 (1965).

The Fish and Wildlife Coordination Act, Pub. L. No. 85-624, 72 Stat. 563 (1958) (codified as amended at 16 U.S.C. § 662 (c), et seq.) authorizes the conservation of fish and wildlife as a purpose of USACE reservoirs. It provides that Federal agencies authorized to construct or operate water-control projects are authorized to modify or add to the structures and operations of such projects, and to acquire lands, in order to accommodate the means and measures for such conservation of wildlife resources as an integral part of such projects.

1.2 PROJECT PURPOSE AND DESCRIPTION

Green River Lake is located in South-Central Kentucky, with the lake area situated within Adair and Taylor Counties, with a slight extension into Casey County. At spillway crest (elevation 713 msl), the lake

extends a distance of 37 miles into the main river channel and 17 miles into Robinson Creek. At seasonal pool (675 msl), the distances are 27.5 miles and 11 miles, respectively.

As a unit in the general comprehensive flood control plan for the Ohio River Basin, Green River Lake furnishes flood protection to the Green River and reduces stages downstream on the Ohio River. The lake is also operated for water quality control, recreation, and fish and wildlife activities. Although water supply is not considered a major Project purpose, it is used locally.

1.3 MASTER PLAN PURPOSE AND SCOPE

The Green River Lake Master Plan (Master Plan) is the strategic land use management document that efficiently and cost effectively guides the comprehensive management, development, and use for recreation, natural resources, and cultural resources throughout the life of the Green River Lake Project for the next 25 years. It is a vital tool for responsible stewardship and sustainability of the Project's resources for the benefit of present and future generations. This Master Plan guides and articulates U.S. Army Corps of Engineers United States Army Corps of Engineers Louisville District (USACE) responsibilities pursuant to federal laws to preserve, conserve, restore, maintain, manage, and develop the land, water, and associated resources. It is dynamic and flexible based on changing conditions.

In accordance with Engineering Regulation (ER) 1130-2-550 Change 07, dated 30 January 2013 and Engineering Pamphlet (EP) 1130-2-550 Change 05, dated 30 January 2013, Master Plans are required for most USACE water resources development Projects having a federally owned land base. This revision of the Green River Lake Master Plan is intended to bring the Master Plan up to date to reflect current ecological, socio-demographic, and outdoor recreation trends that are affecting the Project, as well as, those anticipated to occur within the planning period of 2023 to 2048.

Because the most recent Master Plan for Green River Lake was written in 1981, it provides an inadequate basis with which to guide the operation of Green River Lake and to evaluate contemporary proposals. There have been changes in demand for recreation and population growth, which dictate the need for an update to the Master Plan. A reappraisal for the resources, facilities, and operational characteristics is determined through this plan and indicates the magnitude and diversity of public use and expected future trends.

The Master Plan is based on responses to regional and local needs, resource capabilities and suitability, and expressed public interests consistent with authorized Project purposes and pertinent legislation and regulations. It provides a District-level policy consistent with national objectives and other State and regional goals and programs. The Master Plan update provides a comprehensive description of the Project, a discussion of factors influencing resource management and development, a synopsis of public involvement and input to the planning process, and descriptions of past, present, and proposed development. The purpose of the updated Master Plan is to ensure that actions taken to promote the conservation and sustainability of the land, water, and recreational resources at the Project comply with applicable environmental laws and regulations and to maintain quality land for future use and will reflect changes that have occurred since 1981 in outdoor recreational trends, regional land use,

population, legislative requirements, USACE management policy, and wildlife habitat at Green River Lake.

The Master Plan is distinct from the Project-level implementation emphasis of the Operational Management Plan (OMP). The Master Plan also does not address details of design, management and administration, and implementation. These are specifically addressed in the Green River Lake OMP. In addition, the Master Plan does not address the specifics of regional water quality, shoreline management with respect to private actions conducted by adjoining landowners such as vegetation modification. The operation and maintenance of primary Project operations facilities, including but not limited to the dam, spillway, dike, and gate-controlled outlet, are also not included in this Master Plan.

1.4 GENERAL WATERSHED DESCRIPTION

The upper watershed for the Project (Figure 1) is relatively rugged, and the average stream gradient is about 4 feet per mile. The lake drains an area of 682 square miles, and its principal tributaries include Robinson Creek, Casey Creek, Goose Creek, and the Green River. Streamflow in the watershed generally attains peaks in March or April following heavy rains in late winter and early spring. Snowfall is usually not significant and rarely influences runoff. Minimum flows generally occur in late summer and frequently approach zero flow. At spillway crest (elevation 713 mean sea level (msl)), the lake extends a distance of 35 miles (59.5 km) into the main river channel and 17 miles (23 km) into Robinson Creek. At summer pool (675 msl), the distances are 27.5 miles (44.3 km) and 11 miles (17.7 km), respectively.

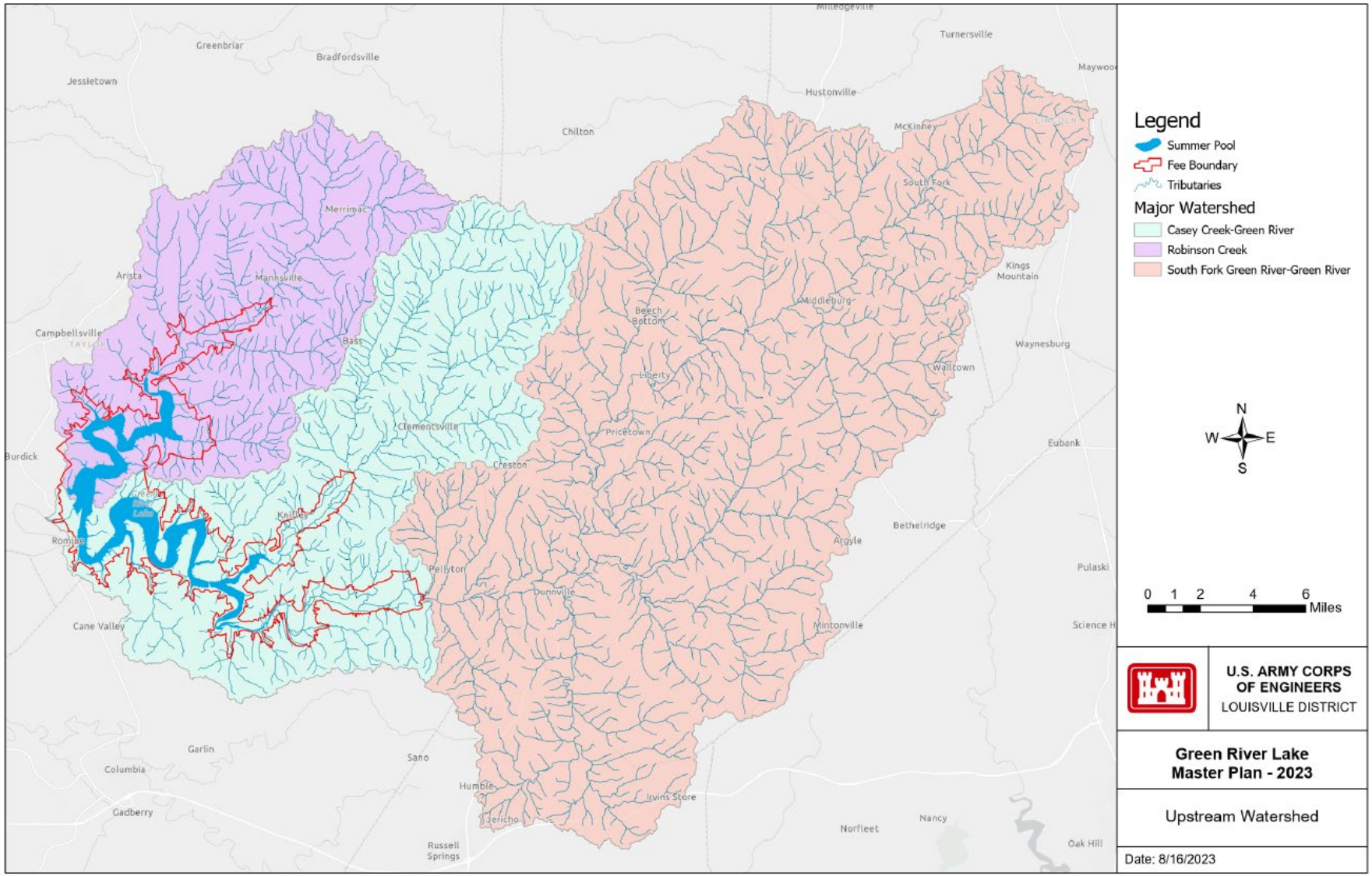

Figure 1. Green River Lake upstream watershed

1.5 PROJECT LOCATION

Green River Lake is in the Eastern Pennyroyal region of South-Central Kentucky, about 8 miles (12.8 km) south of Campbellsville, Kentucky, and approximately 70 air miles (113 km) and 90 land miles (145 km) south and slightly east of Louisville, KY. The Lake is located at Mile 305.7 of the Green River, which flows northwesterly below the Green River Lake Dam to its confluence with the Ohio River nearest to the city of Evansville, Indiana. The lake area is within Adair and Taylor Counties, Kentucky, with some flowage easement slightly extending into Casey County, Kentucky.

1.6 PROJECT ACCESS

Main access to the Project is via State Highway 55 which runs north-south and across the Green River at the tailwater of the Green River Lake Dam and extends along the southwest side of the lake. State Route 76 provides access to the northeast shore of the lake.

1.7 LISTING OF PRIOR DESIGN MEMORANDUMS

Table 1. Previously issued design memorandums

Previously Issued Design Memoranda		
Design Memorandum No.	**Title**	**Date**
1	Site Selection	April 1961
2	Reservoir and Spillway Capacities and Low Flow Regulation Hydroelectric Power Studies	May 1961
	Sup. #1	Sept 1961
	Sup. #2	Oct 1962
3	General Design Memorandum	
	Sup. #1	Oct 1962
	Sup. #2	July 1963
4	Concrete Aggregate and Rip Rap	Jan 1963
5	Dam and Spillway	Feb 1963
	Sup #1	Oct 1964
6	Outlet Works	Jan 1963
7	Real Estate – Construction Area	Jan 1963
8	Real Estate – Reservoir Area	Nov 1963
8A	Preliminary Plan (LRP)	May 1964
8B (C-1)	Construction Design Memorandum	June 1966
9	Real Estate – Reservoir Area	July 1964
10	Relocation of Shale and Roads	Nov 1964
11	Relocation of Gas Transmission Lines	Dec 1964

Previously Issued Design Memoranda		
Design Memorandum No.	**Title**	**Date**
12	Real Estate Required	Aug 1965
13	Relocation of Electric and Telephone Lines	Aug 1965
14	Reservoir Clearing	May 1965

1.8 PREVIOUS MASTER PLAN RECOMMENDATIONS

The 1964 preliminary master plan has several recommendations for the Project. Some recommendations have been actualized, and some projects have not due to budget constraints, shifting goals of land management, etc. The recommendations include coordination with other agencies, land acquisition recommendations, and archeological reconnaissance and surveys.

The 1966 Plan of Development for Public Use and Access Facilities also recommends the development and design of recreation sites including the damsite, Lone Valley, Smith Ridge, Butler Creek, Holmes Bend, White Oak Creek, Pike Ridge Peninsula, and two fishing access sites (Arnold and Plum Point Landings).

The 1981 Updated Master Plan recommends coordination with local, state, and other federal agencies to ensure optimum development and management of the Lake. It also provided recommendations for the seven acquired public access sites including signage, access, and expansion of boat access at camping sites. Real estate recommendations for sites, including the camping area at Pike's Ridge Site 11, were recommended for relocations based on the current visitation and participation trends at that time. Shale and roads, gas transmission lines, and electric and telephone lines were also recommended for relocation based on anticipated public needs. Additionally, the 1981 Updated Master Plan recommended retention of undeveloped Green River Lake Project lands for future expansions. Several campground expansions were also recommended.

1.9 LISTING OF PERTINENT PROJECT INFORMATION

Construction of the Project began in April 1964 and was completed in June 1969. The Project was placed in operation in February 1969. The dam is an earth and rock fill structure 141 feet in height by 2,350 feet in length by 960 feet base width. The control tower has 3 slide gates and 2 bypasses with intakes to control downstream water temperatures for aquatic species. To the right abutment an uncontrolled open cut serves as the spillway. A saddle dike closes a saddle beyond the spillway.

Green River Lake is operated for flood control, water quality control, water supply, and recreation. The plan of operation provides for winter impoundment of the water quality pool at elevation 668 msl, based on a coordinated study with The Nature Conservancy, and a summer recreation pool at elevation 675 msl. The Green River Lake Regulation Manual provides for the seasonal impoundment to begin on 15 March, with summer recreation pool typically being reached around 15 April. Stability of the pool is maintained through 15 September, after which it is lowered 0.5-ft. by 1 November, then lowered the

remaining 6.5-ft. between 1 November through 1 December, at which point the water quality pool is attained. Summer pool provides approximately 8,200 surface acres of water and the water quality pool provides approximately 7,205 acres of water (Table 2). Water quality flow is maintained by a minimum release of 50 cfs from the outlet works.

Table 2. Pertinent Project data

Pertinent Project Data				
Catchment				
Drainage Area		682 square miles		
Reservoir				
Pool Type	Elevation (ft msl)	Surface Area	Capacity (acre-ft)	Length (Miles)
Minimum	653	5,070	36,058	18
Permanent (winter) Pool	668	7,205	162,600	21
Summer Pool	675	8,210	252,200	25
Flood	713	19,100	723,200	37
Shoreline Length (Miles)			147 miles	
Dam				
Type			Earth and Rock fill	
Length (ft)			2,350 feet	
Top elevation (ft msl)			732 ft msl	
Maximum height (ft)			141 feet	
Spillway				
Type			Cut through hill between dam's dike	
Crest Elevation (ft)			713 feet	
Base width of Cut (ft)			450 feet	
Outlet Works				
Type			Circular	
Diameter (ft)			16 feet	
Saddle Dike				
Length (ft)			1,952 feet	
Maximum height (ft)			105 feet	

CHAPTER 2 - PROJECT SETTING, EXISTING CONDITIONS, RESOURCE ANALYSIS, AND FACTORS INFLUENCING MANAGEMENT AND DEVELOPMENT

2.1 DESCRIPTION OF RESERVOIR, POOL, AND LAKE OPERATION

Green River Lake is a reservoir located in South-Central Kentucky, about 8 miles south of Campbellsville, KY in Adair and Taylor Counties. It has been operational since February 1969. The lake surface varies from 7,205 acres of water in the winter to 8,210 acres of water in the summer (summer pool).

The Green River Lake Project is the only project in the Louisville District that participates in the Sustainable Rivers Project (SRP). The SRP, formally established in 2002, is a national partnership between the USACE and The Nature Conservancy (TNC). SRP focuses on modifying operations at USACE dam facilities to enhance habitat conditions for the plants and animals that depend on downstream river flows. With these goals in mind, the dam facility at Green River Lake is operated in ways that improve ecosystems while continuing to provide recreation benefits and flood damage reduction to downstream communities.

The Green River Lake Project was the first collaboration between the USACE and TNC in reservoir management. Activities on the Green River have been a catalyst for the national Sustainable Rivers Program. Environmental management strategies were drafted in 1998, implemented in 2002, and incorporated into the official operating policies for Green River Lake Dam in 2006.

Before flows were improved through the SRP, all the outflow from Green River Lake was released from the bottom of the dam, which was typically much colder than historical flows. The colder flows release occurred in the fall, which disrupted native mussels downstream that spawn in the fall and winter.

Subsequent analysis determined that the temperature of the outflow from the dam could be raised by using multiple outlets present on the dam facility. Ultimately, postponing the annual drawdown gives mussels a better chance to reproduce and improves fishing conditions in Green River Lake by keeping water levels higher longer.

2.2 EXISTING CONDITIONS AND RESOURCE ANALYSIS

2.2.1 Climate

The climate of the region is temperate continental with well-defined seasons. The summers are hot and humid, and the winters are moderately cold and dry. Large daily and annual variations in temperature and precipitation are characteristic for the area. The mean annual high temperature is approximately 67.9 degrees Fahrenheit (F), the daily mean temperature is 56.9 degrees F, the mean low temperature is 47.3 degrees F (NOAA, 2022). Historically, the coldest month is January, which has an average daily temperature of 29.0 degrees F. Historically, the warmest month is July, with an average daily temperature of 86.5 degrees F (NOAA, 2022).

The average number of days In the growing season for the region, (i.e., the last freezing temperature of spring and the first freezing temperature of fall) is 177 days (USACE, 2021). Winters are reasonably cold

and cloudy with weather changes occurring frequently due to the passing of cold and warm fronts. Annual snowfall varies widely from year to year but averages 5.2 inches (NOAA, 2022).

Normally, rainfall is abundant and well distributed throughout the year, with showers and thunderstorms furnishing much of the growing season precipitation. Thunderstorms occur frequently from April through August. The average annual total precipitation is 53.3 inches. The months with the least amount of precipitation include September, October, and January, all with monthly totals averaging less than 4.0 inches. The wettest month is July, which averages approximately 5.3 inches of rain. The wettest months include March, May, July, and December, each with average monthly precipitation amounts greater than 5.1 inches (NOAA, 2022). Before June, rainfall events are typically more widespread, caused by frontal systems moving through the area. In the hotter months of August and September, rainfall is less frequent and isolated.

Historically, storms that have the potential to cause serious flooding in the Green River Lake drainage and the greater Green River Basin occur from late winter to early spring, as a result of quasi-stationary fronts originating from the southwestern United States and the Gulf of Mexico that move northeastwardly towards the north Atlantic Coast. Heavy rainfall events of this type are most impactful during the winter and early spring months due to freezing conditions that work to increase runoff rates. Convective storms which produce high rainfall events during the summer months are typically localized and transpiration and infiltration work to reduce the prevalence of damaging flood events.

2.2.1.1 CLIMATE CHANGE

In 2017, the USACE Huntington District in collaboration with the Ohio River Basin Alliance, the USACE Institute for Water Resources, the USACE Great Lakes and Ohio River Division, and numerous other Federal agencies, non-government organizations, and research and academic institutions completed the Ohio River Basin Climate Change Pilot Report. This pilot study investigated potential climate change impacts to Ohio River Basin (ORB) infrastructure, including Federal facilities operated for reduction of flood damages, navigation, local protection, water supply, and hydroelectric power production, as well as, the potential impacts on terrestrial and aquatic ecosystems that are influenced by operation of these infrastructure components (Drum et al., 2017). The primary purpose of the study was to identify those components of the ORB infrastructure and ecosystem resources that may be at risk from future changes in precipitation and temperature, and to formulate mitigation and adaptation strategies that may be implemented to reduce those effects.

The primary concern to water management agencies is the threat of extreme episodes becoming more prevalent, longer, and more potent. The potential for climate and weather elements including temperature, precipitation, winds, humidity, and evaporation to become less predictable and more susceptible to extreme changes suggests a need for studies of the existing operating schemes for water management and whether the current infrastructure design can accommodate potential future operational changes.

In general, the modeling data suggest that the more rapid changes in temperature, precipitation, and stream flows, resulting from changes in regional climate may not begin within the ORB until 2040. However, modeling results also suggest a gradual increase in annual mean temperatures between 2011 and 2040 amounting to one-half degree per decade, with greater increases between 2041 and 2099 of one full degree per decade. The results of the pilot study further suggests that the Green River Lake

region is not expected to experience marked hydrologic regime changes that may negatively affect the operation of the Project until 2071 (IWR, 2017).

The pilot study addressed the formulation of potential adaptation themes or strategies that could decrease the impacts associated with changes in precipitation, streamflow discharge, and temperatures across the basin. Although not prescriptive in nature, these strategies suggest potential paths forward that can be integrated into near-term and long-term infrastructure planning, structure rehabilitation, water policy analysis, and operational changes and can be useful as a management tool for lake projects throughout the ORB, including Green River Lake.

2.2.2 Air Quality

The U.S. Environmental Protection Agency (USEPA) Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards (NAAQS) for six principal pollutants, called "criteria" pollutants. They are carbon monoxide, nitrogen dioxide, ozone, lead, particulates of 10 microns or less in size (PM-10 and PM-2.5), and sulfur dioxide. Ozone is the only parameter not directly emitted into the air, but that forms in the atmosphere when three atoms of oxygen (O_3) are combined by a chemical reaction between oxides of nitrogen (nOx) and volatile organic compounds (VOC) in the presence of sunlight. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of nOx and VOC, also known as ozone precursors. Strong sunlight and hot weather can cause ground-level ozone to form in harmful concentrations in the air.

As of October 2022, Adair and Taylor Counties were in attainment for all NAAQS (USEPA, 2022).

2.2.3 Topography, Geology, and Soils

The topography of the basin is generally uneven, with occasional hills 300 to 400 feet high and river valleys 100 to 200 feet deep. The highest elevation within the basin, approximately 1,800 feet above mean sea level, is in Lincoln and Casey counties. The valley above Greensburg is relatively narrow and has a depth between the flood plain and the adjacent uplands of over 200 feet. Progressing upstream from this area, the valley widens and the depth of stream entrenchment lessens. Toplands in the Project area are relatively rugged.

The Green River Lake Project lies entirely in the Eastern Pennyroyal physiographic region. The Pennyroyal Region is the largest physiographic region (12,000 sq. miles) of the state, stretching along the southern border of Kentucky from the Appalachian Plateau west all the way to Lake Barkley. The geology consists of Alluvial floodplains along the river, Mississippian limestone and shales on slopes and ridges, with lesser amounts of Devonian shales and dolomites along the Green River (above the lake). The Mississippian limestone found in Adair County was deposited 350 million years ago in the bottom of a warm, shallow sea. Over the last million years, the unconsolidated Quaternary sediments have been deposited along the larger streams and rivers. Figure 2 details the physiographic regions of Kentucky.

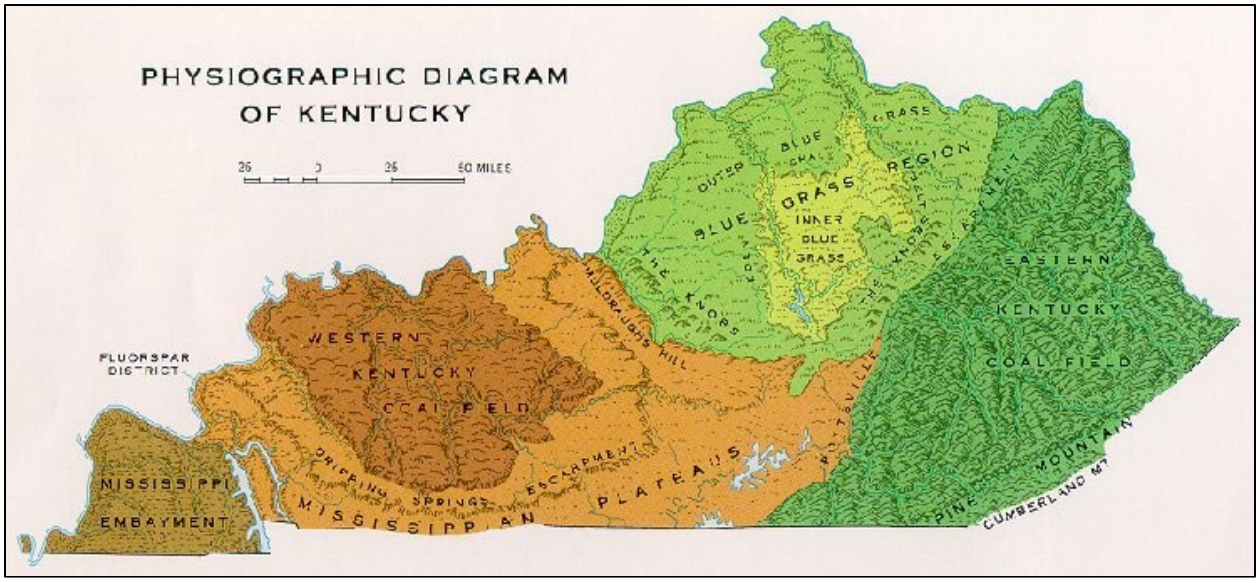

Figure 2. Physiographic regions of Kentucky (Source: KGS, 2022)

The oldest rocks found at the surface in Taylor County are the Calloway Creek Limestone, which were also deposited in warm seas during the Ordovician Period 450 million years ago. Above the Ordovician rocks lies the Devonian Chattanooga Shale, 400 million years old, which was formed when the deep-sea floor became covered with an organic black muck. This muck ultimately formed the distinctive black oil shale geologic formations found in the Project area. The Mississippian sandstones and siltstones are the result of a great influx of mud, silts, and sands brought in by rivers and streams from uplands many miles away and deposited as a great delta. At the end of the Mississippian Period, approximately 320 million years ago, the shallow seas receded and deposited the Pennsylvanian sediments. The warm climate of the Pennsylvanian grew extensive forests and great coastal swamps at the edges of water bodies. Marine waters advanced and receded many times, which produced many layers of sandstone, shale, and coal. This vegetation was deposited into the water and was buried under blankets of sediments, which was compressed into coal over a long geologic period. Nonvegetative sediments such as sand, clay, and silt were compressed into sandstone and shale strata. Over the last million years, unconsolidated Quaternary sediments have been deposited along the larger streams and rivers.

The Pennyroyal Region consists of a limestone plain characterized by tens of thousands of sink holes, sinking streams, streamless valleys, springs, and caverns. The term“"kars”" is used to define this type of terrain. This karst terrain occurs because the bedrock in the eastern and southern parts of the region is dominated by thick deposits of Mississippian-age limestones. These limestones are highly soluble which makes them easily eroded by waters moving through the ground. The Mammoth Cave-Flint Ridge cave system to the west of the Project is the longest cave system in the world and is formed in Mississippian-age limestones of the Mississippian Plateau Region. While some sinkholes and springs are present in the Project area, karst features do not constitute a prominent part of the landscape in the immediate vicinity of Green River Lake.

The Western Pennyroyal region lies in a horseshoe shape to the south and west of the Eastern Pennyroyal. It is separated from the Western Coalfields region to the north by the Dripping Springs

escarpment (Figure 3). Most of the fee lands surrounding the Project consists of steep side slopes with shallow soils.

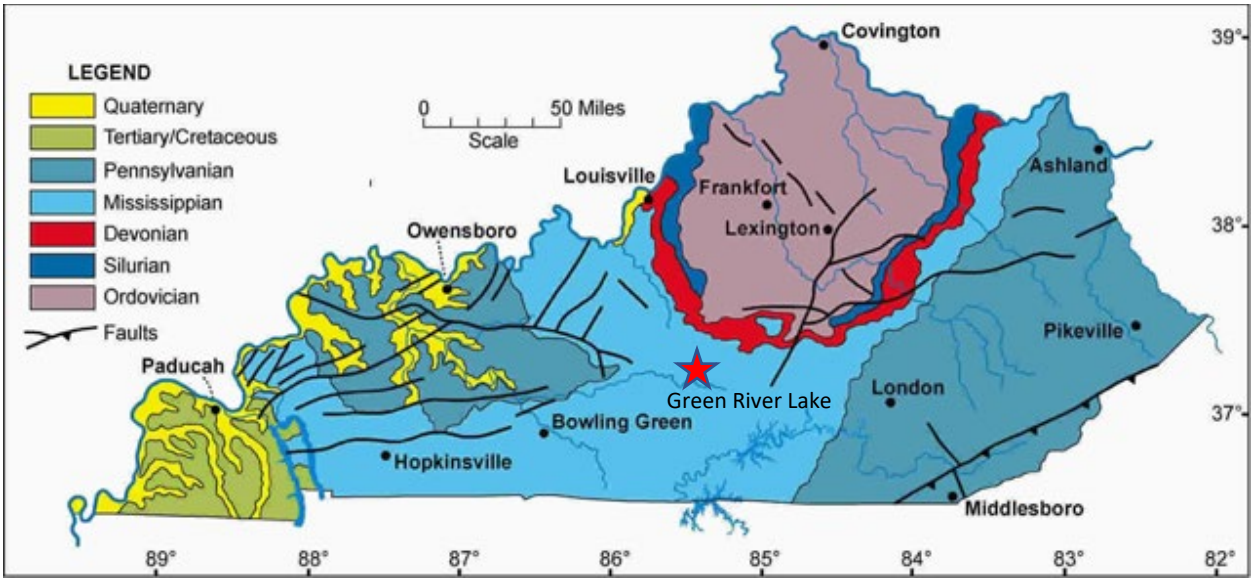

Figure 3. Geology of Kentucky (Source: KGS 2019)

Though the Green River Lake and surrounding area is entirely in the Eastern Pennyroyal region, there is marked change in topography and vegetative cover. North and East along Robinson and Casey Creeks and Green River, the land is characterized by broad floodplains surrounded by steep hills and broad ridges with elevations ranging from 700 – 1000 feet. This portion of the landscape is roughly 50% forested with the side slopes often heavily forested and most bottomlands cleared for agriculture. Immediately south and west of the Project along the Green River, the land is characterized by more rolling terrain with elevations ranging from 550 – 750 feet. This portion of the landscape is roughly 25% forested and a greater proportion of the land is currently in pasture. Maximum local reliefs occur at bluffs along the entrenched streams, where differences in elevation range from 100 to 260 feet with the highest bluffs bordering Green River Lake (KGS, 2022).

Soils are mapped according to the boundaries of major land resource areas (MLRAs), which are geographically associated land resource units that share common characteristics shaped by local and regional physiography, geology, climate, water resources, soils, biological resources, and land uses (NRCS, 2006). The objective of soil mapping is to delineate and organize the landscape into landform segments that have similar use and management requirements. Predictions about soil behavior are based on soil properties but also on abiotic and biotic variables such as climate and biological activity. In this way, soils occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area (NRCS, 2021). Soil profiles also play an extremely important role in watershed management. For example, in many watershed soils act as natural water filters and other types are prone to flooding or erosion, affecting runoff rates and sedimentation. Because soil conditions are predictable over long periods of time, gaining an understanding of soil types, with their benefits and limitations, can lead to more effective land use and management.

A soil association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Soils that have profiles that are almost alike make up a soil series. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. A soil complex consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on soil maps.

The predominant soil associations found on the Project are Garmon-Shelocta Complex, Garmon channery silt loam, and Nolin Silt loam associations (NRCS, 2022). Soils of the Garmon-Shalocta soil complex are moderately deep to shallow, well-drained, rocky soils, found on steep hillsides and side slopes and are common in the Project area. Channery soils of the Garmon complex are similar to the other Garmon Complex soils in their slope, water holding, constituents, and land uses and are another common component of soil profiles of the Project. Table 3 lists several of the most prevalent soil associations and their characteristics found on the Green River Lake Project. A full soil report is provided in Appendix B. Chapter 2 of USACE EM-1110-1-400 recommends avoiding development on slopes greater than 15 percent unless there is no other acceptable alternative. In general, the soil associations present at the Project are not suitable for development of this type based on soil properties and local topography. According to the National Resources Conservation Service (NRCS), three broad soil associations or complexes are prevalent at the Project site. These soil associations are listed in Table 3 and are considered unsuitable for many types of development.

Table 3. Predominant Soil Series of the Green River Lake Project

Soil Association	Proportion of Project (%)	Typical Slope (%)	Suitability Class and Soil Description
Garmon-Shelocta Complex (GaF)	15.3	25–- 60	*Unsuitable*. Fine-loamy residuum weathered from limestone and siltstone and/or shale. Moderately to well drained soils on hillsides.
Garmon channery silt loam (GaF)	10.5	20–- 70	*Unsuitable.* Fine-loamy residuum weathered from siltstone. Well drained soils found on hillsides.
Nolin Silt Loam Complex (No)	8.0	-	*Generally suitable.* Mixed fine-silty alluvium. Found in floodplains and depressions. All areas prime farmland when drained or protected from flooding during growing season.

Source: (NRCS, 2022)

Many of the silt loam soil types present on the Project are classified as prime farmland or farmland of statewide importance. These soil types are scattered in and around the Project; the vast majority are situated above the lake rim and in the outlying areas surrounding the lake. Actions by federal agencies such as construction activities and federal land management decisions have the potential to either directly or indirectly contribute to the loss of prime and unique agricultural lands. A soil report detailing the location of prime and unique farmlands within the Project fee lands is provided in Appendix B.

2.2.4 Surface Water Hydrology and Groundwater

Green River Lake is located at Mile 305.7 of the Green River, which flows northwesterly below the dam to its confluence with the Ohio River near Evansville, Indiana. The upper watershed is relatively rugged, and the average stream gradient is about 4 feet per mile. The Lake drains an area of 682 square miles. Principal tributaries include Robinson Creek, Casey Creek, Goose Creek, and the Green River. Streamflows in the watershed generally attain peaks in March or April following heavy rains in late winter and early spring. Snowfall is usually not significant and rarely influences runoff. Lowest flows at the Project generally occur in late summer when release levels frequently approach-minimum levels.

Much of the Green River Lake Project is underlain by the Fort Payne Formation. Wells in lowland areas near streams produce enough water for a domestic water supply and may produce more than 5 gallons per minute from solution openings. Most wells obtain water from perched or semi-perched water bodies supported by discontinuous shale layers, and many are dry during late summer and fall. Minor spring horizons occur throughout the formation. Numerous small springs and seeps are found throughout the Project area with most springs discharging from small solution openings and joints in limestone or siltstone and are supported by shale layers. Flows emanating from these features may be as high as 30 gallons per minute, but most go dry in late summer or fall. Where shale layers are conspicuous or where the formation consists predominantly of siltstone, most wells are inadequate for domestic use (less than 100 gallons per day). Where chert layers are thick and extensive, yields of more than 5 gallons per minute may be obtained (KGS, 2022).

2.2.5 Water Quality

The water quality management authority of USACE is founded on the Federal Water Pollution Control Act Amendments of 1961, Pub. L. No. 87-88, 75 Stat. 204, as amended (FWPCA), as well as the Clean Water Act of 1977 and the Water Quality Act of 1987. In addition, Executive Order 12088, Federal Compliance with Pollution Control Standards (1978), requires Federal facilities to comply with applicable pollution control standards in the same manner as any non-Federal entity. ER 1110-2-8154 stipulates that it is USACE policy to develop and implement a holistic, environmentally sound water quality management strategy for all projects. Furthermore, it is USACE's goal to responsibly manage our projects to maximize environmental compliance. USACE also must comply with applicable State regulations and standards.

USACE Project personnel conduct water quality monitoring in which weekly measurements are collected from spring to fall during lake stratification to monitor temperature and dissolved oxygen levels. Dissolved oxygen is used as an important indicator of potential water quality problems that can be detrimental to aquatic ecosystems. Reduced oxygen levels at depths can lead to dead zones that can produce fish kills, reduced biodiversity, reduce aesthetic values, impact the quality of drinking water, and create conditions that promote harmful algal blooms (HABs). Water quality in the tailwater is also assessed by analyzing data for exceedances of water quality standards and criteria. Data collected via the Louisville District Water Quality Program is assessed annually. Data is compared and if any exceedances of established water quality criteria occur, the Louisville District Water Quality Team reports this to the Kentucky Division of Water (KDOW).

During summer 2020, Green River Lake had three exceedances of KY's water quality criteria for temperature at the tailwater. The Trophic State Index (TSI) obtained using three indices (i.e., total phosphorus, chlorophyll-a, and secchi depth) classified the lake as moderately eutrophic or eutrophic, indicating moderate to high levels of biological activity potential. Total phosphorus and total nitrogen levels at most sample locations exceeded the USEPA nutrient criteria. Finally, USACE sampling showed there was one sample with cyanobacteria cell counts over 100,000 cells/mL at the time of sampling. The elevated nutrient levels and moderately eutrophic/eutrophic TSI classification indicate a high potential for HAB development in the lake (USACE, 2021).

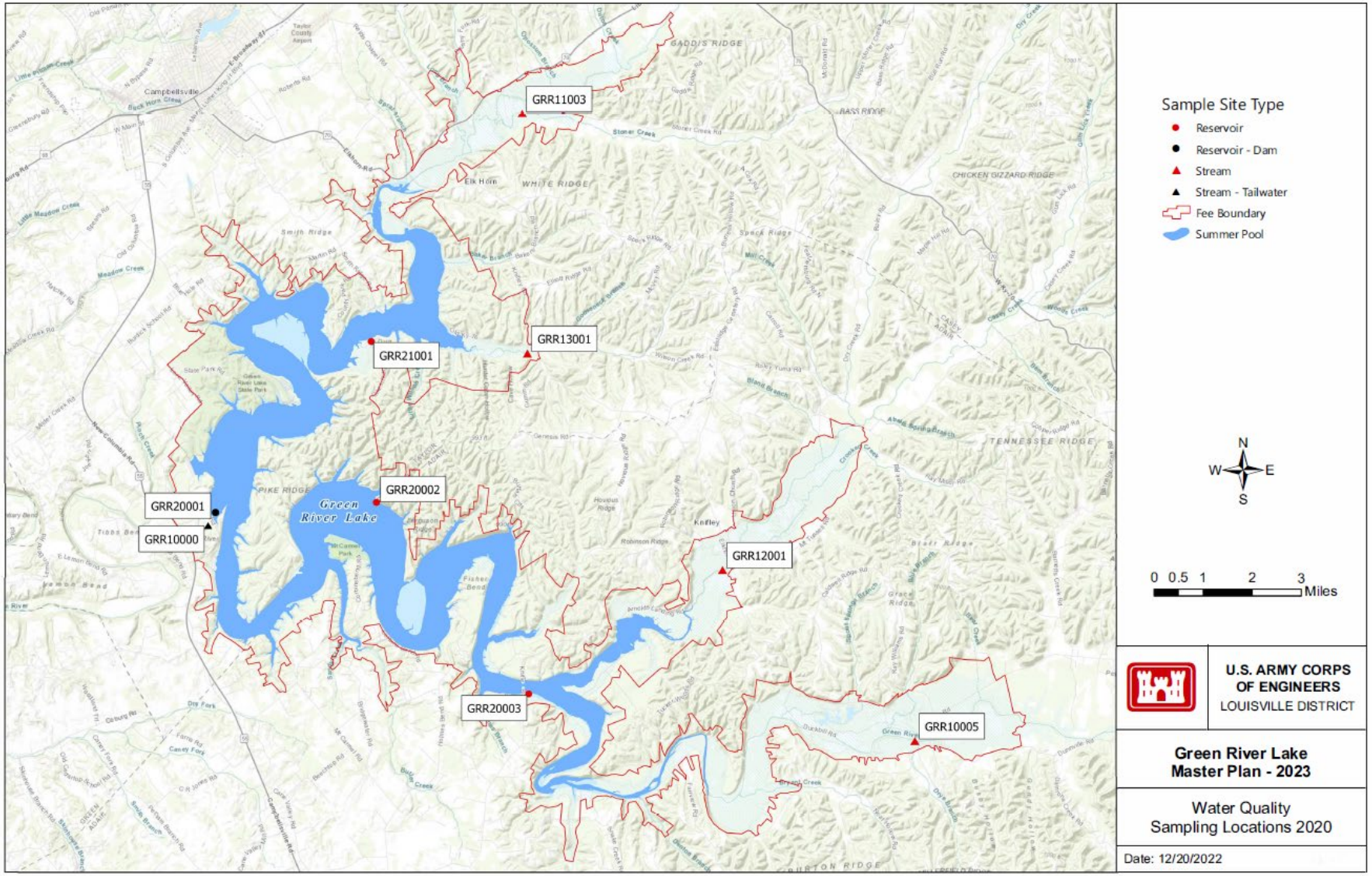

Figure 4. Water quality sampling locations for Green River Lake in 2020

During spring and summer 2016, macroinvertebrate samples were collected at eleven sites on primary inflows and the tailwater of Green River Lake (Figure 4). Benthic macroinvertebrates are often used as water quality indicators to assess short- and long-term trends (USACE, 2019). Macroinvertebrates were collected using established KDOW's collection methodologies. Habitat was also assessed using KDOW's standard operating procedures. The data collected during these studies are used to calculate a Macroinvertebrate Bioassessment Index (MBI) using various indices that have been developed specifically for Kentucky streams. MBI calculates a score (0-100) that is used to assign a rating based on the stream size and physiographic region. Some of the metrics used in calculating MBI values include Taxa Richness; EPT Richness –number of pollution intolerant taxa from the orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies); and % Tolerant Taxa –number of species that are tolerant of poor water quality. In general, good water quality is associated with higher MBI, taxa richness, EPT richness, sensitive species richness values and lower values of % tolerant taxa and use a range of values to establish a water quality rating of *Excellent*, *Good*, *Fair*, *Poor*, and *Very Poor*. Habitat was also assessed using establish KDOW criteria which assigns ratings of *Good*, *Fair*, and *Poor*.

In general, the results of the 2016 bioassessment of Green River Lake are indicative of an impaired watershed. The majority of sample sites received a score of *Fair,* which suggests that the aquatic macroinvertebrate community are impacted by poor water quality. The low MBI scores may be partially explained by the low habitat assessment scores received during the study in which 55 percent of all sample sites were characterized as *Poor* (Table 4). Low habitat scores suggest that riparian habitats surrounding the sample sites have been negatively impacted by human disturbance or other environmental perturbations.

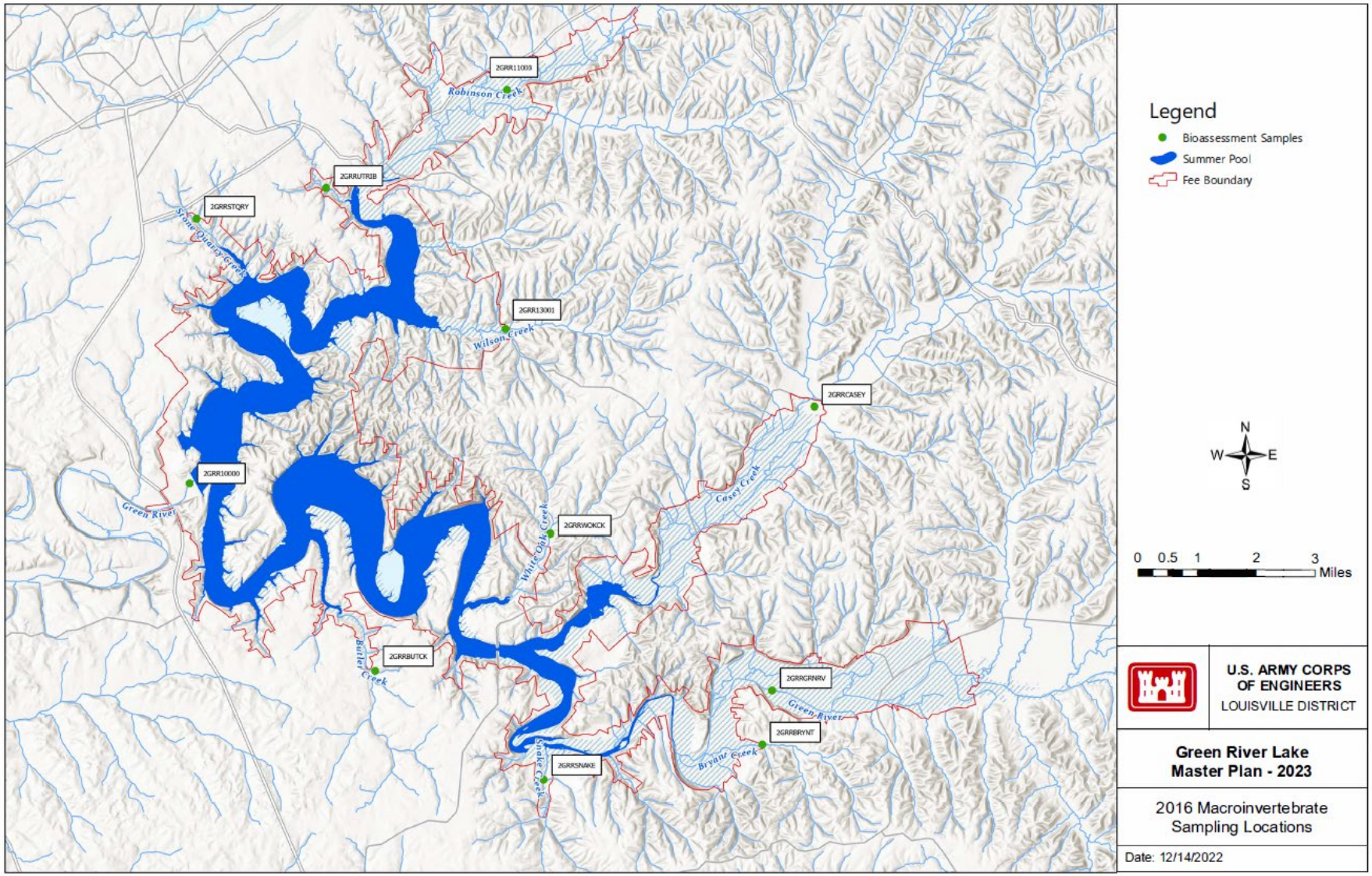

Figure 5. Location of 2016 bioassessment sample sites on Green River Lake

Table 4. Results of 2016 Bioassessment of Green River Lake (Source: USACE, 2022)

Location	Stream	MBI Score	MBI Rating	Habitat Rating	Taxa Richness	EPT Richness
2GRR10000	Green River (tailwater)	33.59	Poor	Poor	18	2
2GRR11003	Robinson Creek	61.55	Fair	Poor	33	11
2GRR13001	Wilson Creek	56.70	Fair	Poor	29	10
2GRRBRYNT	Bryant Creek	42.98	Fair	Fair	38	15
2GRRBUTCK	Butler Creek	45.17	Poor	Poor	37	9
2GRRCASEY	Casey Creek	65.45	Fair	Fair	27	9
2GRRGRNRV	Green River	68.58	Fair	Poor	35	16
2GRRSNAKE	Snake Creek	49.58	Fair	Fair	41	18
2GRRSTQRY	Stone Quarry Creek	49.43	Fair	Good	32	12
2GRRUTRIB	Unknown tributary to Robinson Creek	60.81	Fair	Good	36	15
2GRRWOKCK	White Oak Creek	66.21	Fair	Poor	39	14

As a requirement of the Clean Water Act, KDOW is responsible for monitoring water quality of the state's waters. The most recent water quality assessment of Green River Lake conducted by KDOW was in 2006. According to KDOW (2022), the lake was classified as fully supporting aquatic life, fishing/wading/boating (Secondary Contact Recreation) and drinking water (Domestic Water Supply). The lake was classified as partially supporting fish consumption due to the presence of low levels of mercury and polychlorinated biphenyls (PCBs) in fish tissue samples. Primary contact recreation was not assessed at this time (KDOW, 2022).

Water quality impacts to the surrounding watershed also have the potential to impact the water quality of the lake. Bioassessment of the Project's major inflows are conducted by KDOW as part of state-wide water quality monitoring program. Many of the surrounding streams contributing to the inflow of Green River Lake have been classified as impaired and contribute to water quality of Green River Lake Project. Other tributaries within the watershed are classified as Outstanding State Resource Water (OSRW), e.g., White Oak Creek (UT 0.4 -2.9). Green River (RM 327.3 to 342.9), which comprises the backwaters of Green River Lake, is characterized as not supporting swimming (Primary Contact Recreation) as a result of contamination from fecal coliform *Escherichia coli*. This section of the stream is currently 303(d)1 listed and is a candidate for a Total Maximum Daily Load (TMDL) restoration plan. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can accept and still meet the state's Water Quality Standards for public health and healthy ecosystems. Green River below the Green River Dam (RM 282.3 to 306.95) is also classified as impaired due to fecal coliform contamination and currently has a TMDL plan in place. Potential sources of fecal coliforms to Green River, and the basin as a whole, include publicly owned water treatment facilities, diffuse pollution from agriculture, livestock near streams, failing or improperly maintained residential septic systems, and human waste from straight pipes (USEPA, 2014).

2.2.5.1 Shoreline Erosion

Shoreline erosion has the potential to negatively impact water quality at Green River Lake and is primarily caused by waves created by wind and boat action. Supporting factors include fluctuations in lake level, erodible soil classifications, and high relief of the surrounding topography. USACE, including its outgrant facilities, have and shall continue to implement best management practices (BMPs) and Erosion and Sediment Control Plans to reduce soil erosion and run-off. Such practices have included shoreline stabilization projects that often use a variety of strategies to minimize soil disturbance in highly impacted areas, e.g. utilization of vegetative buffers, grading, and the placement of rip rap materials. These efforts will preserve the maximum water storage capacity of the lake for flood control, maintain water quality, preserve and enhance the lake's fishery, and support recreational opportunities through good water quality.

As with most of Kentucky's reservoirs, sedimentation is an ongoing issue at Green River Lake. Accounting for sedimentation was included in the design and management of the reservoir. The 2023 Master Plan includes a recommendation that an updated sedimentation study be completed to characterize current sedimentation and potential impacts on the Project's authorized purposes.

2.2.6 Fish and Wildlife Resources

Fishing is available on Green River Lake as well as Robinson Creek, Casey Creek, and the Green River. The Project supports largemouth bass (*Micropterus salmoides*), spotted bass (*M. punctulatus*), and smallmouth bass (*M. dolomieu*), muskellunge (*Esox masquinongy*), walleye (*Sander vitreus*), channel catfish (*Ictalarus punctatus*), white crappie (*Pomoxis annularis*), white bass (*Morone chrysops*) bluegill (*Lepomis macrochirus*), and threadfin shad (*Dorosoma petenense*). Up until the mid-199''s, white bass populations were considered very healthy, although somewhat cyclical. However, by 2005, all the white bass had disappeared from the lake. A white bass restocking program was initiated in 2010, with restocking efforts conducted every 4 – 5 years. The KDFWR also conducts annual Muskellunge and walleye stocking efforts at multiple locations on the Project.

The Green River Lake Project supports a healthy number of deer, turkey, furbearer, and squirrel populations. The Kentucky Department of Fish & Wildlife Resources (KDFWR) manages over 20,000 acres of land around Green River Lake for hunting and fishing purposes. This land is referred to as the Green River Lake Wildlife Management Area (GRLWMA). Public use of GRLWMA hunting follows statewide regulations and the area is open for hunting dove, wild turkey, white-tailed deer, waterfowl, rabbit, squirrel, quail, and pheasant. No firearms for deer hunting are allowed except during quota deer hunt. A portion of the area known as the Corbin's Bend Unit has been designated as an American with Disabilities Act (ADA) area for use by mobility impaired individuals. GRLWMA receives moderate to heavy use by all wildlife-related activities. A put-and-take pheasant hunt was initiated in 2000. Waterfowl blind drawings are held the last Saturday of September each year for 33 permanent waterfowl blind sites on the lake and in the Green River bottoms. Open fields have been managed for dove hunting at various locations on the area, but primarily on top the hill at Elkhorn.

Additional wildlife that may be taken on the GRLWMA via trapping permits obtained by KYDFWR include coyote, bobcat, otter, muskrat, beaver, red fox, gray fox, weasel, mink, skunk, and groundhog.

2.2.7 Land Cover and Terrestrial Habitats

The Green River Lake Project lies within the Eastern Highland Rim Ecoregion. This region has great geographical diversity with undulating plains, hills, and karst. Steep bluffs, springs, cascades, and wide bottomlands characterize the region. The Ecoregion is mostly underlain by Mississippian limestone, chert, shale, siltstone, and sandstone which along with slope, aspect, and local hydrological conditions determine the plant communities that are found there. Much of the forest surrounding the Project can be broadly classified as oak–hickory forest. Today, white oak dominates upland forests and bottomland trees such as black walnut, black cherry, ash, and sycamore grow along water courses.

2.2.7.1 Land Cover Types

Habitats of the Project area are delineated and categorized using the National Land Cover Database (NLCD). The NLCD provides nationwide data on land cover and land cover change at a 30-meter resolution with a 16-class legend based on a modified Anderson Level II classification system. NLCD analysis indicates that the dominant land cover category for the Project is "deciduous forest" forested habitat, comprising 66.1% of terrestrial land cover on fee lands (Table 5). Project-wide, 13% percent (n = 3,133.2 acres) of total fee lands are classified as modified by human use or otherwise developed in some way, i.e., developed land, cultivated crops, hay fields, pasture, etc. Table 5 contains a detailed list of terrestrial habitat types and their relative acreages.

Table 5. Estimated land cover types present on the Green River Lake Project (Source: NLCD, 2016).

Land Cover Type	Acreage	Proportion Fee Lands
Mixed Forest	3642.98	15.2%
Hay/Pasture	790.91	3.3%
Deciduous Forest	15842.19	66.1%
Woody Wetlands	742.98	3.1%
Cultivated Crops	1102.48	4.6%
Evergreen Forest	527.27	2.2%
Herbaceous	143.80	0.6%
Barren Land	119.84	0.5%
Emergent Herbaceous Wetlands	71.90	0.3%
Developed, Open Space	766.94	3.2%
Developed, Low Intensity	95.87	0.4%
Developed, Medium Intensity	47.93	0.2%
Shrub/Scrub	47.93	0.2%
Developed, High Intensity	23.97	0.1%
TOTAL	23967	100%

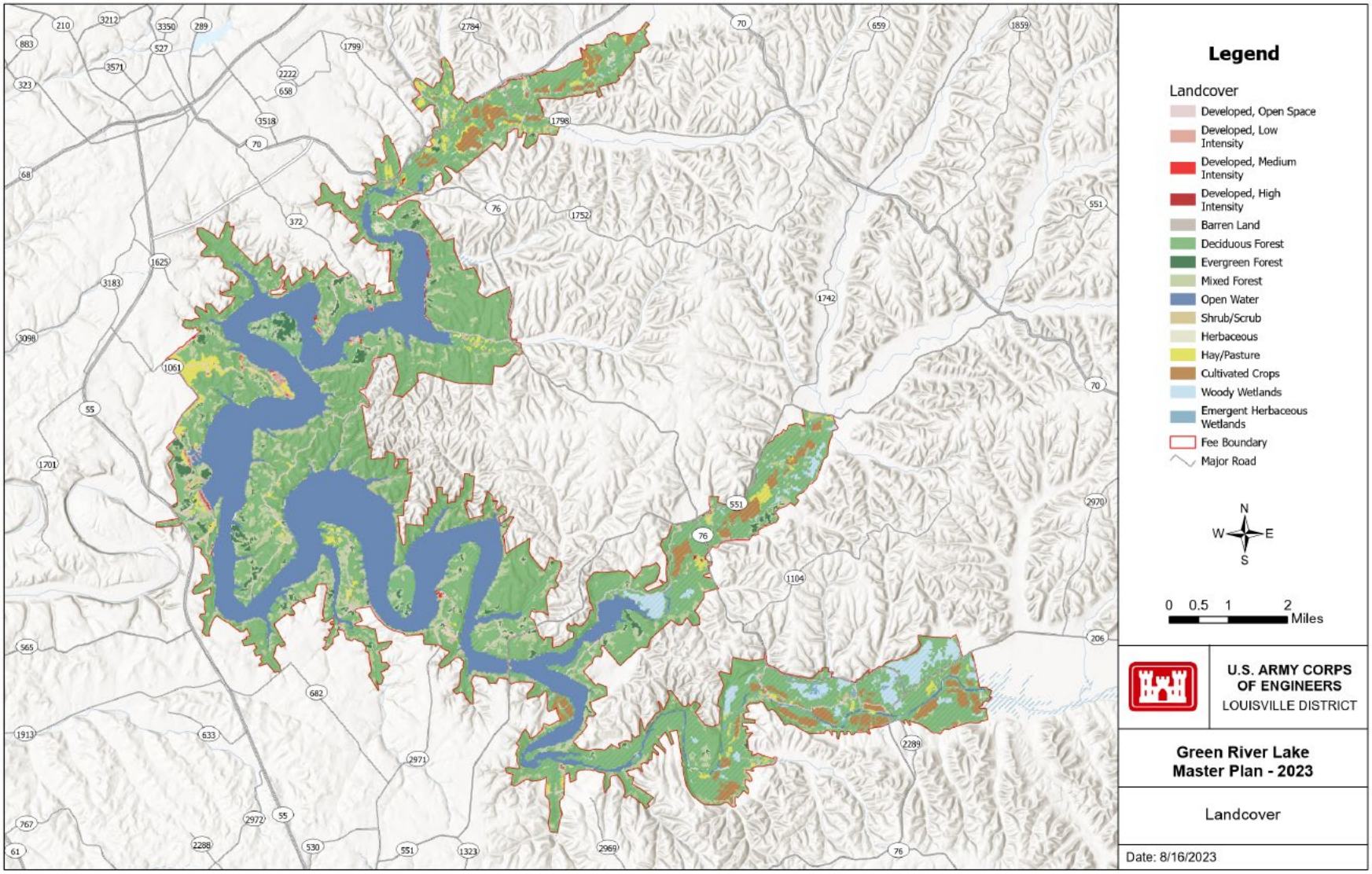

Figure 6. Land cover types at the Green River Lake Project, National Land Cover Database (2016).

2.2.7.2 Forested Habitats

Forested habitats delineated in Figure 6 are classified using the NLCD system and include mixed, evergreen, and deciduous forest habitat types. These habitat classification types are broad categories that can be further refined into known forest community associations that result from local or regional geological character as well as local geology and topology, aspect. In general, the older, larger tracts of the forest habitat are located on steeper slopes that are often associated with water courses and are found in areas that were generally harder to access when the surrounding region was cutover.
The vegetative community structure at Green River Lake is a result of the physiography and geology of the area as well as human activity. Most of the climax forest lands in the region have been transformed into subclimax forest by human habitation. The forest communities continue to mature following the acquisition of the lands by the USACE in the 1960s.

In 1996, The Kentucky Division of Forestry completed a basic inventory of the forest surrounding the Green River Lake Project and developed a Forest Stewardship Plan for the GRLWMA. Forest stand delineations were based on aerial photography and topo maps. In 2007, Biologists with the KDFWR digitized the forest stands from the 1996 plan in ArcGIS and added additional stand information based on the Stewardship Plan, analysis of aerial photography, topo maps, and additional forest inventory data. In 2020, a Forest Management Plan was completed by KDFWR that utilized data from these resources and supplemented it using vegetation height data derived from LIDAR using GIS, ground-truthing, aerial imagery, and topo maps from different years. The resulting 2020 Forest Management Plan represents the best data currently available for detailed forest composition and age structure present on the Green River Lake Project. Common species of the forest surrounding the Project include red maple (*Acer rubrum*), Yellow Poplar (*Liriodendron tulipifera*), and Oak-Hickory associations are comprised of white oak (*Quercus alba*), red oak (*Q. rubra*), black oak (*Q. velutina*), scarlet (*Q. coccinea*), chestnut oak (*Q. montana*), shagbark (*Carya ovata*), pignut (*C. glabra*), bitternut (*C. cordiformis*), and mockernut hickory (*C. tomentosa).* Forested habitats classified as *Hardwood Mix* and *Mixed Upland Hardwoods* include species commonly found in the region including red maple (*Acer rubrum*), sugar maple (*A. saccharum*), boxelder (*Acer negundo*), black walnut (*Juglans nigra*), beech (*Fagus Celtis occidentalis) and (Pinus strobus).* While the specific forest community composition of the Project is dependent on slope, aspect, soil type, and moisture content, there is an ongoing successional transitional from oak-hickory forest to maple-beech forest association on the Project as a result of fire suppression policies and lack of timber extraction activities there. Additional information on the dominant species and size class composition of the most common forest community types present on the GRLWMA (KDFWR, 2020) is provided in Appendix B.

2.2.7.3 Wetland Habitats

Approximately 2,185 acres of freshwater wetlands exist within the Green River Lake fee boundaries (USFWS, 2022). Habitat types include freshwater forested/shrub (n = 1,597.2 acres), and freshwater emergent (566.3 acres) wetland habitats that exist scattered around the Project. Most are found within the floodplain and riparian zones of the backwater sloughs of the lake. However, it should be noted that in most cases, the data provided above is obtained via remote sensing and no systematic survey of existing wetlands has been performed at the Project. Figure 7 shows existing wetlands within the Project boundary according to the USFWS National Wetland Inventory database (USFWS, 2022).

Typical wetland flora of this area includes various sedges (*Carex* spp.), cattail (*Typha* sp.), spikerush (*Eleocharis palustris*), smartweed (*Polygonum* sp.), knotweed (*Reynoutria japonica*), pickerelweed (*Pontedaria cordata*), pondweed (*Potamogeton* sp.), and scouring rush (*Equisetum hyemale*). Trees such as willow (*Salix* sp.), cottonwood (*Populus deltoides*), sycamore (*Platanus occidentalis*), box elders and maples (*Acer* spp.), ash (*Fraxinus* spp.), and oak (*Quercus* spp.) may also be found in wetlands on the Project. Wetlands provide habitat for many animals, including red-winged blackbird (*Agelaius phoenicus*), muskrats (*Ondatra zibethicus*), mink (*Neovison vison*), beaver (*Castor canadensis*), reptiles and amphibians, as well as a wide range of waterfowl.

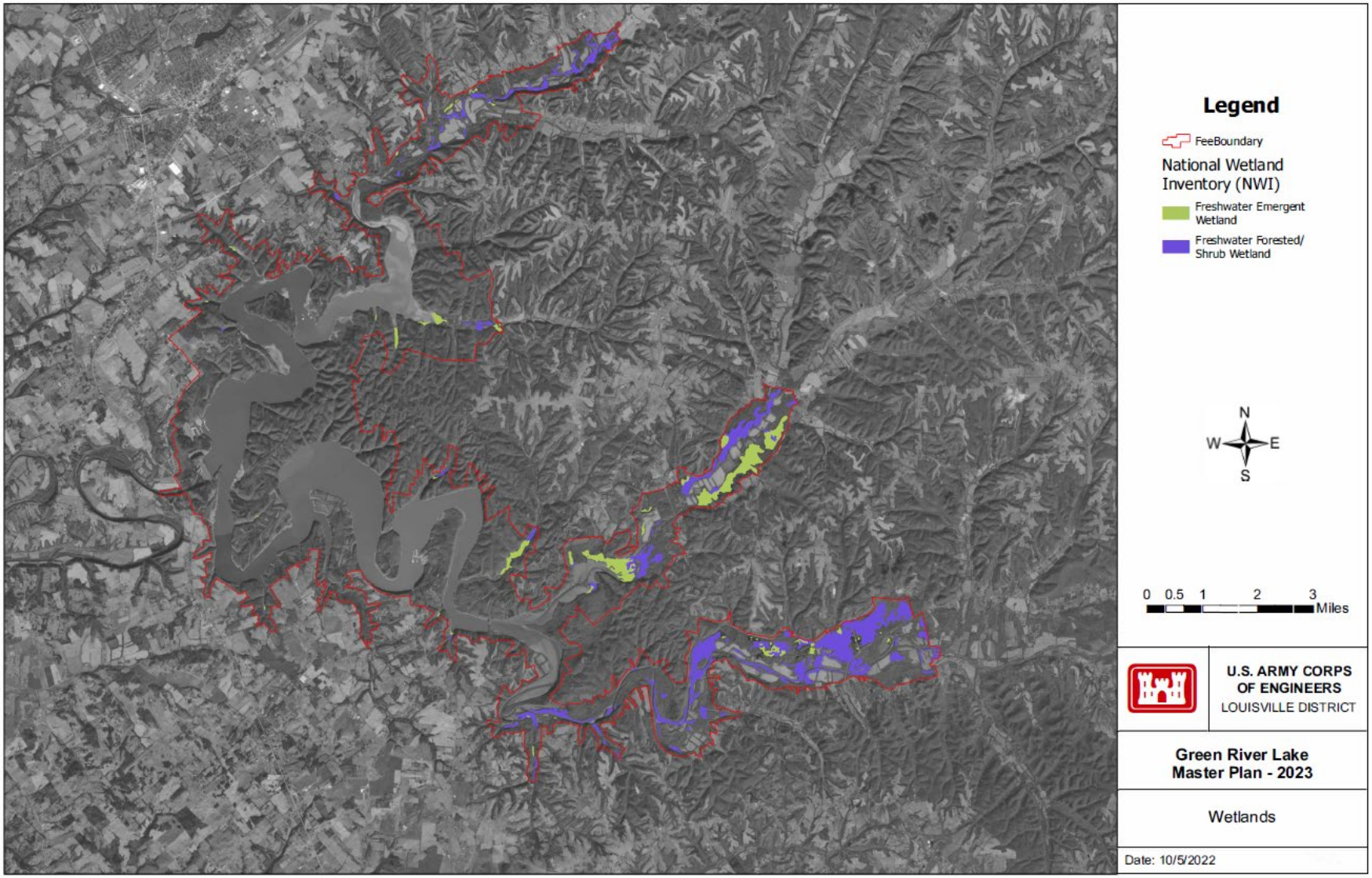

Figure 7. Wetlands within the Green River Lake Project boundary (USFWS National Wetland Inventory).

2.2.8 Listed Species

Lists of threatened, endangered, and species of special concern are maintained by the U.S. Fish and Wildlife Service (USFWS). Under the Endangered Species Act (ESA) of 1973, Pub. L. No. 93-205, 87 Stat. 884 (codified as amended at 16 U.S.C. §§ 1531, et seq.), endangered species generally are defined as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is any species likely to become endangered in the foreseeable future. The Endangered Species Act (ESA) defines critical habitat of the above species as a geographic area that contains the physical or biological features that are essential to the conservation of a particular species and that may need special management or protection.

Based on data obtained from the USFWS Information for Planning and Consultation (IPaC) resource (USFWS, 2022), 14 Federally listed species have been or are known to occur in the vicinity of the Project. Endangered freshwater mussel species listed include the spectaclecase (*Cumberlandia monodonta*), fanshell (*Cyprogenia stegaria*), northern riffleshell (*Epioblasma torulosa rangiana*), snuffbox mussel (*Epioblasma triquetra*), pink mucket, (*Lampsilis abrupta*), ring pink (*Obovaria retusa*), sheepnose (*Plethobasus cyphyus*), clubshell (*Pleurobema clava*), and the rough pigtoe (*Pleurobema plenum*). The threatened mussel species potentially affected by activities in this location is rabbitsfoot (*Quadrula cylindrica cylindrica*). All the mussel species listed above have been experiencing decades of decline due to habitat modification or loss, over harvesting, and pollution. Although these species may have been historically present in the Upper Green River watershed, none are currently found within the Project fee boundary. Several may be extirpated from large parts of their formal ranges and others may be functionally extinct. While many of these species may have been historically present in the Green River watershed or may be found in stretches of the Green River above or below the Project, none are currently found within Green River Lake or Project fee boundaries.

Endangered mammals potentially located on or near the Project include the Federally endangered northern long-eared bat (*Myotis septentrionalis*), Indiana bat (*M. sodalis*), and gray bat (*M. grisescens*). Because all three of the listed bat species have very large ranges that include the entire state of Kentucky, all are considered potentially present throughout the state by the USFWS, even in areas in which they have not been previously documented. While these species have the potential to use the Project Area, there are no known records or hibernacula used by the northern long-eared bat, Indiana bat, or gray bat occurring on fee lands of the Rough River Lake Project.

The entire stretch of the Green River beginning immediately below the Green River Lake Dam to Mammoth Cave National Park (approx. RM 190 – 306) has been designated as Critical Habitat for the rabbitsfoot mussel (USFWS, 2022).

A more detailed review of the life history requirements, ranges, and pertinent distribution data of listed species is provided in Appendix B.

2.2.8.1 Additional Protected Wildlife

Bald eagles (*Haliaeetus leucocephalus*) have a very large range in the continental U.S. and have a history of nesting within and near the Project boundaries. While this species was formally removed from the Federal list of endangered and threatened species in 2007, bald eagles are protected under the Migratory Bird Treaty Act (MBTA) of 1918, Pub. L. No. 65-186, 40 Stat. 755 (codified as amended at 16 U.S.C. §§ 703, et seq.) and the Bald and Golden Eagle Protection Act, Pub. L. No. 86-70, 54 Stat. 250 (codified as amended at 16 U.S.C. §§668-668c). Annual mid-winter counts are conducted at fixed survey locations by KDFWR biologists at Green River Lake. A total of 11 and 22 eagles were observed during midwinter surveys conducted in 2019 and 2020, respectively. The mean number of eagles observed from 2010 – 2020 at the Green River Lake Project was 9.2 (KDFWR, 2022).

The Osprey (*Pandion haliaetus*) is also protected by the MBTA and is a frequent resident of the Project. Lists of state threatened, endangered and species of special concern are also maintained by the State of Kentucky. A complete list of these species known from the counties comprising the Project fee lands is provided in Appendix B. While no surveys have been conducted on fee lands, this list represents species that have the potential to be found on the Project.

2.2.9 Invasive Species

As a result of centuries of habitat manipulation and plant and animal introductions (both intentional and accidental), numerous species have been allowed to reach invasive and/or nuisance status and threaten the integrity of the ecosystem. These species present a management challenge to the Corps.
Invasive species are organisms that are not native (exotic) to a geographical region and cause a problem in that ecosystem. They threaten our nation's resources, preventing or seriously hindering the operation of navigation, adversely affecting flood control, hydropower generation, and water supply, or otherwise limit recreational use by the public. The economic costs can be high and introductions of new invasive species are ongoing. Nuisance species are native, but because of a change in the ecosystem (such as natural disaster, major civil works project, or wide-scale land use alteration) they have reached population levels that threaten development or people and are considered pests.

Invasive species present at the Project include autumn olive (*Elaeagnus umbellate*), bush honeysuckle (*Lonicera maackii*), Japanese honeysuckle (*Lonicera japonica*), microstegia (*Salvia microstegia*), tree of heaven (*Ailanthus altissima*), mimosa (*Albizia julibrissin*), multifora rose (*Rosa multiflora*), and privet (*Ligustrum* spp.). These species are culled by USACE and KDFWR as part of annual timber stand improvement activities occurring on the Project. Each of these species have the potential to negatively impact other vegetation and/or animals on the Project. Honeysuckle species can out-compete and displace native plants, alter natural habitats by decreasing light availability, and deplete soil moisture and nutrients. Multiflora rose forms dense thickets, excluding most native shrubs and herbs from establishing.

Emerald ash borer (*Agrilus planipennis*) infestations have the potential to negatively impact the forest communities of the Project area. The emerald ash borer (EAB) is a destructive wood-boring pest of ash

trees (*Fraxinus* spp.). Native to Asia and the Russian Far East, the EAB was unknown in North America until its discovery in southeast Michigan in 2002. Today, EAB infestations have been detected in 35 states, including the state of Kentucky (first document in 2009). The species has been documented in 2018 in Adair County (EABIN, 2022) and there are records of the EAB in Taylor County (L. Brewster, USACE, pers. comm., 2023) and the Green River Wildlife Management Area (KDFWR, 2021). While white ash (Fraxinus americana) is predominantly found on upland sites, it does not make up a large percentage (<5%) of the tree species in most forest stands (KDFWR, 2021). However, green ash (*Franxinus pennsylvanica*) is an important component of the bottomland forest communities at the Project. As large ash die, canopy gaps will be created which will result in light reaching the forest floor and may promote some understory vegetation on a small scale.

Invasive species have the potential to negatively impact natural areas of the Green River Lake Project and can result in significant impacts to ecosystem function. For example, the creation of canopy gaps caused by the loss of host trees can alter soil moisture, increase incidental light striking the forest floor, and change the temperature profiles. Infestations can also alter forest stand composition and age structure, understory plant diversity, and may facilitate growth of invasive plants. These impacts to forested habitats have the potential to impact the fauna that use these areas (e.g., birds and mammals). For example, some neotropical bird species that require larger tracts of mature, interior forests may be negatively impacted by forest fragmentation and other species that occupy edge habitat may be favored. Loss of trees in riparian areas can adversely impact cold-loving aquatic fish and invertebrate species by increasing solar exposure to streams and increasing water temperature.

2.2.10 Hazardous, Toxic, and Radioactive Waste

The USEPA Envirofacts database was queried to identify HTRW sources within a five-mile radius of the Project boundaries. While a total of 44 USEPA regulated facilities were identified within the radius, none were identified within the USACE property boundaries (USEPA, 2022b).

2.2.11 Noise

Changes in noise are typically measured and reported in units of A-weighted decibels (dBA), a weighted measure of sound level. The primary sources of noise within the Project area include everyday vehicular traffic along the adjacent highways (typically between 50 and 60 dBA at 100 feet) and human-generated recreational activities at the Project. Noise ranging from about 10 dBA for the rustling of leaves to as much as 115 dBA (the upper limit for unprotected hearing exposure established by the Occupational Safety and Health Administration) is common in areas where there are sources of recreational activities, construction activities, and vehicular traffic.

2.2.12 Cultural Resources

Cultural resources within the Master Plan are defined as both archaeological sites that are below ground and above ground structures.

Green River Lake is located within the Upper Green River sections of the Green River Management area. This area has a spatiotemporal occupation of Native Americans spanning from the Paleoindians pre 9,000 Before Christ (BC) (11,450 years before present) into the late 19th and early 20th century with Euro-American contact with Native Americans. An all-inclusive chronology of the eastern United States pertaining to Green River Lake – divides this general chronological sequence into the following periods: Paleoindian (9,500 to 8,000 BC); Archaic (8,000 - 1,000 BC); Woodland (1,000 BC to Anno Domini (AD) 1,000); Mississippian (AD 900 to 1,000); Fort Ancient (AD 1700-1750) and Historic (European contact and settlement, AD 1770-Present) (Pollack, 2008).

These periods represent culturally distinct techno-complexes relating to human adaptation in and around the area surrounding Green River Lake. Cultural resources have the potential to be considered Historical Properties – defined by the National Historic Preservation Act, Pub. L. No. 89-665, 80 Stat. 915 (codified as amended at 54 U.S.C. §§ 300101-307108) (NHPA) as "any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on" the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior, "including artifacts, records, and material remains relating to the district, site, building, structure, or object." Section 106 of the original NHPA (now codified at 54 U.S.C. § 306108) requires Federal agencies to consider the effects of their undertakings on Historic Properties.

2.2.12.1 Prehistoric Setting

The Prehistoric setting includes the Paleoindian, Archaic, Woodland, and Fort Ancient periods, and represents culturally distinct techno-complexes relating to human adaptation to the changing physical and social environment. Furthermore, each of these settings are subdivided further based on stone-tool morphological variability, changes to subsistence strategy, increased sedentism, or other cultural manifestations identified through archaeological research. Subdivisions are grouped temporally as either *early*, *middle*, or *late* periods as cultural patterns shift through time.

Paleoindian Period (9,500 -8,000 BC)
The Paleoindian Period began circa 9,500 B.C. and lasted until 8,000 B.C. This period is characterized by a specialized lithic technology consisting of fluted, lanceolate projectile points. Projectile points of the Clovis and Cumberland clusters are diagnostic of this period. Other associated artifacts include prismatic blades, endscrapers with graver spurs, and ground bone and ivory tools. The Paleoindians are believed to be highly nomadic hunter-gatherers who preyed upon the large herbivores of the Pleistocene period. Undoubtedly, other resources were utilized as well. Little excavated or contextual data exists in Kentucky relative to this period. Much of that which is suspected concerning Paleoindian settlement patterning and subsistence practices has been inferred from the geographical distribution of fluted projectile points (Tankersley, 1990:80).

Five Paleoindian sites have been recorded in the Green River Lake Project area.

Archaic Period (8,000-1,000 BC)

The Archaic period represent a cultural shift from residential mobility to logistical mobility (see Binford 1980 for a discussion between Residential and Logistical mobility) and is also divided into an Early (8,000-6,000 BC), Middle (6,000-3,000 BC), and Late (3,000-1,000 BC) subperiods. This transition coincided with climate change as the boreal forests of the Paleoindian period transitioned to the more deciduous forests with higher flora and faunal diversity. This increase in subsistence diversity helped foster a more diversified subsistence strategy by the Late Archaic. However, there is evidence that occupation at some Late Archaic sites was sporadic and short-term (Bader, 1995)

Many Archaic sites in Western Kentucky are identified through surface finds with diagnostic projectile point morphologies. This is especially true for Early Archaic sites. Jefferies (2008) asserts the absence of these data throughout the Middle Archaic is poorly understood.

Forty-one archaic sites have been recorded within Green River Lake.

Woodland Period (1,000 BC to AD 1000)

The Woodland period is divided into Early (1,000-200 B.C.), Middle (200 B.C.-A.D.500), and Late (A.D. 500-1000). Differences between these periods are in large part distinguished by changes in ceramic styles. In general, there was a smooth transition between the Archaic and Woodland periods. Woodland technologies were much the same as those of the Archaic period (Railey 1990). Some technological innovations, however, serve to differentiate the Woodland from the Archaic as a developmental stage. Among these innovations was the manufacture and use of ceramics. The ungrooved celt replaced the Archaic grooved axe, and bone beamers took the place of endscrapers (Railey 1990).

Burial mounds arose in Kentucky during the Early Woodland period (1,000-200 BC). As a result, the Adena and Hopewell cultural groups emerged as investigations into burial mound variability tended to group mound characteristic into one of these groups. Adena Mounds—typically constructed over circular sub-structures—usually contained several individuals with interments distributed vertically. Hopewell mounds cover individual tombs with additional interments distributed horizontally. These mounds tend to also be clustered in large groups. Another key difference is the presence of ceramic vessels with interred individuals. There is also evidence of settlement nucleation during the Middle Woodland Period (200 BC to AD 500) with large scale village communities emerging by the Late Woodland Period (AD 500-1,000). Lastly, the Late Woodland is marked by greater regional variability regarding substance strategies, ceramics, and social interaction; and the emergence of the bow and arrow technology (Railey, 1990).

The Green River Lake Project area has 16 Woodland site components.

***Mississippian Period/Fort Ancient Period (AD 900 to 1,700*)**

The Mississippian period is marked by the presence of hunting and the cultivation of maize, squash, and native plants (Pollack, 2008). During this period, hierarchy habitations sites which as structured plazas and substructure mounds (Lewis et al., 1998). There is also a transition into a more political organization with villages, farmsteads, and cemeteries. Fort Ancient societies may have differed from Mississippian because they exploited the more variable resource base of the central and upper Ohio River Valley that included the uplands as well as the fertile bottomlands (Muller, 1986:260).

The Green River Lake Project area has nine sites dating to the Mississippian/Fort Ancient period.

2.2.12.2 Historic Setting

Pollack (2008) divides the Historic Setting of Kentucky into the following temporal units: Pre-settlement exploration (?-1775); Early Settlement (1775-1820/1830); Antebellum (1820/1830-1861); Civil War (1861-1865); Postbellum Readjustment and Industrialization (1865-1915); and the Industrial and Commercial Consolidation (1915-1945). McBride and McBride (2008) details each of the periods within the Commonwealth of Kentucky.

Adair County was formed from Green County in 1801. The County was named for General John Adair, former Governor of Kentucky, and noted Indian fighter, and military leader of the war of 1812. He also served in the U.S. Senate and House of Representatives. The County seat is Columbia, which was settled around 1800 (Powell, 1989). Taylor County, one of six named for U.S. Presidents, was also taken from Green County in 1848. It was named for President General Zachary Taylor, who fought in the War of 1812, Indian campaigns, and in the Mexican War.

Early settlement in the area was generally restricted to the stations for protection from hostile Indian raids. No early stations existed in the Taylor County area, however, several fortifications and stations existed in Green County to the east, and Casey County to the west. Allison (1972) relates that, in 1779, Colonel William Casey of Frederic County, Virginia entered Kentucky with other settlers. He resided in Lincoln County but hunted at the headwaters of Green River until 1789. At that time, he, along with Captain John Butler and Major Nathan Montgomery, led a party of thirty families to establish a settlement south of Green River. They crossed Casey's Creek and built two large blockhouses near a large spring and surrounded them with a stockade. The settlement was named Casey's Station. The site of this station is said to be on the James Callison farm. The original Casey's Station was located on Russell Creek, and later a second was built to the south near present day Bliss on Butler Creek (Allison, 1972:36).

Other early stations in the region include Pitmans Station, which was established in 1779-1780 (Allison, 1972). A fortification was also located on Pitmans Creek approximately 2.5 miles (4 kilometers) from Greensburg at the "Narrows", and three quarters of a mile from Pitmans Old Station. Glovers Station was located at the present site of the city of Greensburg and was built in 1780. Skaggs Station, also known as "Shank Painter", was located to the southeast of Greensburg (Allison, 1972). Hostile Indian attacks in Kentucky ceased around 1795 (McBride and McBride, 2008).

The area grew rapidly during the early part of the nineteenth century, due in part to the award of land grants stemming from service in the Revolutionary War. It has been estimated that during this early period, 100-125 thousand immigrants entered the area, with the influx peaking around 1820. The population of the area at this time accounted for one fourth of the state's total (Bladen, 1984:94). Seventy percent of the immigrants came to the area from Virginia. Others originated from North Carolina, Maryland, and Pennsylvania. Of these, over eighty percent were of English, Scottish, Welsh, or Irish nationality (Kleber et al., 1992). In 1869-70, 150 farmers from Pennsylvania settled in the county (Collins, 1847).

Two Union army camps were established in Taylor County during the Civil War. The first, called Camp Hobson, was established at the Green River Bridge, and was a stationary camp charged with guarding the bridge. The second camp, known as Camp Andy Johnson, was moved between Greensburg and Campbellsville as a means of deterring guerilla activity in the area. A number of men from Taylor County enlisted in the Union Army and served in the 13th and 27th Kentucky infantries and in the 6th Kentucky

Cavalry. Other men joined the Confederate cause and served under Gen. John Hunt Morgan in the 3rd Confederate Cavalry.

In 1969, the USACE impounded the Green River for the creation of Green River Lake. The dam and lake were constructed to control downstream flooding on the Green and Ohio rivers. Whole or partial towns of Elkhorn, Knifley, Neatsville, and Yuma were moved for the creation of the reservoir. The lake area covers approximately 34,000 acres.

2.2.12.3 Previous Archaeological Investigation within Green River Lake

Numerous archaeological investigations have occurred within the lake boundaries from the time the lake was constructed in the 1960s to the present. Table 6 identifies surveys conducted that did not identify any cultural resources.

Table 6. Previous Archaeological Investigations within Green River Lake Fee Title Boundaries

Author	Date	Title
Bader, Anne T.	1993	*A Phase I Archaeological Reconnaissance of 20 Acres of Proposed Restaurant and Cabin Sites at Emerald Isle Marina, Green River Lake, Taylor County, Kentucky*
Bader, Anne T.	1995	*A Phase I Archaeological Reconnaissance of Ten Acres at Holmes Bend and a Phase II Evaluation of the Holmes Bend Site (15AD86) Green River Lake, Adair County, Kentucky*
Ball, Donald B.	2001	*A Phase I Cultural Resources Reconnaissance of Two Proposed Marina Utility Line Routes at Green River Lake, Taylor County, Kentucky*
Ball, Donald B	2002	*Phase I Cultural Resources Reconnaissance of Two Proposed Sewer Line Routes at Smith Ridge Recreation Area, Green River Lake, Taylor County, Kentucky*
Ball, Donald B.	2002	*Phase I Cultural Resources Reconnaissance of a Proposed Waterline Easement at Smith Ridge Recreation Area, Green River Lake, Taylor County, Kentucky*
Ball, Donald B.	2002	*A Phase I Cultural Resources Reconnaissance of Four Proposed Improvement Projects at Green River Lake, Taylor and Adair Counties, Kentucky*
Ball, Donald B.	2002	*A Phase I Cultural Resources Reconnaissance of Two Proposed Sewage Lagoons and Related Pipeline Routes at Holmes Bend Recreation Area, Green River Lake, Adair County, Kentucky*
Batlz, Christopher; Orloff Miller; and Jeanne Harris	1999	*Final: Phase I Archaeological Field Reconnaissance of the Green River Lake Shoreline Fluctuation Zone, in Adair and Taylor Counties, Kentucky.*
Baltz, Christopher J.	2004	*A Phase I Archaeological Survey of a Proposed Flush Toilet Near the Green River Lake Visitors' Center, Taylor County, Kentucky*
Davis, Daniel B.	1999	*A Phase I Archaeological Survey of a 60-Acre Tract for the Green River Lake State Park near Campbellsville, Taylor County, Kentucky*

Author	Date	Title
Duffield, Lathel F.	1966	*The Robert Site: A Stratified Archaic Site in the Green River Reservoir, South Central Kentucky*
Guffey, Jennifer	2022	*Archaeological Survey for the Proposed Pike Ridge Shower house Construction, Green River Lake, Taylor County, Kentucky*
Guffey, Jennifer	2022	*Proposed Demolition of the Blackberry Point Comfort Station at the Smith Ridge Recreation Area, Taylor County, Kentucky*
Hanson, Lee H. and Robert C. Dunnell	1964	*Archaeological Survey of the Green River Reservoir*
Hemberger, Jan Maire	1986	*An Archaeological Reconnaissance of 165.43 Acres Proposed for Disposal at Green River Lake Project, Adair and Taylor Counties, Kentucky*
Loughlin, Michael L, Andrew Madison, Rebecca Madison, Katie Becraft, and Melissa Zabecki	2003	*A Phase I Archaeological Survey of a 600-Acre Parcel for the Campbellsville- Taylor County Park Board, Taylor County, Kentucky.*
Prybylski, Matthew and Anne Bader	2006	*Phase I Archaeological Survey for a Proposed Waterline at the Green River Lake Visitors Center Taylor County, Kentucky*
Schlard, Eric	2011	*An Archaeological Assessment of 13 Proposed Wetland Units on the Green River Wildlife Management Area, Adair and Taylor County, Kentucky*
Schock, Jack M.	1982	*An Archaeological Reconnaissance of a Proposed Hydroelectric Plant Site on 98 Ares at Green River Lake Dam in Southern Taylor County, Kentucky.*
Schock, Jack M.	1986	*Archaeological Testing at 15Ta9 in the Green River Reservoir State Park near Campbellsville in Taylor County- "A Supplement to the Original Survey Report".*
Stallings, Rickard and Nancy Ross-Stallings	1991	*A Phase I Cultural Resources Survey of a 2000 Foot Access Road and Two Water Pipelines Located in Adair County, Kentucky. Project 91-11*
Venter, Marcie L; Christopher Gunn; and Eric Schlarb	2009	*Combined Phase I Archaeological Survey and Phase II Evaluation of 15TA120 and 15TA122 Associated with Proposed Sewer Line Installation in Green River Lake State Park in Taylor County, Kentucky*

2.2.12.4 Recorded Cultural Resources

Currently, there are 152 archeological sites that have been recorded at Green River Lake. A single archaeological site that is an Early Archaic and Historic multiple component site and is considered eligible for listing on the National Register Historic Places. Specific locations of known cultural sites are not identified in the Master Plan in an effort to help protect and preserve them.

2.2.12.5 Long-term Cultural Resource Objectives

As funding allows, a Cultural Resources Management Plan (CRMP) shall be developed and incorporated into the Operational Management Plan in accordance with EP 1130-2-540. The purpose of the CRMP is to provide a comprehensive program to direct the historic preservation activities and objectives at Green River Lake. A partial inventory of cultural resources at Green River Lake has been completed in compliance with Section 110 of the National Historic Preservation Act (NHPA). In accordance with Section 106 of the NHPA, any proposed ground-disturbing activities or projects, such as those described in this Master Plan or those proposed in the future by others for right-of-way easements or other undertakings, will require coordination with the Kentucky State Historic Preservation Office (KY-SHPO) and federally recognized Tribes to locate and evaluate potential impacts to historic and prehistoric resources. Resources determined eligible for the NRHP must be protected from proposed project impacts or the impacts must be mitigated. All future cultural resource investigations at Green River Lake must be coordinated with the KY-SHPO and federally recognized Tribes to ensure compliance with the NHPA, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act.

2.2.12.6 Implications of Historic Resource Development

Prior to the implementation of any ground disturbing activity or federal undertaking, proposed actions shall comply with Section 106 of the NHPA. A federal undertaking, as defined by 36 CFR Part 800.16(y), is "…any project, activity, or program funded in whole or part under the direct or indirect jurisdiction of a Federal Agency, including those carried out by or on behalf of a Federal Agency; those carried out with Federal Assistance; and those requiring a Federal permit, license, or approval." Section 106 compliance shall be conducted by USACE. In the event of unanticipated historic or prehistoric resources are encountered, all work must cease immediately and the USACE archaeologist shall be contacted before work may resume.

2.2.13 Interpretation/Visual Qualities

Shaped by erosion activity of the Green River, the Project area boasts a great variety of terrain ranging from gradual slopes to steep ravines which supports diverse plant and animal communities. There are numerous major creeks that make up the surrounding watershed which, when taken with both the Green River and Green River Lake, surrounding grasslands, large contiguous stands of deciduous and evergreen forest, farmlands and agricultural areas, karst topography, and intensively managed areas provide significant natural biological and topographical diversity. Green River Lake has views of the rolling hills found in the bluegrass including panoramic views of the lake and tailwater from the dam and visitor center interpretive area. The habitats of the area offer opportunities for wildlife viewing including that of deer, turkey, various songbirds and waterfowl, bald eagle, and osprey.

2.2.14 Demographics

While Kentucky's population is steadily growing, it is at a slower rate than much of the country. According to the 2020 Census, the population in Kentucky has increased by 3% to 4,505,836 compared to the United States which grew by 6.3% since 2010 (Kentucky State Data Center, 2016).

2.2.14.1 Zone of Influence

The USEPA EJScreen tool (https://www.epa.gov/ejscreen) was utilized to evaluate the demographics and environmental justice variables for the area encompassing the Project. Within this Master Plan, the primary zone of influence refers to counties within 30 minutes of travel from the Project and the secondary zone of influence refers to counties within 30-60 minutes of travel from the Project. The Green River Lake zone of influence includes the 16 counties shown in Figure 8 below.

Figure 8 further breaks down the zones of influence into three drive-times: less than 30 minutes (color coded in green), 30-45 minutes (color coded in yellow), and 45 to 60 minutes (color coded in red). The green areas correspond to the primary zone of influence and the red and yellow areas correspond to the secondary zone of influence.

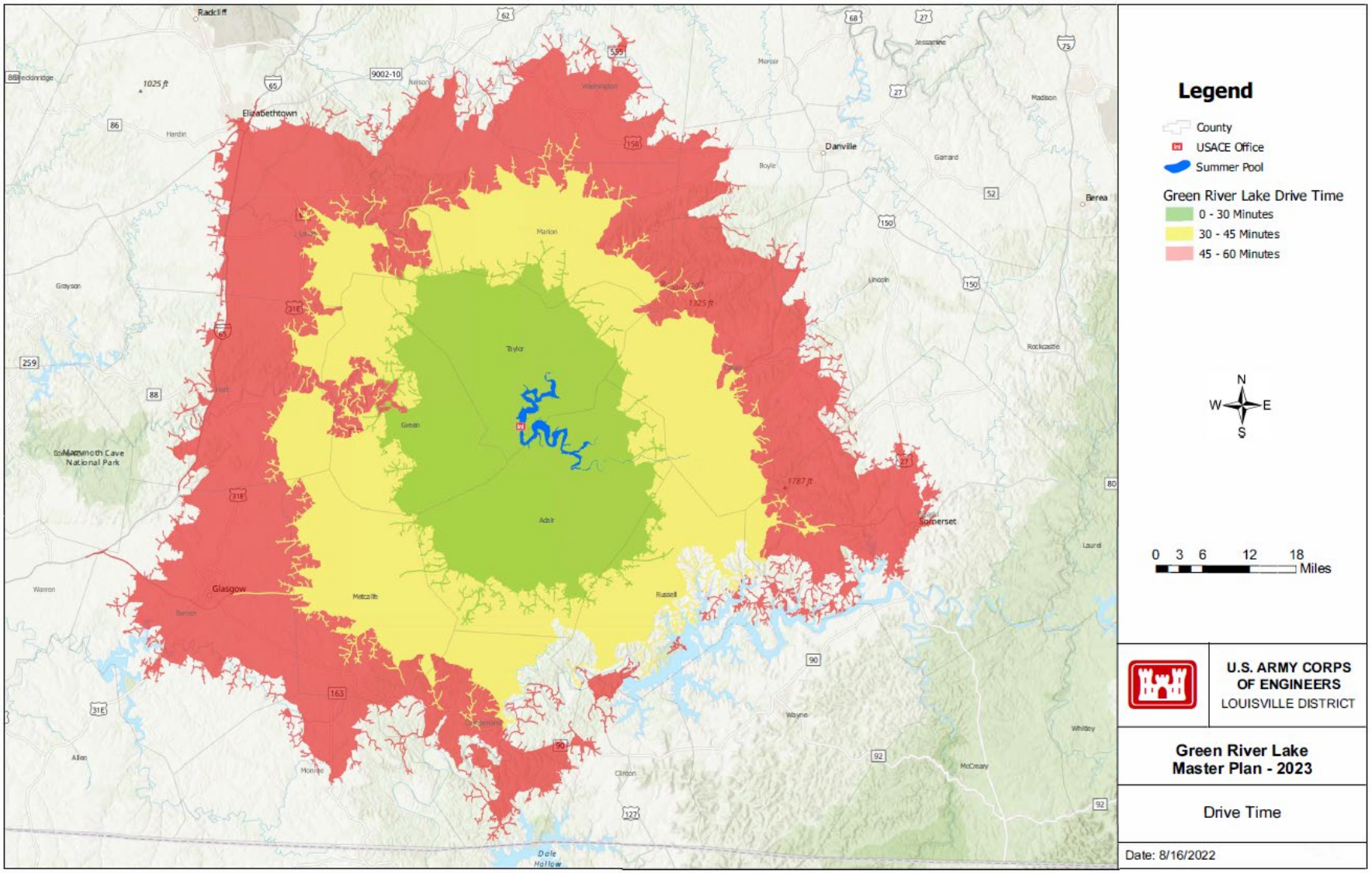

Figure 8. Drive times for Green River Lake zone of influence

2.2.14.2 Local Population

Between 2015 and 2040, the population of the Commonwealth is expected to increase by 10.4% (from 4,425,092 in 2015 to 4,886,381 in 2040) (Kentucky State Data Center). Consistent with population trends across the country, the counties in the Commonwealth that experienced growth tended to be in or around urban areas since 2010 (Kentucky SCORP, 2019).

Table 7 contains 2020 populations information and the projected population growth for counties within the zone of influence of Green River Lake through 2040 (zones of influence are discussed in the previous section). Hardin County is the most populous county in the Green River area of influence with a population of 110,702 in 2020. Cumberland County is the least populated with a population of 5,888 people in 2020.

Table 7. 2020 Populations and population projections for the Green River Lake zone of influence

		Projections				
County	**Census 2020**	**2025**	**2030**	**2035**	**2040**	**% Change 2020-2040**
Adair	18,903	19,213	19,145	18,963	18,711	-1.0
Barren	44,485	46,580	47,943	49,211	50,329	13.1
Boyle	30,614	31,232	31,810	32,170	32,431	5.9
Casey	15,941	15,167	14,729	14,237	13,725	-13.9
Cumberland	5,888	6,358	6,111	5,833	5,550	-5.7
Green	11,107	10,367	9,971	9,542	9,093	-18.1
Hardin	110,702	118,413	124,137	129,638	134,901	18.0
Hart	19,288	18,836	18,935	19,955	18,889	-2.1
Larue	14,867	14,348	14,309	14,197	14,040	-5.6
Lincoln	24,275	24,035	23,576	22,975	22,319	-8.1
Marion	19,581	19,824	19,929	19,961	19,909	1.7
Metcalfe	10,286	9,595	9,390	9,154	8,900	-13.5
Monroe	11,338	9,896	9,474	9,021	8,567	-24.4
Pulaski	65,034	67,345	68,854	70,180	71,296	9.6
Russel	17,991	18,178	18,303	18,362	18,410	2.3
Taylor	26,023	26,446	26,890	27,298	27,718	6.5
Washington	12,027	12,656	12,904	13,079	13,198	9.7

Source: 2020 Census Data and Kentucky State Data Center, 2016; U.S. Census Bureau; Indiana Business Research Center

Nine of the 17 counties listed are projected to experience a decline in population from 2020 to 2040 with the largest decrease in Monroe County of -24.4%. Eight of the counties are expected to increase in population with Hardin County having the largest increase of 18.1%. The city of Elizabethtown in Hardin County, as well as a few other larger metropolitan areas, exists within the zone of influence which have the potential to influence visitation of the lake. Elizabethtown (population 31,394) is 40 air miles to the northwest. The city of Glasgow in Barren County has a population of 15,014 and is about 37 miles west of the lake. The city of Somerset in Pulaski County is 38 miles east of the lake with a population of 11,924. The city of Campbellsville in Taylor County is the nearest city, about 5 miles north of Green River

Lake, and has a population of 11,426. Between 2010-2040, the populations of Barren, Pulaski and Taylor Counties are expected to grow by 13.1%, 9.6% and 6.5%, respectively (Kentucky State Data Center).

The Census Bureau estimated Kentucky's 2019 population to be about 51% female and 49% male with a median age of 38.9 years. Currently, the age group of 65 years or older accounts for about 17% of the total population of Kentucky (U.S. Census Bureau). Between the 2000 and 2010 Kentucky census, the African American population increased from 293,639 to 333,075 (13.4%), the Asian population increased from 29,368 to 48,338 (64.6%) and the Hispanic population increased from 59,939 to 132,836 (121.6%) (Kentucky State Data Center). Between 2015 and 2040, the white population in Kentucky is projected to decrease by 0.25%, while the black, non-Hispanic, and Hispanic populations are projected to increase by 20.2%, 114.3%, and 150.7%, respectively (Kentucky State Data Center). Table 8 below shows the five most populous counties in the zone of influence by race.

Table 8. Population by race for the five most populous counties in the zone of influence

County	Race	2020 Population	% of County Population
Hardin	White Alone, not Hispanic or Latino	81,085	73.8
	African American	13,825	12.6
	American Indian and Alaska Native	490	0.4
	Asian	2,277	2.1
	Native Hawaiian and Pacific Islander	421	0.4
	Some Other Race	2,330	2.1
	Two or More Races	9,400	8.6
Pulaski	White Alone, not Hispanic or Latino	60,111	92.4
	African American	695	1.1
	American Indian and Alaska Native	210	0.3
	Asian	440	0.7
	Native Hawaiian and Pacific Islander	13	0.0
	Some Other Race	806	1.2
	Two or More Races	2,759	4.2
Barren	White Alone, not Hispanic or Latino	39,270	88.3
	African American	1,724	3.9
	American Indian and Alaska Native	147	0.3
	Asian	260	0.6
	Native Hawaiian and Pacific Islander	54	0.1
	Some Other Race	802	1.8
	Two or More Races	2,228	5.0
Boyle	White Alone, not Hispanic or Latino	25,365	82.9
	African American	2,194	7.2
	American Indian and Alaska Native	61	0.2
	Asian	361	1.2
	Native Hawaiian and Pacific Islander	4	0.0
	Some Other Race	619	2.0
	Two or More Races	2,010	6.6

County	Race	2020 Population	% of County Population
Taylor	White Alone, not Hispanic or Latino	22,938	88.1
	African American	1,255	4.8
	American Indian and Alaska Native	32	0.1
	Asian	246	0.9
	Native Hawaiian and Pacific Islander	10	0.0
	Some Other Race	379	1.5
	Two or More Races	1,163	4.5

According to the 2019 American Community Survey, 13.4% of the total U.S. population is below poverty level. According to the 2020 census, 16.6% of Kentuckians live below the poverty level. In comparison, 12 out of 18 counties in the Green River Lake primary zone of influence have a higher percentage of the population below the poverty level. The percentage populations living below poverty for the zone of influence ranges from 11.6% (Hardin County) to 26.4% (Casey County). The counties with the highest percentage of the population below poverty are Casey County (26.4%), Barren County (25.2%) and Monroe County (24.7%). The counties with the lowest percentage of the population below poverty are Hardin County (11.6%), Washington County (14.6), Boyle County (15.1%) and Larue County (15.7%) (2020 U.S. Census Data).

2.2.14.3 Environmental Justice

Executive Order 12898 *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (Exec. Order No. 12898, 1994) requires that, to the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands.

Executive Order 13985 *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government* (Exec. Order No. 13985, 2021) promotes racial equity and support for underserved communities and allocation of resources to address the historic failure to invest sufficiently, justly, and equally in underserved communities, as well as, individuals from those communities.

Executive Order 14008 *Tackling the Climate Crisis at Home and Abroad* (Exec. Order No. 14008, 2021) established the Justice40 Initiative with the goal that 40 percent of the overall benefits of certain investments, including climate change and clean water infrastructure flow to disadvantaged communities.

The Council on Environmental Quality (CEQ) created the Climate and Economic Justice Screening Tool (CEJST) to help Federal agencies identify disadvantaged communities that have been historically marginalized, underserved, and/or overburdened by pollution. The tool identifies these communities through publicly available nationally consistent datasets. Under the current formula, a census tract will be identified as “disadvantaged” in one or more categories of criteria if the census tract is above the

threshold for one or more environmental or climate indicators and the census tract is above the threshold for the socioeconomic indicators. A search of the Climate and Economic Justice Screening Tool for an area encompassing the Project fee lands (Census Tracts 21001970100 and 21217920500) indicates that this area is identified as a "disadvantaged" community because it meets more than one burden threshold and the associated socioeconomic threshold. Factors that indicate this community is disadvantaged include a relatively high proportion of households living in poverty, and high rates of heart disease, and transportation barriers.

The U.S. Environmental Protection Agency's (EPA) EJscreen tool was also used to obtain the most current American Community Survey (ACS) data to evaluate the demographics and environmental justice variables for all areas within 20 miles of the Green River Lake Dam (Table 9).

Table 9. Percentages of demographic and environmental justice variables within 20 miles of Green River Lake (pop. 71,279)

Selected Variables	Value	State Avg.	%ile in State	EPA Region (4) Avg.	%ile in EPA Region	USA Avg.	%ile in USA
People of Color	8%	15%	47	39%	14	40%	17
Low Income	44%	37%	65	35%	68	31%	74
Unemployment Rate	5%	6%	59	6%	58	5%	61
Linguistically Isolated	1%	1%	74	3%	53	5%	46
Less Than High School Education	19%	14%	72	13%	76	12%	77
Under Age 5	6%	6%	49	6%	53	6%	51
Over Age 64	18%	16%	66	17%	65	16%	68

2.2.14.4 Economic Impact of Recreation Related Spending

The USACE recognizes the importance of Green River Lake and the activities on USACE lands and waters as being an important part of the local economy. Besides the economic savings through flood risk management and development advantages through water supply, businesses can see investment opportunities, and people are drawn to the natural areas surrounding USACE lakes, as is evidenced by the growing number of residents adjacent to USACE properties. Nationally, the USACE lakes attract about 350 million recreation visits every year, with direct economic benefits on local economies within a 30-mile radius. Table 10 outlines the estimated economic benefits of Green River Lake and surrounding communities from FY 2016 and 2019.

Table 10. Estimated economic benefits of Green River Lake

Economic Benefits	
Economic Data in FY 16	**Economic Data in FY 19**
· $12,889,211 in visitor spending within 30 miles of Green River Lake.	· $40,669,872 in visitor spending within 30 miles of Green River Lake.
· $8,372,206 in sales within 30 miles of Green River Lake.	· $19,597,623 in sales within 30 miles of Green River Lake.
· 108 jobs within 30 miles of Green River Lake.	· 343 jobs within 30 miles of Green River Lake.

Economic Benefits	
Economic Data in FY 16	**Economic Data in FY 19**
· $2,590,574 in labor income within 30 miles of Green River Lake.	· $8,696,068 in labor income within 30 miles of Green River Lake.
· $3,883,741 in value added within 30 miles of Green River Lake.	· $10,913,861 in value added within 30 miles of Green River Lake.
· $2,399,824 in National Economic Development Benefits.	· $9,240,052 in National Economic Development Benefits.
With multiplier effects, visitor trip spending resulted in:	**With multiplier effects, visitor trip spending resulted in:**
· $11,667,426 in total sales.	· $27,457,154 in total sales.
· 134 jobs.	· 417 jobs
· $3,556,041 in labor income.	· $10,859,775 in labor income.
· $5,621,765 in value added (wages & salaries, payroll benefits, profits, rents, and indirect business taxes).	· $14,783,450 in value added (wages & salaries, payroll benefits, profits, rents, and indirect business taxes).
Benefits in Perspective	
The money spent by visitors to USACE lakes on trip expenses adds to the local and national economies by supporting jobs and generating income. Visitor spending represents a sizable component of the economy in many communities around USACE lakes.	

Source: https://www.iwr.usace.army.mil/Missions/Value-to-the-Nation/

2.3 RECREATION FACILITIES, ACTIVITIES, AND NEEDS

Green River Lake is the primary location for water-related recreation in the area, providing the public with a location for boating, sailing, canoeing/kayaking, paddle boarding, and swimming. Project visitors may pursue a wide variety of interests at the Project including camping, hunting, fishing, picnicking, hiking, bird watching, horseback riding and bicycling.

Periodically, USACE estimates visitation to the Project by activity. Table 11 presents the relative visitation counts by activity and changes in available facilities between FY 2016 and 2019, with nearly 679,000 visitors estimated in 2016 and 1,027,000 visitors estimated in 2019.

In the following tables and figures, “campers” refer to visitors staying at USACE-managed campgrounds and “overnight visitors” refer to those staying at campgrounds not managed by USACE.

Table 11. Social benefits 2016 and 2019

Social Benefits	
Facilities in FY2016	**Facilities in FY2019**
• 14 Recreation areas	• 14 Recreation areas
• 122 picnic sites	• 132 picnic sites
• 499 camping sites	• 503 camping sites

Social Benefits	
Facilities in FY2016	**Facilities in FY2019**
• 11 playgrounds	• 11 playgrounds
• 4 swimming areas	• 4 swimming areas
• 44 trails	• 44 trails
• 47 trail miles	• 45 trail miles
• 0 fishing docks and piers	• 5 fishing docks and piers
• 12 boat ramps	• 12 boat ramps
• 642 marina slips	• 748 marina slips
Visits (person-trips) in FY 2016	**Visits (person-trips) in FY 2019**
• 678,714 in total	• 1,026,654 in total
• 22,554 picnickers	• 169,318 picnickers
• 14,904 campers	• 356,923 campers/overnight visitors
• 87,750 swimmers	• 223,793 swimmers
• 21,012 water skiers	• 106,582 walkers/hikers/joggers
• 213,279 boaters	• 147,268 boaters
• 213,088 sightseers	• 193,418 sightseers
• 214,497 anglers	• 103,387 anglers
• 6,827 hunters	• 43,056 special event attendees
• 44,777 others	• 35,732 others
Public outreach in FY 2016	**Public outreach in FY 2019**
• 45,636 public outreach contacts	• 12,349 public outreach contacts
Benefits in Perspective	
Recreation experiences increase motivation to learn more about the environment; increase understanding and awareness of environmental issues; and increase sensitivity to the environment.	

2.3.1 Visitation Profile

The following tables are derived from the USACE Visitation Estimating and Reporting System (VERS) data source; the numbers in Table 12, above, are from Value to the Nation Fast Facts. The discrepancy between the VERS data and the Value to the Nation Fast Facts is due to the use of different data-gathering techniques. The numbers in the following figures are derived from the VERS Project visitation numbers.

National and regional variables affect the way people decide to spend their leisure time. For that reason, Green River Lake visitation can fluctuate from year to year. Table 12 presents historic visitation data dating from FY 2014 to FY 2021. The visitation comparison from 2014 to 2021 shows the last year data that was obtained was the highest visitation the lake has experienced since reliable visitation records have been collected. The 2020 lower visitation numbers coincide with the COVID-19 pandemic shutdowns. Other than this anomaly, the trend has shown increased visitation yearly.

Table 12. Visitation counts for 2014-2021

Fiscal Year	Project Visitation
2014	798,012
2015	846,262
2016	749,197
2017	704,724
2018	919,337
2019	1,026,654
2020	853,030
2021	1,228,249

Visitation also varies by overnight visits versus day use visits to Green River Lake.
Figure 9, below, presents average historic day use and overnight visits from FY 2014 to FY 2021.

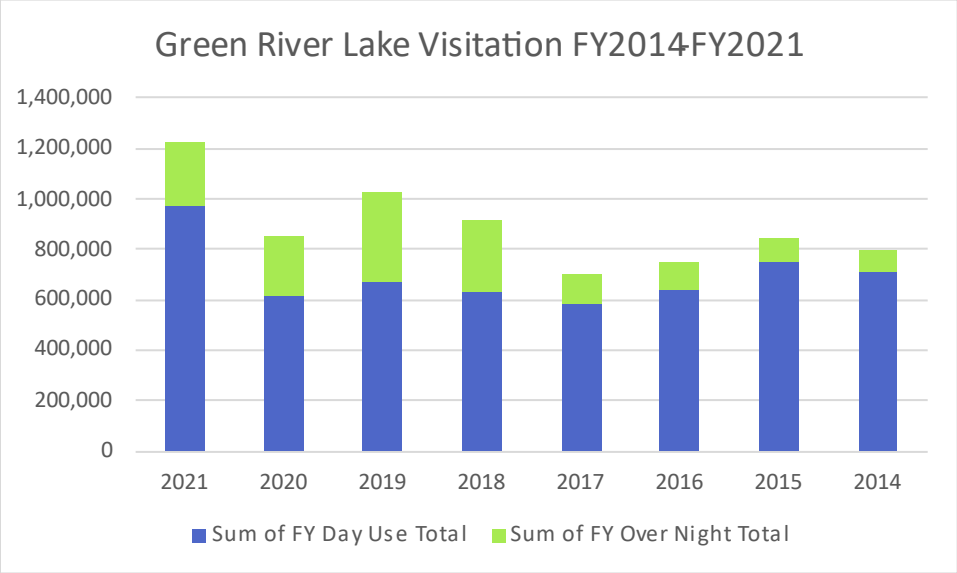

Figure 9. Average day use and overnight visits 2014-2021

Visitation also varies from lake to lake within the Louisville District. Figure 10 compares the average overnight and day use visits of the lakes in the Louisville District from FY 2014 to FY 2020. Out of the 24 lakes in the Louisville District, Green River Lake ranked sixth in total visitation, third in overnight visits, and eighth in day use visits.

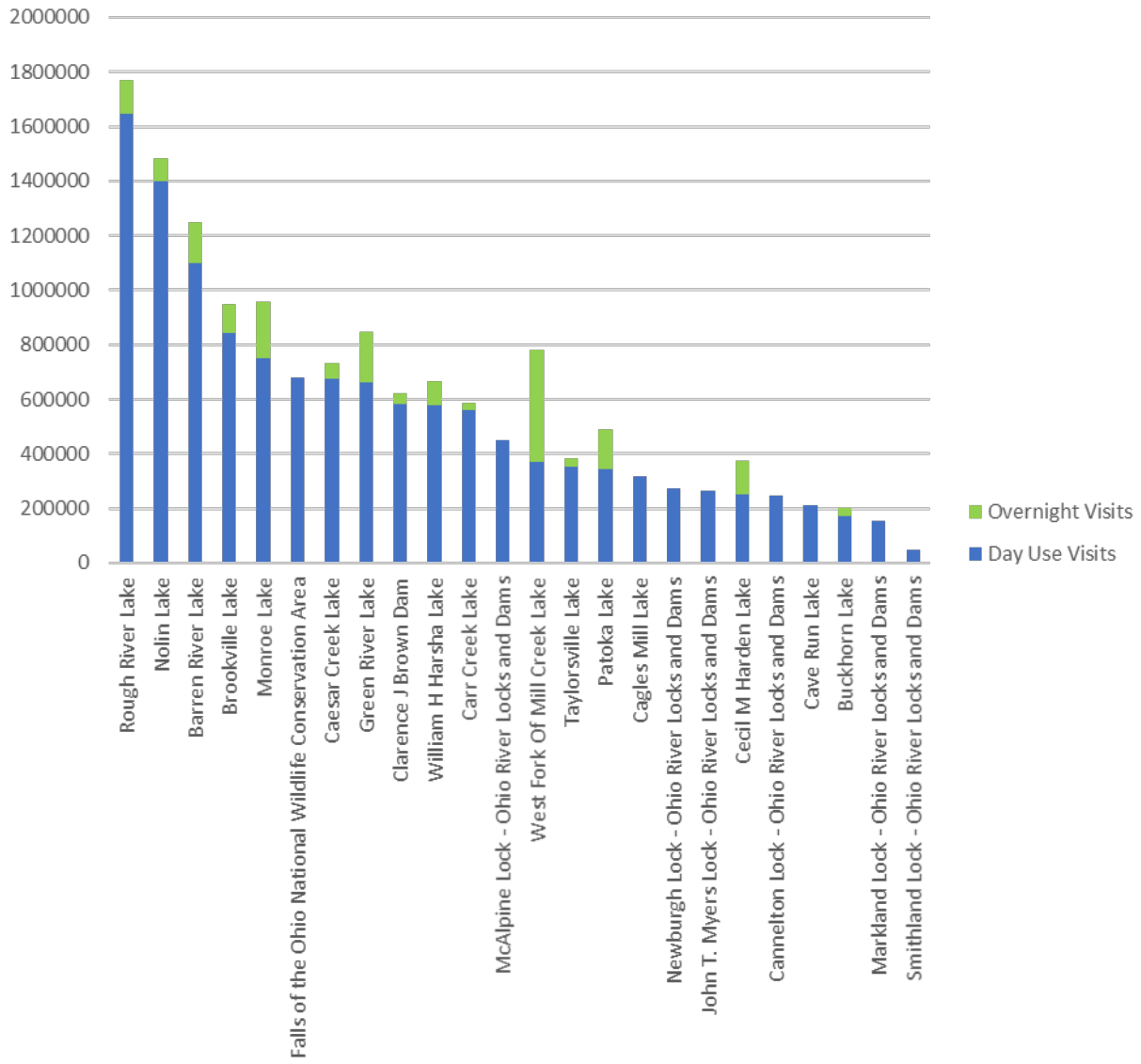

Figure 10. Average overnight and day use visits in Louisville District Lake FY 2014-2020

Visitation also varies in the Regional Green River Area, which includes Green River Lake, Barren River Lake, Nolin River Lake, and Rough River Lake.

Figure 11, below, compares the average overnight and day use visits of the lakes in the Regional Green River Area from FY 2015 to FY 2021. Of the four Lakes, Green River Lake received the most overnight visitors, but the lowest combined total of overnight and day use visits.

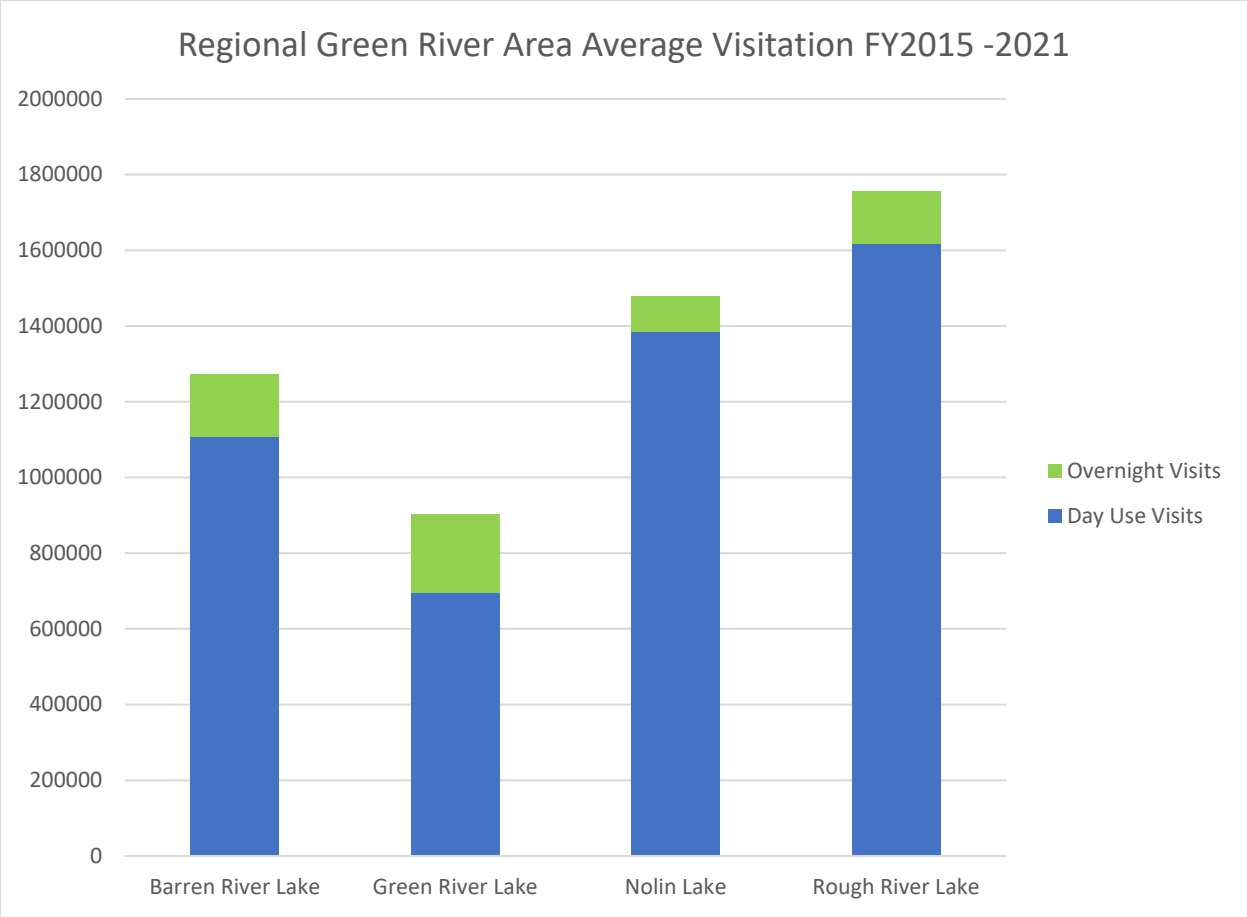

Figure 11. Overnight and day visits for the Regional Green River Area

2.3.2 Recreation Areas and Facilities

Recreation areas at Green River Lake have been developed to provide both overnight and day-use opportunities. Of the 14 recreation areas at the Project, eight are operated by USACE and the remainder are leased to state government or private entities. Arnolds Landing, Butler Creek, Emerald Isle Resort, Green River Lake State Park, the Wildlife Management Area access points and the Holmes Bend Resort are managed by other entities such as the state or private owners.

A description of current land use classifications, the recreation areas at Green River Lake and recreational development proposed by this plan are presented in Section 5. Table 13 lists facilities and activities by recreation area at Green River Lake.

Table 13. Facilities and activities by recreation area at Green River Lake

Recreation Area	Camping	Showers	Boat Ramps	Marina	Fishing Facilities	Picnic	Playground	Swimming Area	Trails	Managing Agency
Arnolds Landing			■			■				
Butler Creek			■			■				
Dam Area						■	■		■	USACE
Dam Area – Site 1 Day Use			■		■	■				USACE
Emerald Isle Resort			■	■	■					
Green River Lake State Park	■	■	■	■	■	■	■	■	■	State
WMA access points			■		■					State
Holmes Bend	■	■	■		■	■	■	■	■	USACE
Holmes Bend Resort		■		■	■					
Pikes Ridge	■	■	■		■	■	■	■	■	USACE
Smith Ridge	■	■	■		■	■	■	■	■	USACE
Tailwater			■		■	■	■			USACE
Visitor Center						■	■		■	USACE
Wilson Creek*	*									USACE

Legend: ■ *Indicates amenity is present at recreation area*
□ *Indicates amenity is not present at recreation area*

**Camping at Wilson Creek to close after Fall 2023*

2.3.3 Recreation Analysis: Trends

A general motivation behind the resource objectives described in this Master Plan is to enhance visitors' recreational experience at Green River Lake. The resources objectives were developed with input from stakeholders and the public, as well as, the experience of lake staff (further details provided in Section 3.1.2). As such, the resource objectives reflect the trends and needs of those directly involved with the lake's recreation facilities.

Recreational trends vary from state to state and region to region. Kentucky's 2019 Statewide Comprehensive Outdoor Recreation Plan (SCORP) was developed to assist recreation providers and state funding offices to strategically work towards delivering recreational opportunities and facilities that Kentuckians want and that create outdoor recreational experiences that provide personal, social, health, and economic benefits. The planning horizon for this SCORP is 2020 through 2025. The 2020 - 2025 Kentucky SCORP presents a summary and analysis of the state's outdoor recreation resources with ten strategic goals:

- Expand and improve the quantity and variety of outdoor recreation opportunities, with emphasis on areas and population segments where these are most lacking.
- Develop and promote the recreational opportunities that are associated with tourism.
- Implement an integrated strategy of trail development utilizing the funding resources and selection criteria of the Recreational Trails Program Fund, Land and Water Conservation Fund, Transportation Enhancement funds, and other sources.
- Facilitate the public's awareness and Statewide Outdoor Recreation Goals/use of Kentucky's outdoor recreation resources, facilities, programs, and promote the social and health benefits of their use.
- Preserve the state's natural, environmental, historical, and cultural assets.
- Establish and maintain a strong element of public participation in the planning, development, and management of outdoor recreation facilities and programs.
- Increase and promote coordination and definition of roles among the various federal, state, regional, local, and private agencies that are responsible for the planning, programming, and implementation of recreation facilities and opportunities.
- Make the most efficient use of existing recreation facilities and resources.
- Fully exploit all existing funding resources for recreation and seek to develop other funding possibilities.
- Promote the use of SCORP as a planning tool and the progressive implantation of its identified objectives.

A public participation survey was completed in 2019 in support of the development of the 2019 Kentucky SCORP. Most respondents indicated that they had visited a beach, lake, or river (89.3%), walked for pleasure or exercised or leisurely enjoyed the outdoors (84.2%), or visited parks or historical sites (80.1%). Roughly two out of every three respondents indicated that they viewed scenery (67.5%), attended an outdoor fair or festival (62.7%), went swimming, or hiked on trails (56.0%). Other notable activities respondents listed included driving for pleasure (49.5%) and fishing in freshwater from the bank or from the pier (47.8%). Figure 12 lists the top 16 recreation activities in order of most popular to least popular and the percentage of respondents who had participated in each activity.

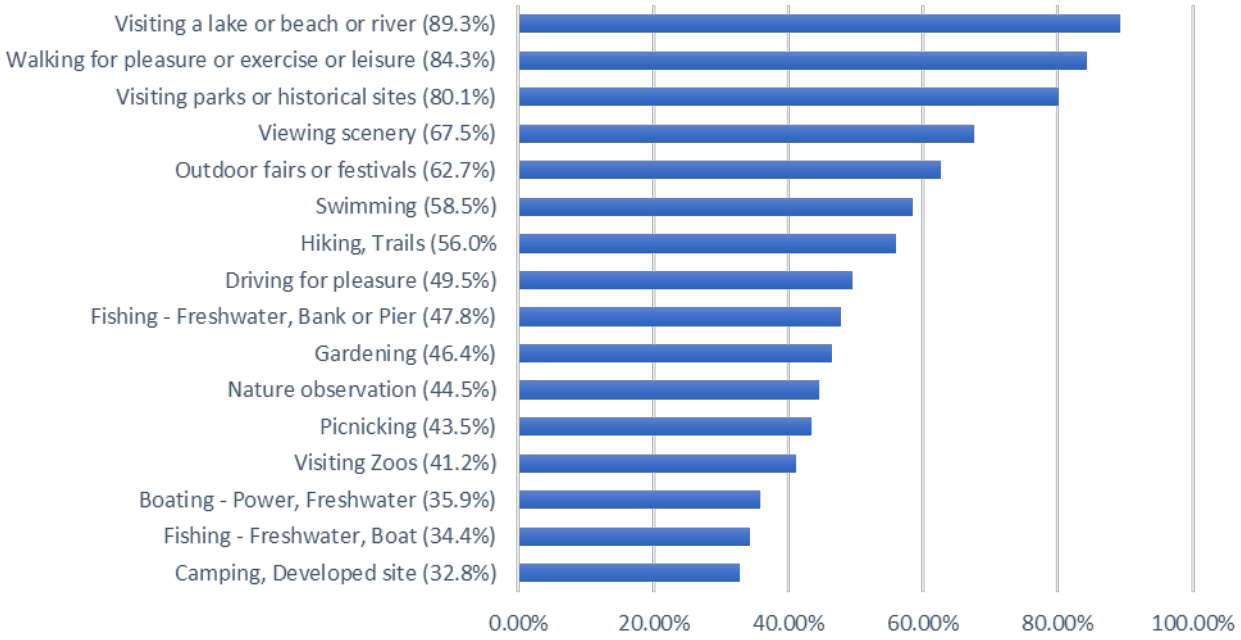

Figure 12. Top 16 recreation activities participated in by SCORP survey respondents

This survey asked participants to identify the types of facilities they had visited over the past year. Most respondents indicated that they attended local (87.5%) and state (81.4%) parks. Nearly half (47.3%) responded that they had attended a national park or national forest. Approximately one-third (33.6%) attended a mixed-public or private club such as the YMCA or Boys and Girls Club. From the survey respondents provided activities they or another family member in their household participated in over the last five years.

2.3.4 Recreation Analysis: Needs

Green River Lake offers an array of recreational opportunities. The Kentucky SCORP supports the need for hiking, biking, and more water-based outdoor activities in general. USACE recognizes the importance of partnerships for supporting recreational amenities. If future partnerships develop and budgets allow, there could be more opportunities to integrate more facilities to accommodate the public. The activities at the lake are balanced with the primary missions of the Project, namely flood risk management and environmental stewardship.

2.3.5 Recreational Carrying Capacity

Recreational carrying capacity is considered by USACE to ensure that visitors have a high quality and safe recreational experience, and that natural resources are not irreparably damaged. Carrying capacity is a measure of the level of a particular use or activity that can occur without causing public safety issues, unacceptable social conditions, or resource degradation. The carrying capability of the land is determined primarily by the distinct characteristics of the site. These characteristics, both natural and

manmade, are development constraints that often determine the type of facilities that should be provided.

Overcrowding is one social condition that can lead to both unacceptable recreational experiences by the visitor and damaged or destroyed facilities. Presently, USACE staff uses historic visitation data combined with visitor use patterns to monitor land-based recreation areas for overcrowding and capacity use. When visitation trends show patterns of overcrowding, or facilities show signs of degradation, then a more formal review or study may be completed to determine the actual impact and a recommended solution.

Many of the existing recreation facilities often reach capacity on summer weekends, although few occurrences of negative overcrowding or facility degradation have been observed to necessitate the need for a formal land use capacity study. As funding and resources allow, it would be desirable to have additional recreational facilities to relieve high occupancy use. Providing facilities that cater to a variety of interests and different members of the family will encourage visitors to enjoy the lake while preventing overcrowding by creating opportunities for visitors to disperse.

An example of a carrying capacity study at Green River Lake would be a study of the boat recreation and water surface areas at the lake to determine the number of recreational boats the lake can effectively and safely hold at any given time. Other examples of future carrying capacity considerations would be to evaluate the need for more parking or boater access in the more popular recreational areas, such as Holmes Bend, or to evaluate wildlife in the Project area and determine if management of public hunting on USACE lands should include restrictions by species or by area.

USACE will continue to identify possible causes and effects of overcrowding and overuse and apply appropriate best management practices including site management, regulating visitor behavior, and modifying visitor behavior.

2.4 RELATED RECREATIONAL, HISTORICAL, AND CULTURAL AREAS

In addition to Green River Lake, recreationists have several other water-based recreational facilities available within 100 driving miles of the Project. Table 14 lists the other USACE-managed Projects within 100 driving miles of Green River Lake, and Table 15 lists other parks and recreational areas within 100 driving miles of Green River Lake. The acreages were found via internet searches.

Table 14. Other authorized USACE Projects

Other Authorized USACE Projects				
Area	Driving Miles from Green River Lake	Activities	Land Area in Acres	Water Area in Acres
Laurel River Lake	77	Bird watching, hunting, hiking, camping, picnicking, fishing, boating, swimming	581*	5,600

Other Authorized USACE Projects				
Area	Driving Miles from Green River Lake	Activities	Land Area in Acres	Water Area in Acres
Dale Hollow Lake	60	Picnicking, camping, swimming, hiking, fishing, boating	26,965	27,700
Barren River Lake	55	Picnicking, camping, swimming, hiking, fishing, boating	11,500	12,300
Lake Cumberland	40	Fishing, hunting, camping, picnicking, boating, canoeing, hiking	43,600	60,000
Nolin Lake	66	Picnicking, camping, swimming, hiking, fishing, boating	7,619	5,795
Taylorsville Lake	80	Camping, hiking, horseback riding, fishing, boating	12,093	3,050
Rough River Lake	90	Picnicking, camping, swimming, hiking, fishing, boating	4,487	5,100

*Represents only acreage managed by USACE

Table 15. Other recreation areas within 100 driving miles of Green River Lake

*Selected Other Recreation Areas in Vicinity				
Area	**Driving Miles from Green River Lake**	**Activities**	**Total Area in Acres**	**Water Area in Acres**
Jellystone Park, Cave City	50	Camping, picnicking, swimming	-	-
Mammoth Cave National Park	75	Camping, hiking, boating, swimming	52,830	-
Standing Stone State Park (TN)	71	Boating, camping, fishing hiking, swimming	11,000	-
Marion County Wildlife Management Area and State Forest	35	Picnicking, hiking, camping, hunting, horseback riding	1,340	-
Daniel Boone National Forest	109	Hiking, camping, rock climbing, picnicking, swimming, fishing, wildlife viewing, hunting, horseback riding, outdoor learning	2.1 million	-

*Selected Other Recreation Areas in Vicinity				
Area	**Driving Miles from Green River Lake**	**Activities**	**Total Area in Acres**	**Water Area in Acres**
R.F Tarter Wildlife Management Area	28	Hunting and wildlife viewing	1,170	-
Clay Hill Memorial Forest	18	Hiking, outdoor education	305	-
Herrington Lake	69	Camping, boating, swimming, golfing	-	2,335

*List is not comprehensive

2.5 REAL ESTATE AND ACQUISITION POLICY

The Green River Lake Project was authorized by the Flood Control Act of 1938, Pub. L. No. 75-761, 52 Stat. 1215.. The upper guide taking elevation was established at elevation 718 feet mean sea level (MSL), or a line 300 feet from elevation 713 feet MSL, whichever takes the greater amount of land. The flood control pool was set at elevation 713 feet MSL. Numerous taking line deviations were approved during initial acquisition of the Project lands based on a tract-by-tract analysis to avoid relocations of cemeteries, acquisition of improvements, uneconomic remnants, and to run the boundary with existing property lines, roads, and terrain features.

Current fee acreage totals 32,217.74 located in Adair and Taylor Counties, Kentucky, which include 15,992.50 acres in Adair County and 16,225.24 acres in Taylor County.

2.5.1 Disposals

The following real property interests have been disposed.

- 35.63 acres, road easements conveyed to the Fiscal Court of Adair County, Kentucky, by Quitclaim Deed dated December 3, 1970 (all of Tracts 1417E-2, 1440E, 1441E, 1947E-1, 1947E-2, 1948E-1, 1948E-2, 1949E, 1950E, 1951E, 1952E, 1953E, portion of 2238E-3, 2240E-3, 2240E-4, 2500E-2, 2526E-2, 2636E-2, 2800E-4, 2801E, 2802E, 2803E-1, 2803E-2, 2804E, 2805E-2, 2806E, 2807E, and 2808E), subject to the right to flood as necessary within the Project boundary. This disposal occurred in accordance with Relocation Contract No. DA-15-029-CIVENG-66-144.

- 41.39 acres, road easements conveyed to the Fiscal Court of Taylor County, Kentucky by Quitclaim Deed dated July 28, 1971 (all of Tracts 805E, 806E-1, 806E-2, 807E-1, 807E-2, 808E-1, 808E-2, 809E, 1135E-1, 1136E, 1281E, 1282E, 1283E, 1284E, 1285E, 1534E-2,

and 1535E), subject to the right to flood as necessary within the Project boundary. This disposal occurred in accordance with Relocation Contract No. DA-15-029-CIVENG-66-71.

- 1.80 acres, fee conveyed to Billy W. Pyles and Dennie Pyles by Quitclaim Deed dated October 9, 1984 (portion of Tract 2235), reserving a flowage easement below elevation 718 feet MSL and any and all coal, oil, and gas rights.

- 1.14 acres, fee conveyed to Melvin Antle by Quitclaim Deed dated October 29, 1990 (portion of Tract 2120-2).

- 17.37 acres, fee conveyed to Carolyn Campbell by Quitclaim Deed dated December 13, 1990 (all of Tract 1106 and portions of Tracts 1101, 1107, and 1109), reserving a flowage easement below elevation 718 feet MSL (1.05 acres).

- 9.94 acres, fee conveyed to Leland Grant by Quitclaim Deed dated December 13, 1990 (portion of Tract 2639-2), reserving a flowage easement below elevation 718 feet MSL (4.15 acres).

- 20.93 acres, fee conveyed to G&L Construction Company by Quitclaim Deed dated December 20, 1990 (all of Tract 2645 and portions of Tracts 2636 and 2637), reserving a flowage easement below elevation 718 feet MSL (2.66 acres).

- 28.00 acres, fee conveyed to William Warren and Billy Pyles by Quitclaim Deed dated January 7, 1991 (all of Tracts 2211, 2213, 2214, 2215, 2219, 2220, 2221, and portions of 2216, 2217, 2222, 2261 and 2271, reserving a flowage easement below elevation 718 feet MSL (20.97 acres).

- 99.74 acres, fee conveyed to the Commonwealth of Kentucky, Department of Fish and Wildlife Resources, by Quitclaim Deed dated April 2, 1991 (all of Tract 2308 and portions of Tracts 2309, 2312, 2623, 2624, and 2649), as follows:
    - 62.26 acres (Parcel 4), reserving flowage easement over entire area.
    - 37.48 acres (Parcel 5), reserving 31.50 acres flowage easement below elevation 718 MSL

- 183.22 acres, road easements conveyed to the Commonwealth of Kentucky, Kentucky Transportation Cabinet, Department of Highways, Frankfort, Kentucky by Quitclaim Deed dated October 10, 1994 (all of Tracts 907E-2, 932E, 935E, 936E, 937E, 938E, 939E, 940E, 941E, 1040E, 1041E, 1042E, 1121E-2, 1122E-1, 1122E-2, 1123E, 1124E, 1125E, 1126E, 1128E, 1129E, 1130E, 1131E, 1132E, 1133E, 1134E-1, 1134E-2, 1208E-2, 1233E-2, 1233E-3, 1251E, 1252E, 1253E, 1254E, 1255E, 1256E, 1258E, 1266E, 1271E, 1272E, 1273E, 1274E, 1275E, 1278E, 1278E-2, 1279E, 1280E, 1507E-2, 1512E-2, 1524E-2, 1529E, 1913E, 1915E, 1927E, 1928E, 1933E-1, 1933E-2, 1934E, 1935E, 1936E, 1937E-1, 1937E-2, 1938E, 1939E, 1940E, 1941E, 1942E, 1943E, 1944E, 1945E, 1946E, 1954E, 2001E-1, 2001E-2, 2002E-1, 2002E-2, 2025E, 2026E, 2100E, 2118E-2, 2120E-3, 2121E, 2122E, 2123E, 2124E, 2125E, 2126E, 2128E, 2200E-3, 2204E-2, 2208E-2, 2209E-2, 2223E-2,

portions of Tract 2238E-3, 2278E-1, 2279E, 2280E-1, 2281E, 2282E, 2283E, 2284E, 2285E, 2286E-1, 2287E, 2288E, 2506E, 2516E-2, and 2607E), subject to the right to flood as necessary. This disposal occurred in accordance with Relocation Contract No. DA-15-029-CIVENG-65-175.

2.5.2 Outgrants

Outgrants allow use of federally owned land by state and local agencies as well as private corporations and individuals. Outgrants specify what types of activities are allowed on Federal lands and all Federal regulations still apply.

Leases

USACE has issued six leases consisting of 1,530.95 acres at Green River Lake for public park and recreational purposes and for commercial concession purposes.

The USACE leases 1,313 acres of land and water to the Commonwealth of Kentucky, Department of Parks, in Taylor County, Kentucky, under Lease No. DACW27-1-99-032 for public park and recreational purposes. The term of the lease is fifty (50) years, beginning May 1, 1999, and ending April 30, 2049. The Commonwealth of Kentucky, Department of Parks, provides the following services: camp store, campground, playgrounds, basketball court, volleyball court, hiking, horse and bike trails, birding, boat launching ramps, amphitheater, picnic shelter, comfort stations, beach area, model plane airfield, and miniature golf course. The Commonwealth of Kentucky, Department of Parks, has entered into two third-party sublease agreements with Green River Marina, LLC and Tim Horton's Children Foundation, Inc. The marina operator provides the following services: uncovered outdoor seating, store, fishing bait house, fuel station, boat slip rentals (covered and uncovered), and watercraft rentals. Tim Horton's Children Foundation, Inc. subleases 46.2 acres known as Camp Kentahten for the development, construction, and operation of a camp for disadvantaged children that includes a lodge, dining hall, activity building, zipline tower, beach area, amphitheater, two shelters, and an archery range.

The USACE leases 33 acres of land and 55 acres of water to Emerald Isle Marina, Inc. and Emerald Isle Resort, Inc., under Lease No. DACW27-1-19-294 for commercial concession purposes. The term of the lease is twenty-five (25) years, beginning September 1, 2019, and ending August 31, 2044. Emerald Isle Marina provides the following services: watercraft rentals, boat slip rentals (covered and uncovered), fuel station, boat ramp, restaurant with indoor seating, and store. Emerald Isle Resort has ten condos with two or three bedrooms.

The USACE leases 109.5 acres of land and water to Holmes Bend Boat Dock, Inc., under Lease No. DACW27-1-98-020 for commercial concession purposes. The term of the lease is twenty-five (25) years, beginning April 1, 1998, and ending March 31, 2024. Holmes Bend Boat Dock provides the following services: watercraft rentals, boat slip rentals (covered and uncovered), fuel station, restaurant with indoor seating, and store.

The USACE leases 13.2 acres of land to Holmes Bend Rentals, Inc., under Lease No. DACW27-1-16-170 for commercial concession purposes. The term of the lease is twenty-five (25) years, beginning March 1, 2016, and ending February 28, 2041. Holmes Bend Rentals has twelve cabins with two or three bedrooms, one studio cabin, a lodge with six individual suites, a large meeting room with restrooms, and a gazebo.

The USACE leases 2 acres of land to Adair County Fiscal Court for Arnold's Landing Boat Ramp, under Lease No. DACW27-1-00-039 for public park and recreational purposes. The term of the lease is twenty-five (25) years, beginning July 1, 2000, and ending June 30, 2025. Adair County Fiscal Court provides the following services: boat launching ramp with parking area and a shelter.

The USACE leases 5.25 acres of land to Adair County Fiscal Court for Butler Creek Boat Ramp, under Lease No. DACW27-1-12-182 for public park and recreational purposes. The term of the lease is twenty-five (25) years, beginning April 1, 2012, and ending March 31, 2037. Adair County Fiscal Court provides the following services: boat launching ramp with parking area and two shelters.

Easements

USACE has issued sixty-two (62) easements at Green River Lake (Table 16). Numerous easement outgrants are issued to various entities for the construction, operation, and maintenance of water, sewer, electric, oil and gas, telecommunication, and cable lines. Other easements grant various entities the right to construct, operate, and maintain roads and bridges.

Table 16. Green River Lake issued easements

Easement Number	Grantee	Purpose	Term Ends
DACW27-2-00-024	HOLMES BEND BOAT DOCK INC C/O DAVID BUTLER	WATER PIPELINE/RUNS CONCURRENT WITH LEASE DACW27-1-98-020	31-Mar-2024
DACW27-2-04-1184	FISCAL COURT OF TAYLOR COUNTY	ROBIN ROAD/TRS 523 & 524	PERPETUAL
DACW27-2-05-064	COLUMBIA/ADAIR COUNTY WATER COMMISSION	FLOATING WATER INTAKE STRUCTURE, WATER MAIN TRS 1404 & 1405	PERPETUAL
DACW27-2-06-222	TAYLOR COUNTY RURAL ELECTRIC	BURIED ELECTRIC LINE/TR. 101 GREEN RIVER STATE MARINA	30-Apr-2049
DACW27-2-06-356	ADAIR COUNTY WATER DISTRICT	WATERLINE/PIKESOUTH RIDGE CAMPGROUND TRS 609, 610, & 211	PERPETUAL

Easement Number	Grantee	Purpose	Term Ends
DACW27-2-08-033	TAYLOR COUNTY RURAL ELECTRIC	2 ELECTRIC POLES W/SECURITY LIGHTS TRS 1615 & 1616	PERPETUAL
DACW27-2-08-347	KENTUCKY DEPT. OF TRANSPORTATION	BRIDGE/ DRAINAGE STRUCTURE/TR 2200-1	PERPETUAL
DACW27-2-10-091	CAMPBELLSVILLE MUNICIPAL	SEWERLINE W/LIFT STATION/TRS 303, 304, 317, 319, & 524	PERPETUAL
DACW27-2-11-448	COLUMBIA/ADAIR UTILITIES DISTRICT	8-INCH PUBLIC WATERLINE/TRS 1915-2, 1919, 1930, & 2002	PERPETUAL
DACW27-2-14-185	COLUMBIA GULF TRANSMISSION	ACCESS ROAD TO PIPELINE/TRS 2105 & 2106	PERPETUAL
DACW27-2-17-141	TAYLOR COUNTY RURAL ELECTRIC	ELECTRIC LINES/HOLMES BEND REC AREA/TRS 1714, 1715-1, 1717, 1718, 1727, & 1728	PERPETUAL
DACW27-2-19-288	WINDSTREAM	REMOTE TELE CABINET, APPURTENANCES/TR 1100 - 0.057 AC	5-JAN-2069
DACW27-2-67-2106	TENN GAS PIPELINE	GAS PIPELINE/TR 1525	PERPETUAL
DACW27-2-67-2107	TENN GAS PIPELINE	GAS PIPELINE/TR 218	PERPETUAL
DACW27-2-67-2108	TENN GAS PIPELINE	GAS PIPELINE/TR 203	PERPETUAL
DACW27-2-67-2109	TENN GAS PIPELINE	GAS PIPELINE/TR 202	PERPETUAL
DACW27-2-67-2110	TENN GAS PIPELINE	GAS PIPELINE/TR 215	PERPETUAL
DACW27-2-67-2111	TENN GAS PIPELINE	GAS PIPELINE/TR 213	PERPETUAL
DACW27-2-67-2112	TENN GAS PIPELINE	GAS PIPELINE/TR 214	PERPETUAL
DACW27-2-67-2113	TENN GAS PIPELINE	GAS PIPELINE/TR 112	PERPETUAL
DACW27-2-67-2114	TENN GAS PIPELINE	GAS PIPELINE/TR 1400-2	PERPETUAL
DACW27-2-67-2133	TENN GAS PIPELINE	42-INCH GAS PIPELINE/TRS 1502, 1521, & 1522	PERPETUAL
DACW27-2-67-2248	COLUMBIA GULF TRANSMISSION	36-INCH MAIN LINE/GAS/TRS 1920, 1921, 2000, 2002, & 2003	PERPETUAL

Easement Number	Grantee	Purpose	Term Ends
DACW27-2-67-2249	COLUMBIA GULF TRANSMISSION	36-INCH MAIN GAS PIPELINE/TRS 1920, 1921, 2000, 2002, & 2003	PERPETUAL
DACW27-2-67-2250	COLUMBIA GULF TRANSMISSION	36-INCH GAS PIPELINE/TRS 1920, 1921, 2000, 2002, & 2003	PERPETUAL
DACW27-2-67-2251	COLUMBIA GULF TRANSMISSION	36-INCH GAS PIPELINE/TRS 1920, 1921, 2000, 2002, & 2003	PERPETUAL
DACW27-2-67-2252	COLUMBIA GULF TRANSMISSION	36-INCH GAS PIPELINE/TRS 1920, 1921, 2000, 2002, & 2003	PERPETUAL
DACW27-2-68-2127	TEXAS EASTERN TRANSMISSION	GAS PIPELINE/ TR 1720	PERPETUAL
DACW27-2-68-2128	TEXAS EASTERN TRANSMISSION	GAS PIPELINE/ TR 1721	PERPETUAL
DACW27-2-68-2129	TEXAS EASTERN TRANSMISSION	GAS PIPELINE/ TR 1725	PERPETUAL
DACW27-2-68-2130	TEXAS EASTERN TRANSMISSION	GAS PIPELINE/ TR 1726	PERPETUAL
DACW27-2-68-2131	TEXAS EASTERN TRANSMISSION	GAS PIPELINE/ TR 1919	PERPETUAL
DACW27-2-68-2132	TEXAS EASTERN TRANSMISSION	GAS PIPELINE/ TR 1931	PERPETUAL
DACW27-2-68-2133	TEXAS EASTERN TRANSMISSION	36-INCH GAS PIPELINE/TR 1915	PERPETUAL
DACW27-2-68-2134	TEXAS EASTERN TRANSMISSION	36-INCH GAS PIPELINE/TR 1914	PERPETUAL
DACW27-2-68-2144	TAYLOR COUNTY RURAL ELECTRIC	RELO CONTRACT DACW27-C-0016/ ELECTRIC ABOVE GROUND/ VARIOUS TRACTS	PERPETUAL
DACW27-2-70-021	CITY OF CAMPBELLSVILLE	WATER INTAKE/PIPELINE TR 504	PERPETUAL
DACW27-2-70-074	FISCAL COURT OF ADAIR COUNTY KENTUCKY	ROAD/TR 2207	PERPETUAL

Easement Number	Grantee	Purpose	Term Ends
DACW27-2-70-084	TAYLOR COUNTY RURAL ELECTRIC	RELO CONTRACT DACW27-C-68-0007/ELECTRIC/ VARIOUS TRACTS	PERPETUAL
DACW27-2-71-068	FISCAL COURT OF ADAIR COUNTY KENTUCKY	RELO CONTRACT DA15-029-CIVENG-66-144/ROAD/ VARIOUS TRACTS	PERPETUAL
DACW27-2-71-149	COLUMBIA GULF TRANSMISSION	36-INCH GAS PIPELINE/TRS 2308, 2309, & 2312	24-MAY-2021 * renewal in process
DACW27-2-72-028	FISCAL COURT OF TAYLOR COUNTY	RELO CONTRACT DA15-029-CIVENG-66-71/ROAD	PERPETUAL
DACW27-2-77-111	CITY OF CAMPBELLSVILLE	WATERLINE/TRS 1021, 1029, 1100, & 1003	19-AUG-2027
DACW27-2-80-054	FISCAL COURT OF ADAIR COUNTY KENTUCKY	COUNTY ROAD/TRS 2623 & 2624	PERPETUAL
DACW27-2-80-41	ADAIR COUNTY WATER DISTRICT	WATER DISTRIBUTION LINE/TRS 2415, 2524, & 2525	13-FEB-2030
DACW27-2-81-019	TAYLOR COUNTY RURAL ELECTRIC	ELECTRIC POWER TRANSMISSION LINE/ABOVE GROUND/TRS 2309 & 2312	16-NOV-2030
DACW27-2-81-031	COMMONWEALTH OF KENTUCKY (DEPT. OF PARKS)	ROAD (STATE ROAD 551)/TRS 2308, 2309, & 2312	PERPETUAL
DACW27-2-81-068	FISCAL COURT OF TAYLOR COUNTY	COUNTY ROAD/ TR 1101	PERPETUAL
DACW27-2-84-074	CITY OF CAMPBELLSVILLE	6-INCH WATERLINE AND PUMPING STATION/TR 1225	18-APR-2034
DACW27-2-85-020	TAYLOR COUNTY RURAL ELECTRIC	7.5 KW CABLE POWERLINE APPROX. 3500 FT ABOVE GROUND/TRS 609, 610, & 611	5-NOV-2034

Easement Number	Grantee	Purpose	Term Ends
DACW27-2-86-133	CAMPBELLSVILLE WATER	ROAD TO PUMPING FACILITY AT GREEN RIVER LAKE/TR 504	PERPETUAL
DACW27-2-90-155	TELESCRIPPS CABLE CO.	BURIED TV CABLE/TRS 101 & 304 ALONG RD TO STATE MARINA	10-DEC-2015 * renewal in process
DACW27-2-91-027	GTE SOUTH, INC.	TELEPHONE LINES ABOVE GROUND/TRS 1214, 1225, 1239, 1241, 1242, 1248, & 1249	21-FEB-2021 * renewal in process
DACW27-2-91-037	TELESCRIPPS CABLE CO.	CABLE TV TO TAYLOR COUNTY BOAT DOCK/TRS 603, 604-1, 605-1, 625, & 627	1-MAY-2016 * renewal in process
DACW27-2-91-055	CAMPBELLSVILLE MUNICIPAL	WATER STORAGE CONTRACT DACW27-69-C-0045 – 6-INCH WATERLINE HWY 1061	17-JUL-2041
DACW27-2-92-018	CITY OF COLUMBIA	ACCESS ROAD TO WATER INTAKE STRUCTURE/TRS 1713-3 & 1714	13-APR-2042
DACW27-2-92-048	GTE SOUTH, INC.	AERIAL & BURIED TELEPHONE LINES/TRS 601, 603, 604-1, 605-1, 608, 610, 625, 627, & 628	28-JUL-2022 * renewal in process
DACW27-2-93-068	COMMONWEALTH OF KENTUCKY (DEPT. OF TRANSPORTATION)	RELO CONTRACT CIVENG-65-175/ KY STATE HWY NOS. 70, 76, 206, 551	PERPETUAL
DACW27-2-94-010	TAYLOR COUNTY RURAL ELECTRIC	ELECTRIC POWER LINE ABOVE GROUND TR 1713-3	5-APR-2044
DACW27-2-94-063	FISCAL COURT OF ADAIR COUNTY KENTUCKY	ROAD (PUBLIC)/ TR 2639-2 LITTLE CAKE ROAD	PERPETUAL

Easement Number	Grantee	Purpose	Term Ends
DACW27-2-95-035	FISCAL COURT OF ADAIR COUNTY KENTUCKY	ROAD (PUBLIC)/ TRS 2507, 2508, 2509, 2510, & 2514	PERPETUAL
DACW27-2-99-028	ADAIR COUNTY WATER DISTRICT	WATER LINE	31-MAR-2049

Licenses

License outgrants (Table 17) are issued to various entities to perform a specified act on Government property without acquiring an estate therein. It essentially authorizes an act which would otherwise constitute a trespass.

Table 17. License outgrants at Green River Lake

License Number	Grantee	Purpose	Term Ends
DACW27-3-20-193	Commonwealth of Kentucky, Department of Fish and Wildlife Resources	Fish and Wildlife Management Activities - 29,002 acres of land and water	31-Mar-2045
DACW27-3-12-298	Adair County Emergency Management	Early Warning Siren/Holmes Bend Rec Area/ Tract 1714	4-Jun-2037
DACW27-3-22-255	Campbellsville Fire – Rescue	Swift Water Rescue Training in Tailwater Area	28-Feb-2027
DACW27-3-94-161	Gary Mings	Access Road/Tract 1113	31-Dec-2023

Consent to Easement Structures

USACE has issued one Consent to Easement Structures, DACW27-9-96-002, for the construction, operation, and maintenance of two road entrances, a parking lot, and six minnow ponds over a portion of flowage easement Tract 2289E.

2.6 PERTINENT PUBLIC LAWS

Numerous public laws apply directly or indirectly to the management of Federal land at Green River Lake. Listed below are several key public laws that are most frequently referenced in planning and operational documents.

- Section 4 of the Flood Control Act of 1944 Pub. L. No. 78-534, 58 Stat. 887 (codified as amended at 16 U.S.C. § 460d) - Section 4 of the act, as amended, authorizes USACE to construct, maintain, and operate public parks and recreational facilities in reservoir areas and to grant leases and

licenses for lands, including facilities, preferably to Federal, state, or local governmental agencies.

- The Fish and Wildlife Coordination Act of 1958, Pub. L. No. 85-624, 72 Stat. 563, (codified as amended at 16 U.S.C. § 661, et seq.) - This act, as amended, sets down the general policy that fish and wildlife conservation shall receive equal consideration with other Project purposes and be coordinated with other features of water resource development programs. Opportunities for improving fish and wildlife resources and adverse effects on these resources shall be examined along with other purposes which might be served by water resources development.

- National Historic Preservation Act of 1966, Pub. L. No. 89-665, 80 Stat. 915 (codified as amended at 54 U.S.C. §§ 300100-300708) - This act provides for: (1) an expanded National Register of significant sites and objects; (2) matching grants to states undertaking historic and archeological resource inventories; (3) a program of grants-in-aid to the National Trust for Historic Preservation; and (4) the establishment of an Advisory Council on Historic Preservation. Section 106 of the original NHPA requires Federal agencies to consider the effects of their undertakings on historic properties and to provide the Advisory Council on Historic Preservation (ACHP) with a reasonable opportunity to comment. In addition, Federal agencies are required to consult on the Section 106 process with State Historic Preservation Offices (SHPO), Tribal Historic Preservation Offices (THPO), and Indian Tribes.

- Archaeological Resources Protection Act of 1979, Pub. L. No. 96-95, 93 Stat. 721 (codified as amended at 16 U.S.C. §§ 470aa-470mm) – This 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.

- Native American Graves Protection and Repatriation Act, Pub. L. No. 101-601, 104 Stat. 3048 (codified as amended at 25 U.S.C. § 3001, et seq.) – This act requires Federal agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their lineal descendants and their respective peoples.

- Pub. L. No. 86-717, 74 Stat. 817 - This act provides for the protection of forest and other vegetative cover for reservoir areas under this jurisdiction of the Secretary of the Army and the Chief of Engineers.

- Federal Water Project Recreation Act, Pub. L. No. 89-72, 79 Stat. 213 (1965).
  This act requires that not less than one-half the separable costs of developing recreational facilities and all operation and maintenance costs at Federal reservoir Projects shall be borne by a non-Federal public body. A Headquarters USACE/Office of Management and Budget (HQUSACE/OMB) implementation policy made these provisions applicable to Projects completed prior to 1965.

- Endangered Species Act of 1973 (codified as amended at 16 U.S.C. §§ 1531-1544). Section 7 of the Endangered Species Act (16 U.S.C. § 1536) states that all Federal departments and agencies

shall, in consultation with and with the assistance of the Secretary of the Interior (Secretary), ensure that any actions authorized, funded, or carried out by them do not jeopardize the continued existence of any threatened or endangered (T&E) species, or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary to be critical.

- National Environmental Policy Act of 1969, Pub. L. No. 91-190, 83 Stat. 852 (codified as amended at 42 U.S.C. § 4321, et seq.) (NEPA) – NEPA sets forth the national policy "to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." Section 102 authorizes and directs that, to the fullest extent possible, the policies, regulations, and public law of the United States shall be interpreted and administered in accordance with the policies set forth in NEPA. Section 102 requires consideration of environmental impacts associated with Federal actions. Section 101 requires the Federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony. Specifically, Section 101 directs the Federal government to:

  - Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
  - Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings.
  - Attain the widest range of beneficial uses of the environment without degradation risk to health or safety or other undesirable and unintended consequences.
  - Preserve important historic, cultural, and natural aspects of our national heritage and maintain wherever possible an environment which supports diversity and variety of individual choice.
  - Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities.
  - Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

CHAPTER 3 – RESOURCE OBJECTIVES

3.1 MASTER PLAN VISION

USACE's vision for the on-going management of the land, water, and recreational resources of Green River Lake is to protect and improve the assets that currently draw users to the lake, conserve the lake's natural and cultural resources, and create more sustainable practices throughout the lake operations.

This chapter sets forth goals and objectives necessary to achieve USACE's vision for the future of Green River Lake. In the context of this Master Plan, "goals" express the overall desired end state of the Master Plan whereas resource "objectives" are specific task-oriented actions necessary to achieve the overall Master Plan goals. The Master Plan resource objectives will be used as the basis for a future update of the OMP, which is the strategic implementation plan for the Master Plan.

3.1.1 Resource Goals

The following statements, paraphrased from EP 1130-2-550, Chapter 3, express the goals for the Green River Lake Master Plan:

GOAL A. Provide the best management practices to respond to regional needs, resource capabilities and capacities, 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 interests while sustaining Project natural resources.

GOAL D. Recognize the unique qualities, characteristics, and potentials of the Project.

GOAL E. Provide consistency and compatibility with national objectives and other State and regional goals and programs.

In addition to the above goals, USACE management activities are guided by USACE-wide Environmental Operating Principles (EOPs) as follows:

- Foster sustainability as a way of life throughout the organization.
- Proactively consider environmental consequences of all Corps activities and act accordingly.
- Create mutually supporting economic and environmentally sustainable solutions.
- Continue to meet our corporate responsibility and accountability under the law for activities undertaken by the Corps, which may impact human and natural environments.
- Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
- Leverage scientific, economic, and social knowledge to understand the environmental context and effects of Corps actions in a collaborative manner.

- Employ an open, transparent process that respects views of individuals and groups interested in Corps activities.

3.1.2 Resource Objectives

Resource objectives are 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 Louisville District, Green River Lake Project Office. The objectives stated in this Master Plan support the goals of the Master Plan, USACE EOPs, and applicable national performance measures. They are consistent with authorized Project purposes, Federal laws and directives, regional needs, resource capabilities, and they consider public input. Recreational and natural resource carrying capacities are also accounted for during development of the objectives found in this Master Plan. Regional and State planning documents including 2019 Kentucky SCORP were also considered when developing objectives.

The objectives in this Master Plan provide Project benefits, meet public needs, and foster environmental sustainability for Green River Lake to the greatest extent possible. They include recreation objectives, natural resource management objectives, education, and outreach objectives; general management objectives; and cultural resource management objectives.

Table 18. Recreation Objectives

Recreation Objectives	Goals				
	A	B	C	D	E
Inventory areas of lake that may be in need of increased protection from motorized boats and evaluate no wake areas as needed.	X		X	X	
Work with local recreation organizations to potentially link existing trails where there is opportunity and improve the recreational experience through trail enhancements.	X		X	X	X
Seek out opportunities for the addition of dedicated horse trails around lake in order to decrease trail user conflicts.	X		X	X	X
Improve and modernize day use and campground facilities through addition and repair of amenities, including, but not limited to: road improvements, sewer hook ups, increased electrical service, concrete or asphalt recreational vehicle pads, picnic sites, wireless internet access, amphitheaters, restrooms, trails, pavilions, and improved park entrances.	X		X	X	X
Maintain universally accessible facilities and shoreline fishing at Green River Lake.	X		X		X
Evaluate and monitor outdoor recreation trends to identify needs for new or improved recreation facilities and increased public access on USACE-managed public lands and water.	X		X	X	X

Recreation Objectives	Goals				
	A	B	C	D	E
Identify public use areas (trails, boat ramps, parking areas, etc.) and facility modifications (such as trail connections described in the Campbellsville/Taylor County Rail Town Master Connectivity Plan) to prevent overuse, conflict, and public safety concerns.	X		X	X	X

Table 19. Natural Resource Management Objectives

Natural Resource Management Objectives	Goals				
	A	B	C	D	E
Maintain stewardship of natural areas around lake and minimize activities that disturb the scenic beauty and aesthetics of the lake.	X	X	X	X	X
Ensure that the biological diversity of the area is protected by preserving habitat.	X	X		X	X
Remove diseased trees and develop a plan for replanting native species.	X	X		X	X
Monitor lands and waters for invasive, non-native and aggressively spreading native species and take action to prevent and/or reduce the spread of these species.	X	X		X	X
Protect and enhance habitat for pollinators and look for potential new habitat in currently mowed areas.	X	X		X	X

Table 20. Cultural Resource Management Objectives

Cultural Resource Management Objectives	Goals				
	A	B	C	D	E
Prioritize protection of historic areas and improve visibility and work with local historians and other stakeholders to create heritage programming, interpretive signage, and outreach to public.	X	X	X	X	X
Protect and manage Project natural and cultural resources through sustainable development that prioritizes stewardship and cultural value.	X	X		X	X
Ensure that cultural and historical preservation is integrated into all undertakings at Green River Lake in compliance with applicable laws (Section 106 and 110 of the National Historic Preservation Act; the Archeological Resources Protection Act and Native American Graves Protection and Repatriations Act).	X	X		X	X
Complete an internal comprehensive inventory of known cultural resources at Green River Lake.	X	X		X	X

Cultural Resource Management Objectives	Goals				
	A	B	C	D	E
Actively maintain compliance with Public Law 101-601, Native American Graves Protection and Repatriation Act (16 November 1990) which requires Federal Agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their respective peoples.	X	X		X	X

Table 21. General Objectives

General Objectives	Goals				
	A	B	C	D	E
Continue good partnerships with non-profits and city and county groups.	X		X	X	X
Continue diligent water patrols of the lake and enforcement of regulations.	X		X		X
Develop measures to control erosion and ensure protection of vegetation and wildlife.	X	X	X	X	X

Table 22. Education and Outreach Objectives

Education and Outreach Objectives	Goals				
	A	B	C	D	E
Continue outreach to adjacent landowners on policies and permit processes to reduce encroachment actions.	X	X		X	X
Continue collaboration with local school district to increase field trips to Green River Lake, as well as outreach programs hosted at schools. Increase programs that teach children about the USACE mission, wildlife and habitat, restoration efforts, water safety, litter reduction, etc.	X	X	X		X
Identify, evaluate, and provide to the extent possible increased opportunities for education and outreach including plant foraging and harvesting partnerships with tribal nations.	X	X	X	X	X
Organize and promote regular volunteer and community service opportunities to encourage community involvement and investment in the lake.	X	X	X		X

CHAPTER 4 – LAND ALLOCATION, LAND CLASSIFICATION, WATER SURFACE, AND PROJECT EASEMENT LANDS

The purpose of this Master Plan is to guide the comprehensive management and development of recreation, natural, and cultural resources at the Project and define the USACE's responsibilities pursuant to Federal laws to preserve, conserve, restore, maintain, manage, and develop lands, waters, and resources. An important aspect in managing these goals is properly defining the appropriate use for lands and water surface consistent with their congressionally authorized purpose.

4.1 LAND ALLOCATION

All lands at USACE water resource development projects are allocated by USACE into one of four categories listed below. In accordance with Engineer Pamphlet (EP) 1130-2-550, land allocations identify the authorized purposes for which USACE lands were acquired. Four possible allocation categories are identified in the USACE regulations including Operations, Recreation, Fish and Wildlife, and Mitigation. The lands at Green River Lake were allocated to Operations and Recreation, shown in Figure 13 and Table 23 below. Although not all four types of allocations were applicable at Green River Lake, they are all four described below to provide a better understanding of the purposes for which USACE acquired lands for water resource development projects.

- **Operations** (i.e., flood control, hydropower, etc.). Lands acquired for the congressionally authorized purpose of constructing and operating the Project. Typically, most Project lands are included in this allocation. For Green River Lake, the "Operations" allocation was further divided into the following sub-allocations:
    - Operations: Recreation - Intensive Use
    - Operations: Recreation - Low Density
    - Operations: Reserve Forest Land
    - Operations: Wildlife Management

- **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 of "Recreation."

- **Fish and Wildlife**. Lands acquired specifically for the congressionally authorized purpose of fish and wildlife management. These lands are referred to as separable fish and wildlife lands. Lands under this allocation can only be given a land classification of "Wildlife Management."

- **Mitigation**. Lands acquired or designated specifically for the congressionally authorized purpose of offsetting losses associated with development of the Project. These lands are referred to as separable mitigation lands. Lands under this allocation can only be given a land classification of "Mitigation."

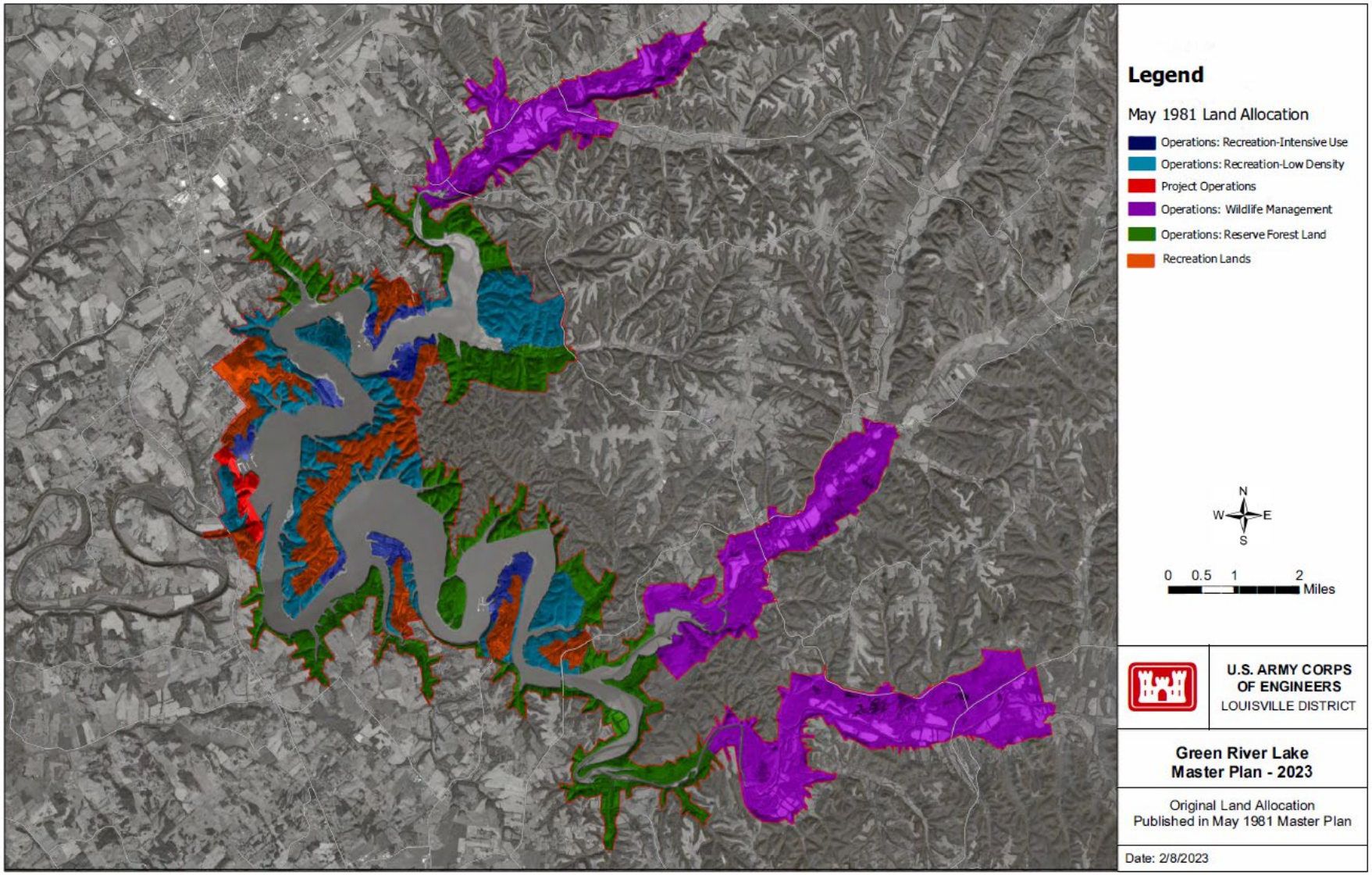

Figure 13. Map of and allocation, digitized from the May 1981 Master Plan for Green River Lake

4.2 LAND CLASSIFICATION

The objective of classifying Projects lands and waters is to identify the primary use for which Project lands are managed. Land and water classification is a central component of this plan, and once a particular classification is established, any significant change to that classification would require a formal process including public review and comment. Project lands are zoned for development and resource management consistent with authorized Project purposes, NEPA, and other federal laws.
Appendix A shows the land allocations maps from the 1981 Master Plan. At that time, classifications were referred to as allocations (see Section 4.1). New regulations in 2013 redefined the word "allocation" to mean "authorized purpose" of the purchased land whereas the 1981 Master Plan used allocation as a term to describe how the land was to be managed. The 1981 Master Plan uses an obsolete classification scheme that has been rectified in this document to meet current standards.

Current USACE guidance further defines land classifications to provide for development and resource management consistent with authorized purposes and other Federal laws. Currently, there are six categories of classification identified in USACE regulations:

- Project Operations
- High Density Recreation
- Mitigation
- Environmentally Sensitive Areas
- Multiple Resource Managed Lands
- Water Surface

The classification process refines the land allocations to fully utilize Project lands and considers public desires, legislative authority, regional and Project specific resource requirements, and suitability. Land classification indicates the primary use for which project lands are managed. There have been no changes to the type of land management activities, however the system for classification has been realigned to meet current standards.

The land classifications, as defined below, represent the future of land use at Green River Lake. The planning team, in conjunction with Project staff and stakeholders, identified the appropriate classifications for land surrounding the Project based on resources, demand projections, demand trends and capacity needs. These classifications, which are based on existing land use and zoning, should be considered future land use areas for the next 20 to 30 years. Thus, the lands were classified to retain current land use and represent ideal future land uses throughout the Project.

Additionally, the land and water classification acreages were derived using geographic information system (GIS) technology that was not available for the 1981 Master Plan. These totals do not reflect the official land acquisition records. There have been land disposals (sales), described in Section 2.14.2. Therefore, acreages represented as land classification and the resulting totals will differ from official land acquisition and allocation (see Appendix A for a map of Land Allocations as described in the 1981 Master Plan).

A map delineating Project lands and waters into each of the categories is provided in
Figure 14 below. Table 23 juxtaposes the land classifications acreages in this Master Plan with the 1981 Master Plan land allocations acreages.

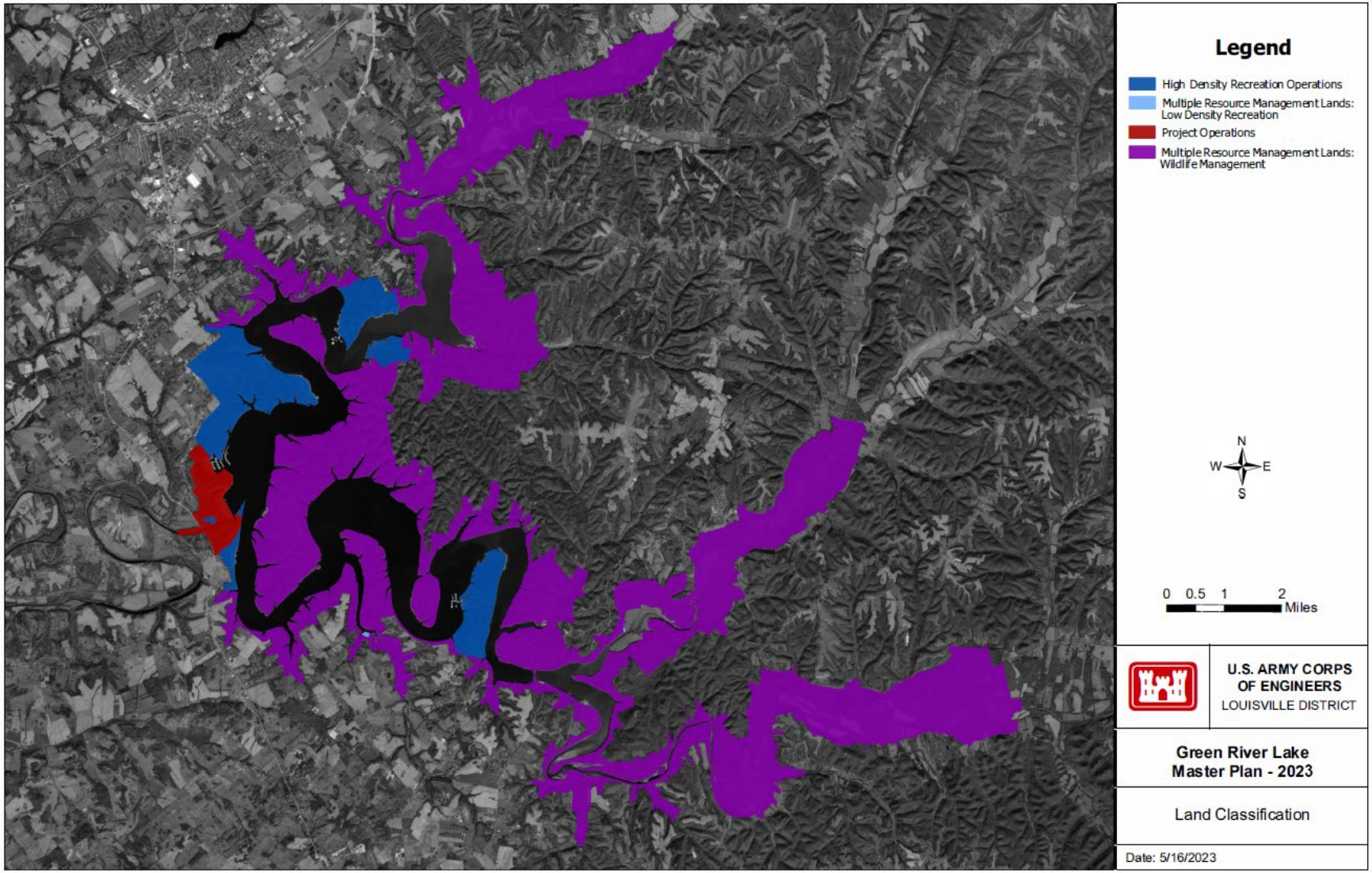

Figure 14. Land classification map

Table 23. 2023 land classification acreages compared to the original 1981 land allocation acreages

CLASSIFICATION	2023 Master Plan Acres	1981 Master Plan Acres
LAND		
Project Operations	552	245
Specific Recreation Lands*	-	3,199
Intensive Recreation*	-	1,110
High Density Recreation	2,466	-
Low Density Recreation*	-	3,756
Mitigation	-	-
Operations, Forest Reserve Land*	-	8,855
Operations, Wildlife Management*	-	8,026
Environmentally Sensitive Areas (ESAs)	2,187	-
Multiple Resource Management Lands: Low Density Recreation***	7	-
Multiple Resource Management Lands: Wildlife Management***	20,942	-
Multiple Resource Management Lands: Vegetative Management	-	-
Multiple Resource Management Lands: Future/Inactive Recreation	-	-
Fish and Wildlife	-	-
	WATER	
Designated No-Wake**	286	-
Restricted**	35	-
Open Recreation (does not include Designated No-Ski) Designated No-Ski	5,402 2,487	-
Fish and Wildlife Sanctuary**	-	-

*Classifications are now obsolete based on ER 1130-2-550 and EP 1130-2-550

**Water zoning was established in the 1981 update of the 1964 preliminary Master Plan, but acreages were not calculated

***Acreages reflect updates including the closure of Wilson Creek campground and transfer of 39 acres of Low Density land to Wildlife Management, expected to occur after September 2023

4.3 CURRENT LAND AND WATER CLASSIFICATIONS

4.3.1 Project Operations

This classification includes lands required for the dam and associated structures, administrative offices, maintenance compounds, and other areas that are used to operate and maintain Green River Lake.

Where compatible with operational requirements, Project Operations lands may be used for wildlife habitat management and recreational use. Regardless of any limited recreation use (for example, public fishing access within the tailwater still basin) allowed on these lands, the primary classification of Project Operations will take precedence over these uses.

There are approximately 552 acres with this classification at Green River Lake.

4.3.2 High Density Recreation

These lands are designated for intensive levels of recreational use to accommodate and support the recreational needs and desires of visitors. They include lands on which existing or planned major recreational facilities are located and allow for developed public recreation facilities, concession development, and high-density or high-impact recreational use. In general, any uses of these lands that interfere with public enjoyment of recreation opportunities are prohibited. Low-density recreation and wildlife management activities compatible with intensive recreation use are acceptable, especially on an interim basis. No agricultural uses are permitted on those lands except on an interim basis for maintenance of scenic or open space values. Permits, licenses, and easements are not issued for non-compatible manmade intrusions such as pipelines; overhead transmission lines; and non-Project roads, except where warranted by the public interest and where no viable alternative area or route is available.

There are approximately 2,466 acres with this classification at Green River Lake.

4.3.3 Mitigation

This classification is used only for lands allocated for mitigation for the purpose of offsetting losses associated with the development of the Project.

There are no lands at Green River Lake with this classification.

4.3.4 Environmentally Sensitive Areas

Environmentally Sensitive Areas are areas where scientific, ecological, cultural, and aesthetic features have been identified. At Green River Lake, several distinct areas have been classified as Environmentally Sensitive Areas (ESAs) for the protection of sensitive wetland areas. Development of public use on lands within this classification is normally prohibited to ensure that these sensitive areas are not adversely impacted. Agricultural uses are not permitted on lands with this classification. Each of these areas are discussed in Section 5.5 of this Master Plan and illustrated on the maps in Appendix A.

There are approximately 2,187 acres with this classification at Green River Lake.

4.3.5 Multiple Resource Management Lands

This classification is divided into four sub-classifications identified as: Low Density Recreation, Wildlife Management, Vegetative Management, and Future or Inactive Recreation Areas. A primary sub classification that reflects the dominant use of the land must be designated, understanding that other compatible uses may also occur on these lands (i.e., a trail through an area designated as Wildlife Management). Typically, Multiple Resource Management Lands support only passive, non-intrusive uses with very limited facilities or infrastructure.

There are approximately 20,838 acres classified as Multiple Resource Management Lands at Green River Lake.

- **Low-Density Recreation** (7 acres). These lands are designated for dispersed and/or low- impact recreation use. Development of facilities on these lands is limited. Emphasis is on providing opportunities for non-motorized activities such as walking, fishing, hunting, or nature study. Site-specific, low-impact activities such as primitive camping and picnicking are allowed. Facilities may include boat ramps, boat docks, trails, parking areas and vehicle controls, vault toilets, picnic tables, and fire rings. Manmade intrusions, including power lines, non-Project roads, and water and sewer pipelines, may be permitted under conditions that minimize adverse effects on the natural environment. Vegetation management, including agricultural activities that do not greatly alter the natural character of the environment, are permitted for a variety of purposes, including erosion control, retention and improvement of scenic qualities, and wildlife management. Hunting and fishing are allowed pursuant to tribal or state fish and wildlife management regulations where these activities are not in conflict with the safety of visitors and Project personnel.

- **Wildlife Management** (20,942 acres). This land classification applies to those lands managed primarily for the conservation of fish and wildlife habitat. These lands generally include comparatively large contiguous parcels, most of which are located within the flood pool of the lake. Passive recreation uses such as natural surface trails, fishing, hunting, and wildlife observation are compatible with this classification unless restrictions are necessary to protect sensitive species or to promote public safety.

- **Vegetative Management** (0 acres) These are lands designated for stewardship of forest, prairie, and other native vegetative cover. Passive recreation activities previously described may be allowed in these areas.

- **Future or Inactive Recreation Areas** (0 acres). These are lands with site characteristics compatible with High Density Recreation development. These are areas where High Density Recreation development was anticipated in prior land classifications, but the development either never took place or was minimal. These areas are typically closed to vehicular traffic and will be managed as multiple resource management lands until development takes place.

Figure 15 below shows the four land classifications distribution at Green River Lake.

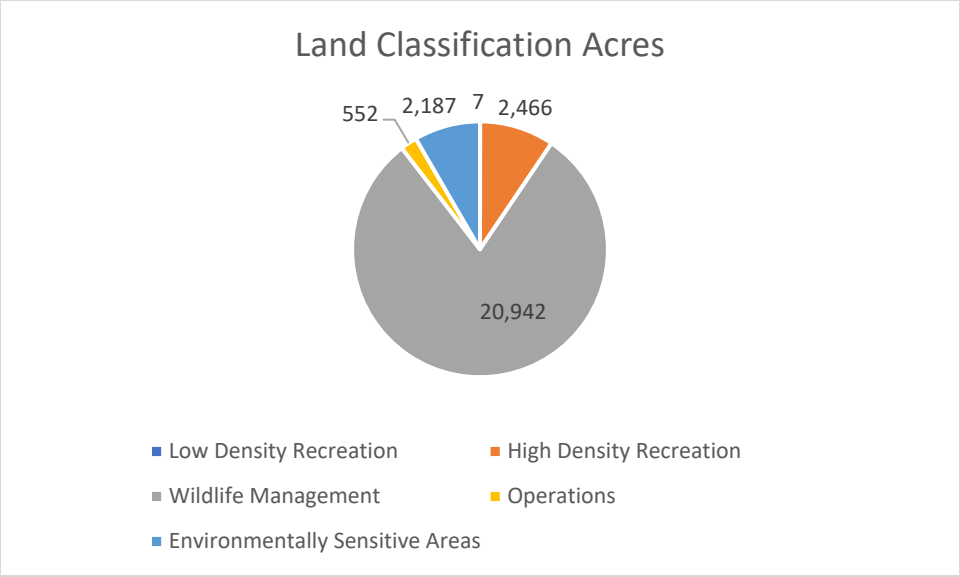

Figure 15. Land classifications at Green River Lake

4.3.6 Water Surface

USACE regulations specify four possible sub-categories of water surface classification. These classifications are intended to promote public safety, protect resources, or protect Project operational features such as the dam and spillway. These areas are typically marked by USACE or lessees with navigational or informational buoys or signs or are denoted on public maps and brochures. The Water Surface Classification map can be found in Appendix A of this Plan. The four sub-categories of water surface classification are derived from a total summer pool area of 8,210 acres:

- **Designated No-Wake** (286 acres). Water areas are designated for operation at no-wake speed to protect environmentally sensitive shoreline areas, recreational water access areas from disturbance, and for public safety.

- **Restricted** (35 acres) Restricted water surface includes those areas where recreational boating is prohibited or restricted for Project operations, safety, and security purposes. This also includes public beaches.

- **Open Recreation** (5,402 acres, does not include Designated No-Ski). Open Recreation includes all water surface areas available for year-round or seasonal water-based recreational use. This classification encompasses the majority of the lake water surface and is open to general recreational boating. Boaters are advised through maps and brochures, or signs at boat ramps and marinas, that navigational hazards may be present at any time and at any location in these areas. Operation of a boat in these areas is at the owner's risk. Specific navigational hazards may or may not be marked with a buoy.

    - **Designated No-Ski** (2,487 acres). Water areas that are treated as a subset of Open Recreation, but where water skiing is prohibited for public safety.

- **Fish and Wildlife Sanctuary** (0 acres). This Water Surface zoning designation applies to areas that have annual or seasonal restrictions to protect fish and wildlife species during periods of migrations, resting, feeding, nesting, and/or spawning.

Table 24. Water Surface Classification Summary

Water Surface Classification Summary	
Water Surface Classification	**Acres**
Designated No-Wake	286
Restricted	35
Open Recreation Designated No-Ski	5,402 (does not include Designated No-Ski) 2,487
Fish and Wildlife Sanctuary	0

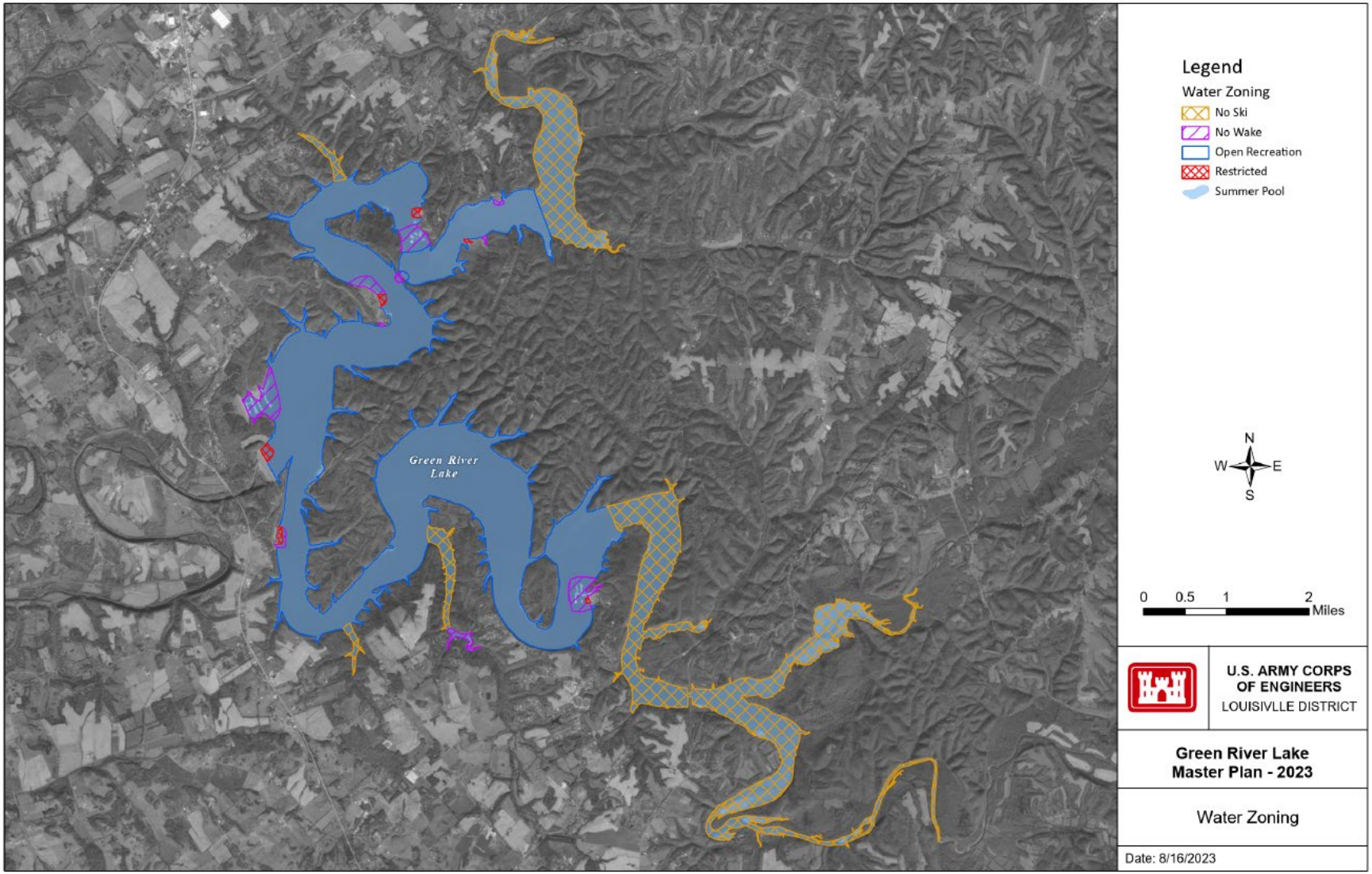

Figure 16. Water Surface Zoning Map. Estimated area- water zoning may change over time

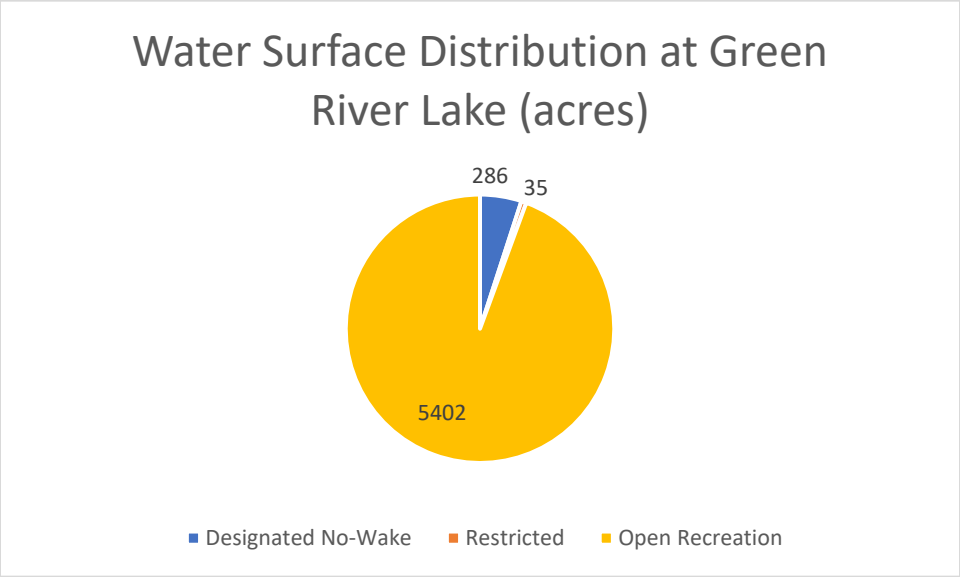

Figure 17. Water surface classification distribution at Green River Lake

4.3.7 Project Easement Lands

Flowage Easement. Easements were purchased by the USACE which grant the Government the right to occasionally or permanently flood private land during flood risk management operations. Currently, 1,616 acres of perpetual flowage easements are at Green River Lake located in Adair, Taylor, and Casey Counties. The purpose of these easements is to provide adequate storage for flood waters. Habitable structures are prohibited within flowage easements.

Road Easement. Easements were purchased by the USACE which grant the Government the right to construct, operate, repair, and replace roads. There are 34 acres of road easements at Green River Lake located in Adair and Taylor Counties.

CHAPTER 5 – RESOURCE PLAN

The resource plan describes, in broad terms, how Project lands will be managed according to the established land classifications. Each classification is discussed in terms of anticipated public use and resource stewardship needs.

5.1 MANAGEMENT BY CLASSIFICATION

This chapter describes how Project lands will be managed using the Master Plan as guidance. The classifications that exist at Green River Lake are Project Operations, High Density Recreation, Environmentally Sensitive Areas, and Multiple Resource Management Lands, which consist of Low Density Recreation and Wildlife Management. Water Surface classifications are divided into four classifications and one sub-classification: Designated No-Wake, Restricted, Open Recreation, Designated No-Ski (a sub-classification of Open Recreation), and Fish and Wildlife Sanctuary. Fourteen distinct Project site areas (PSAs) have been identified at Green River Lake (Table 25). The Resource Plan describes how areas under these various classifications will be managed in broad terms.

Table 25. Land Classifications of Recreation Areas

Recreation Area	Land Class	Acres*	Total Acres
Arnold's Landing	Low Density Recreation	2	2
Butler Creek	Low Density Recreation	5.25	5.25
Dam Area	High Density Recreation Area Operations	345 139	484
Emerald Isle	High Density Recreation Area	33	33
Holmes Bend	High Density Recreation Area	529	529
Holmes Bend Marina	High Density Recreation Area	120	120
Pikes Ridge	High Density Recreation Area	154	154
Site 1	High Density Recreation Area	67	67
Smith Ridge	High Density Recreation Area	381	381
Green River Lake State Park	High Density Recreation Area	1,331	1,331
Tailwater	High Density Recreation Area Operations	53 37	90
Visitor Center	High Density Recreation Area Operations	15 6	21
Green River Lake WMA	Wildlife Management	20,903	20,903
Wilson Creek**	Wildlife Management	39	39

**Acreages may only represent an estimate due to differences related to extracting data*
*** Wilson Creek land classification change from Low Density Recreation to Wildlife Management Area after September 2023*

Further details for managing these lands will be included in the Operational Management Plan (OMP) for the Project, as revised. Management tasks described in the OMP will support the resource objectives, land classifications, and resource plan set forth in this Master Plan. While the following sections address broad plans for the land classifications listed above, the USACE will strive to meet universal Project goals at all Project lands, which include taking proactive measures to enhance universal access to lands and facilities, improvement of safety for visitors, and identification and elimination of encroachments and trespassing. In addition, USACE will seek to identify important "unofficial" recreation activities and sites such as undeveloped shoreline fishing areas, swimming areas outside of developed beaches, and other preferred areas used by recreationists into the future. As development occurs in the future, USACE will seek to protect these areas and may require mitigation for development actions that would negatively impact these sites. As these sites are identified, they will be included in future updates to the Master Plan and may also be included in the OMP.

5.2 PROJECT OPERATIONS

Figure 18. Control tower from dam

This category includes those lands required for operation of the dam, spillway, dike, and outlet works at the Project. Figure 18 shows the control tower, taken from on top of the dam. Figure 19 below shows an aerial with the dam area labeled. There are 183 acres of land with this classification at Green River Lake, including the USACE office. The management plan for these areas is to continue providing physical security necessary to insure continued operations of the dam and related facilities. Public access to these areas is often restricted, apart from the dual purpose USACE office and visitor center. The visitor center is open to the public and managed as high-density recreation, described further in Section 5.3 below.

Operations Recommendations:

- Continue to manage lake operations in accordance with authority
- Remain open to opportunities for increased connectivity and sustainability

Figure 19. Operations area map

5.3 HIGH DENSITY RECREATION

Green River Lake has 2,466[1] acres classified as High-Density Recreation. Lands developed for intensive recreational activities for the visiting public including campgrounds, day-use areas, marinas, resorts and commercial concessions. Facilities in lands classified as High-Density Recreation should be able to accommodate the recreation needs of visitors in concentrated numbers, while also offering ample open space for other recreation activities.

In general, any uses of these lands that interfere with public enjoyment of recreation opportunities are prohibited. The management plan for all the areas listed below is to continue maintaining and improving existing facilities. Emphasis will be placed on improvements that align with the resource objectives from Chapter 3 such as managing the Project's infrastructure through the implementation of more sustainable practices and materials and maintaining and improving facilities across the lake Project.

The ten (10) High Density Recreation-classified Project Site Areas (PSAs) at Green River Lake are detailed below. Future recommendations are contingent upon budget constraints and future recreational needs and trends. Figure 20 shows the locations of the PSAs at the Project. The PSAs within the High-Density Recreation classification can be grouped into the following categories, based on management responsibility and types of recreational facilities available at each:

- USACE-Managed PSAs (Dam Area, Site 1, Holmes Bend, Pikes Ridge, Smith Ridge, Tailwater, and Visitor Center)
- Outgranted Multipurpose Areas managed by Kentucky Department of Parks (Green River Lake State Park including Green River Marina) and commercial concessionaires (Emerald Isle Resort and Holmes Bend Resort).

[1] This number includes water leases.

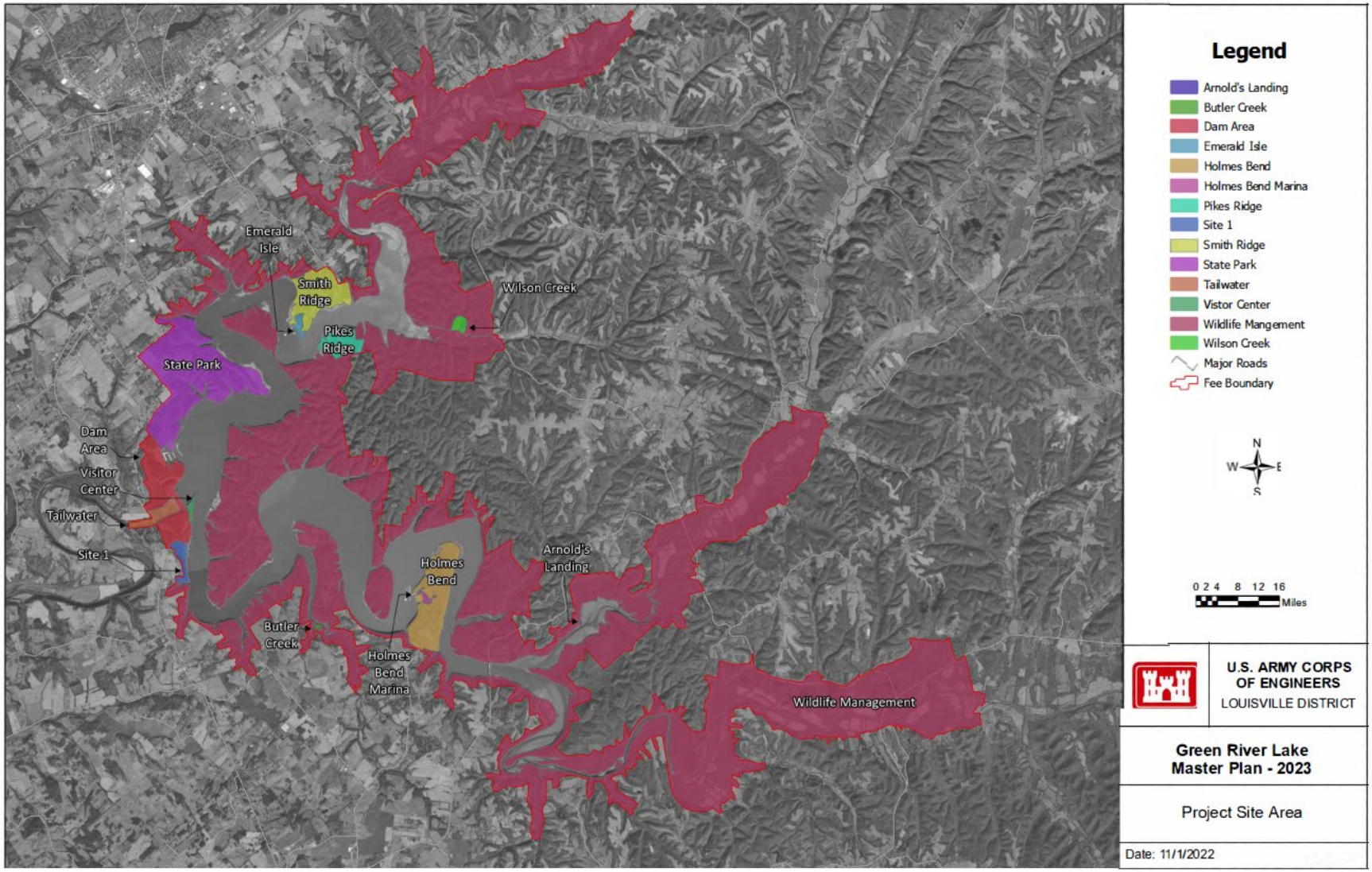

Figure 20. Project Site Areas at Green River Lake

USACE MANAGED PSAs

USACE provides maintenance within these campgrounds and associated multipurpose areas and assures they are being managed in accordance with the resource objectives identified in Chapter 3.

Multipurpose areas provide visitors with a variety of recreational opportunities such as camping, swimming, picnicking, and access to playgrounds. The goal is to provide visitors with recreational experiences while maintaining the functionality of operations and environmental stewardship. Individual USACE-managed multipurpose areas are described below.

Dam Area

Green River Lake's Dam Area is 485 acres and is managed for operations and high-density recreation. The Big Beech and Big Oak Picnic Areas are located within this PSA and are very popular. The area is mostly wooded but has a group picnic shelter, a playground, and trails, as shown in Figure 21. The Salsman Beaver Pondand Scott Valley Trails are located just north of the dam and can be accessed from Lake Rd.

Figure 21. Trail sign for the Salsman Trail and Beaver Pond in the Dam Area

Future Recommendations:

- Coordinate with Campbellsville/Taylor County Trail Town to assess the feasibility of a future bike trail system connection to the lake area.
- Continue partnership with Friends of Green River for fundraising and maintenance opportunities.
- Consider an increase in parking at the Big Oak Picnic Area to accommodate heavy usage.

Site 1

The Site 1 Day Use Area is 67 acres and is classified as high-density recreation. The day-use area is near the dam and includes a boat ramp with four launch lanes, several parking areas, a courtesy dock, a fishing pier that is popular for fishing, restroom facility, and group picnic shelter for public enjoyment.


Figure 22. Automated Fee Station at Site 1

Future Recommendations:

- Pave gravel parking lot

- Develop partnerships that can support future interpretive efforts, including but not limited to, highlighting the historic significance of the area and other historic sites near the lake

Holmes Bend Recreation Area

The Holmes Bend PSA is 529 acres and is classified as high-density recreation. This area has a large campground with 125 campsites, 40 of which have electric hookups only and 62 of which have water and electric. The campground has flush toilets, showers, fire rings and drinking water, a playground, interpretive hiking trail and horseback riding trails. The area also has a boat ramp, a fishing pier, picnic areas including a group shelter, and a swimming beach.

Figure 23. Holmes Bend Campground

Future Recommendations:

- Explore opportunities to increase parking for the boat ramp and swimming area
- Consider removing concrete dock and add new floating dock to increase access and safety
- Consider installing an additional courtesy dock
- Investigate adding high efficiency lighting
- Investigate adding Wi-Fi access

Pikes Ridge Campground

Pikes Ridge is 154 acres and is classified as high-density recreation. It is a shoreline campground with 60 campsites, 20 of which have water and electric hookups. Several waterfront campsites are available, providing convenient lake access. A playground, interpretive hiking trail and swimming beach offer additional recreation opportunities within the campground. A boat ramp, courtesy dock, several docks to tie up boats, a fishing pier, parking area, vault toilets, and new shower house are also all located within the campground.


Figure 24. Shoreline campsites at Pikes Ridge

Future Recommendations:

- Consider expanding campground to accommodate growing popularity
- Consider increasing number of sites with water and electric

Smith Ridge Recreation Area

Smith Ridge Recreation Area is 381 acres and is classified as high-density recreation. The Smith Ridge Campground offers 80 campsites, 62 of which have water and electric hookups. Amenities such as flush toilets, showers, fire rings, and drinking water provide a comfortable camping experience. A playground and interpretive hiking trail offer additional recreation opportunities within the campground. A boat ramp, fishing pier, parking areas, picnic areas, swimming beach, 9-hole disc golf course and additional restroom facilities are located within one mile of the campground.

Figure 25. Swimming Beach at Smith Ridge Rec. Area

Future Recommendations:

- Maintain and improve disc golf area and picnic area by replacing aging facilities
- Consider adding more campsites near lake with water and electric utilities
- Continue education on dangers of cliff jumping and add signage at area near marina
- Upgrade playground area
- At ramp area, upgrade bathroom facilities
- Replace wood piers with floating piers at ramp area
- As budget allows, repave all roads and parking in Smith Ridge Recreation Area
- As budget allows, consider constructing a new group picnic shelter

Tailwater

The tailwater area is 90 acres and is classified as operations and high-density recreation. The area offers recreational facilities including a one-lane boat ramp, parking, restrooms and pit toilets and a picnic area with group shelter and playground. Fishing is available at the Corps outlet works/stilling basin.

Future Recommendations:

- Consider improvements to boat ramp

Figure 26. View of Tailwater facilities

Figure 27. Visitor's Center from parking lot

Visitor Center

The Visitor Center area is 21 acres and is classified as operations and high-density recreation. The area has ample parking, a picnic area, group shelter, two overlooks, a playground and offers a self-guided tour of the Atkinson-Griffin Log cabin. The Visitor Center has a theater for presentations and meetings, as well as an educational area with interactive displays and live animals representing species found in the local area.

Future Recommendations:

- Continue educational programming that engages public about sustainability and environmental stewardship
- Maintain visitor center educational area

OUTGRANTED MULTIPURPOSE AREAS

There are areas at Green River Lake within the High-Density Recreation classification that are leased to the Kentucky Department of Parks and commercial concessionaires (additional detail is provided in Section 2.12.3). USACE does not provide any maintenance within any of these locations, but USACE staff have provided support to the managing agency. USACE is also required to review requests and ensure compliance with applicable laws and regulations for proposed activities within these leased areas. The goal is to work with USACE partners to assure recreation areas are being managed in accordance with resource objectives identified in Chapter 3.

In addition to working with partners to achieve the resource objectives, USACE assures multipurpose areas are being managed in accordance with the terms of the area's lease or license. The goal is to provide visitors with recreational experiences while maintaining the functionality of operations and environmental stewardship. Individual multipurpose areas are described below.

Emerald Isle Resort

The Emerald Isle Resort and Marina PSA is 33 acres and classified as high-density recreation. Located within the Smith Ridge Recreation Area, the PSA is about one mile from the Smith Ridge Campground. The marina has several wet slips for houseboats and recreational boats and also offers boat rentals. Visitors can find gas, a store, and restaurant at Emerald Isle, as well as 10 condos available for rent. The marina features a parking area and its own boat ramp.

Figure 28. Wayfinding at Emerald Isle Resort

Future Recommendations:

- Continue to maintain lease with Emerald Isle
- Support Emerald Isle's efforts to develop additional recreational amenities at resort

Green River Lake State Park

The Green River Lake State Park is 1,331 acres classified as high-density recreation and is managed by the Kentucky Department of Parks. The park offers fun for the whole family with facilities including the Green River Lake Marina, a model airplane field, several wildlife viewing areas, several miles of multi-use trails, a public swimming beach, three boat ramps, a picnic shelter with several picnic sites, playgrounds, public restroom, a mini golf course, a store and a campground. The 227-site campground includes 167 sites with water and electric hookups.

Figure 29. Green River Lake State Park playground area

Future Recommendations:

- Work with the KY Department of Parks to explore ways to decrease conflicts between cyclists and horseback riders on trails

- Continue to maintain lease with Kentucky Department of Parks
- Support Kentucky Department of Parks' efforts to develop additional recreational amenities

Holmes Bend Resort

The Holmes Bend Resort and Marina is a 120 acre PSA classified as high-density recreation and is located about a mile from the Holmes Bend Campground. The marina rents wet slips for houseboats and recreational boats. Visitors can find rental boats, gas, a store, and a restaurant at the marina. Overnight facilities include 12 rental cabins and a lodge with six condos.

Figure 30. Homes Bend Resort Cabins

Future Recommendations:

- Continue to maintain lease with Holmes Bend lessees
- Support Holmes Bend's efforts to develop additional recreational amenities

5.4 MITIGATION

This classification is used only for lands allocated for mitigation for the purpose of offsetting losses associated with the development of the Project. No lands at Green River Lake have this classification.

5.5 ENVIRONMENTALLY SENSITIVE AREAS

Environmentally Sensitive Areas (ESAs) are areas where scientific, ecological, cultural, or aesthetic features have been identified. Defining sensitive areas as part of the Master Plan process assists in the protection of valuable resources. Many factors contribute to identifying sensitive areas, and designation is not limited to just lands that are otherwise protected by Federal, state, and local laws. These sites are mapped and managed by the USACE. Other sites may not be formally mapped and/or made available to the public due to sensitive nature including locations of threatened and endangered species and cultural sites. All of these areas must be managed to ensure they are not adversely impacted. Typically, this is accomplished either through limiting development and/or public access to the sites or restricting the types of activities that may be conducted there.

Many species of greatest conservation need are found on USACE lands including Federally listed bat species. The degree of sensitivity varies by location and by contributing factors to sensitivity. An area may be available to construct a properly designed hiking trail or may be actively managed via silvicultural practices like timber stand improvement without negatively impacting the site's suitability for a particular species. Other sites can be very sensitive to human disturbance and need adequate protection from development. Examples of this degree of sensitivity would involve eagle nests and bat

hibernacula. These species can be negatively impacted by some human activities, especially during active breeding season or during hibernation.

The following situational occurrences on the landscape can contribute to areas being classified as sensitive. In many cases, multiple contributors to sensitivity exist on one area.

- Known or discovered cultural sites.
- Shoreline erosion.
- Reforestations.
- Preservation or creation of prairie habitats.
- Wetlands.
- Lands possessing unique wildlife value because of biodiversity or listed species.
- Aesthetic quality or aesthetic views (scenic).
- Corridors between habitats that protect connectivity.

Areas designated as sensitive can change over time and continued monitoring through programs like Multiple Species Inventory and Monitoring program (MSIM) provide valuable information to keep identified sensitive areas current. Using Geographic Information System (GIS) databases maintained with separated layers, the dynamic nature of sensitivity can be managed in an up-to date program. Some areas may be highly sensitive to change; other areas need prescribed management to remain viable. Management practices include invasive species control, prescribed fire, or plantings.

The USACE Louisville District is in the planning stage for a Cultural Resource Management Plan and will develop as funding is available. However, there is currently no set timeline for this action.

The goal of sensitive area management is to protect and preserve known areas that contribute to the diversity and health of the Lake. The program should be beneficial to plants, animals, and the people that enjoy the resource. Green River Lake contains 2,187 acres of ESA lands consisting of wetland habitats and buffers designed to protect nesting sites for listed species. Internal USACE ESA maps are located here: O:\OP\Public\MasterPlans\Green River Area\Green\Maps\ESA_FOR OFFICE USE ONLY.

5.6 MULTIPLE RESOURCE MANAGEMENT LANDS

This classification allows for the designation of a predominant use with the understanding that other compatible uses may also occur on these lands. The Multiple Resource Management Lands classification is divided into four sub-classifications. The land classifications below reflect the predominant sub-classification and describe other compatible uses that may occur on these lands.

5.6.1 Low Density Recreation

Low density recreation refers to lands with minimal development or infrastructure that support passive public recreational use (e.g., primitive camping, fishing, hunting, trails, wildlife viewing, etc.). Natural conditions preclude intensive public use development because extensive alteration of natural systems would be required. Difficult access also is a factor indicating low-density use as most appropriate for these lands.

Private or long-term exclusive group use of these lands will not be permitted. Management practices leading to habitat improvements for the benefit of wildlife are encouraged. As such, other sub-classifications tend to be compatible with this classification as well (i.e., vegetative management and wildlife management). No licenses, permits, or easements will be issued for non-compatible manmade intrusion, such as underground or exposed pipelines, cables, overhead transmission lines, or non-Project roads. Exceptions to this restriction may be made where necessary to serve a demonstrated public need only in those instances where no reasonable alternative is available. Hunting uses are permitted under this land classification, pursuant to tribal or state fish and wildlife management regulations where these activities are not in conflict with the safety of visitors and Project personnel.

The three (3) Low-Density Recreation-classified Project Site Areas (PSAs) at Green River Lake are detailed below. Future recommendations are contingent upon budget constraints, environmental considerations, and future recreational needs and trends. Figure 20 above shows the locations of the PSAs at the Project. The PSAs within the Low-Density Recreation classification can be grouped into the following categories, based on management responsibility and types of recreational facilities available at each:

- USACE-Managed PSAs (Wilson Creek[2])
- Outgranted Multipurpose Areas managed by Adair County Fiscal Court (Arnold's Landing, Butler Creek)

<u>Wilson Creek</u>

The Wilson Creek PSA currently contains 39 acres[2] classified as low-density recreation. The area includes a five-site primitive camping area with pit toilets. The Wildlife Management Area (WMA) is located adjacent to the Wilson Creek campground. The road in this area provides access to the lake. There is also a parking area, which is managed by KDFWR as part of the WMA.

Figure 31. Entrance to Wilson Creek Recreation Area

Wilson Creek Recommendations:

- Explore ways to decrease illegal activities (lighting, increased patrols, etc.)
- Close campground (including pit toilets, bulletin board, etc.) and lease land to KDFWR to manage as Wildlife Management Area[2]

[2] The 39 acres of Wilson Creek campground is planned to close after September 2023, at which point the land will be leased to KDFWR and managed as Wildlife Management Area.

Arnold's Landing

Arnold's Landing is leased to Adair County Fiscal Court. The area consists of a small, two-acre day-use area classified as low-density recreation and is located off Old KY 551 Rd., on the eastern half of the Project site about four miles southwest of Knifley, Kentucky. Visitors enjoy the use of the area's one-lane boat ramp, a parking area, and group shelter with two picnic sites useful for smaller groups.

Figure 32. Arnold's Landing picnic shelter

Future Recommendations:

- Work with Adair County Fiscal Court to increase maintenance efforts for courtesy dock

Butler Creek

The Butler Creek PSA is a 5.25-acre area classified for both low density recreation and wildlife management. The PSA is leased to the Adair County Fiscal Court and managed for day-use recreation. Visitors have access to the two-lane boat ramp, parking area, and two group shelters with eight picnic sites.

Figure 33. Butler Creek picnic area

Future Recommendations:

- Work with Adair County Fiscal Court to increase maintenance efforts for courtesy dock

5.6.2 Wildlife Management

These are lands designated for the stewardship of fish and wildlife resources and are managed by USACE and Kentucky Department of Fish and Wildlife Resources. There are 20,942 acres[3]* of land under this classification at the lake, however, areas of low-density recreation and ESAs all support wildlife and activities authorized in these areas are compatible with other multiple resource management activities (i.e., hunting, hiking, bird watching, etc.). Management efforts focus on producing native wildlife food and habitat. The broad objective of fish and wildlife management is to conserve, maintain and improve

[3] *20,942 acres of WMA, including the addition of Wilson Creek's 39 acres.*

the fish and wildlife habitat to produce the greatest dividend for the benefit of the public. Implementation of a fish and wildlife management plan is the first step toward achieving the goals of the Fish and Wildlife Coordination Act. KDFWR shares responsibility with USACE for managing fish and wildlife, primarily through enforcement of laws and regulations and establishing seasons and bag limits for game species. Future management plans for wildlife areas include continued cooperation with partners and managing and improving wildlife management areas under this land classification.

Priority in all lands under this classification will be provided to special status species including those Federally and state listed, those identified as species of concern, and those afforded special protections in other Federal regulations such as the Bald and Golden Eagle Act and the Migratory Bird Act. Techniques such as prescribed burning, planting native grasses and forbs beneficial to pollinators, and artificial nest boxes to encourage continued use by raptors, including osprey and bald eagles, will also be utilized. Such lands are available to the public for sightseeing, nature study, hiking, hunting, and other activities that enhance environmental awareness and promote environmental stewardship.

Green River Lake Wildlife Management Area (WMA)

The Green River Lake WMA is leased by the Kentucky Department of Fish & Wildlife Resources (KDFWR). The area includes over 20,792 acres of land managed for hunting and fishing purposes. The WMA's several parking areas create access points for hunting and wildlife viewing. A boat ramp is located at Snake Creek, and a fishing pier on Green River is available at Evans Cemetery Road. The KDFWR Offices are located near the Smith Ridge Recreation Area.

Figure 34. WMA Hunter Check Station

Future Recommendations:

- Support KDFWR where possible to control invasive species in the WMA areas such as Tree of Heaven, kudzu, honey suckle, and Autumn Olive as well as fauna species such as the Emerald Ash Borer.

5.6.3 Vegetative Management

These lands are designated for stewardship of forest, prairie, and other native vegetative cover. The vegetation at Green River Lake is a result of the geologic history of the area as well as human activity.

The USACE objectives concerning vegetation and forest management are to apply wise resource management principles that provide for habitat diversity and demonstrate good stewardship in the management of these resources. The management of woodlands is focused on the establishment and maintenance of the natural diversity of native plant species and communities. Management of forest resources focuses on the establishment and maintenance of riparian zones and connection of fragmented upland woodlots. Efforts have been made by the USACE to restore and expand wetland and prairie habitat. These activities should continue with identification of opportunities to expand these habitat types.

Invasive species pose a significant threat to the lake landscape and resources. Vegetative threats include Tree of Heaven, kudzu, Autumn Olive, and honeysuckle. All these species can significantly alter native ecosystems. Trees are also very susceptible to invasive species, as evidenced by the emerald ash borer. Diligent monitoring and swift reaction are key to successful invasive species management. Eradication is rarely attainable, but control is critical to managing invasive species.

In general, the vegetation management is applicable for the management of particular tracts of land specifically to achieve a desired vegetative state (e.g., food plots, management for old-growth or large timber and native grass management) and is typically conducted in areas classified as low-density recreation or WMAs. Vegetation management can also occur on a smaller scale, as when USACE conducts invasive plant species management along sections of shoreline and in larger tracks of land. These areas often occur along sections of the shoreline where ongoing shoreline management is occurring. Vegetative management may be conducted to improve wildlife habitat or in conjunction with wildlife management activities in areas of public hunting.

Currently, no lands are formally classified as vegetative management at Green River Lake; however, vegetation management does occur across the Project. In general, vegetative management that would be conducted by USACE personnel on fee lands occurs on an as needed basis using protocols or prescriptions that are site specific and highly variable both in terms of scope and type of management.

KDFWR actively manages the 29,002 acres of the Green River Lake Wildlife Management Area. Silviculture is the practice of controlling the establishment, composition, character, and growth of forest stands to satisfy specific objectives. Silvicultural practices utilized by KDFWR include a number of forest stand improvement (FSI) techniques including crop tree release, oak shelterwood system (the selective promotion of oak seedlings), midstory removal, the creation of patch openings to promote uneven-aged growth, and prescribed fire. KDFWR also has an active invasive species control and removal program which employs both mechanical and chemical control prescriptions.

Since 2009, forest management on GRLWMA has focused on bottomland forested areas in an effort to change tree species composition and habitat structure for wildlife. While this management will continue, future management will include management of upland forest habitats as well.
As of 2021, vegetation management conducted by the agency occurs primarily on open land habitats including 1,150 acres of native grasses, 780 acres of crop leases, and 300 acres devoted to food plots and/or fallow fields. Management of open lands primarily consists of prescribed burning and planting of food plots. Non-commercial forest management practices are used to restore bottomland oak forests and create early successional woody habitat. Prescribed burning of upland forests are conducted to perpetuate or restore desired or unique habitat types. As of 2021, all management of this type has occurred on the Pikes Ridge Unit.

5.6.4 Future/Inactive Recreation Areas

These areas generally have site characteristics compatible either with future recreational development or recreation areas that are closed. Until there is an opportunity to develop or reopen these areas, they will be managed for multiple resources; however, these are inactive areas currently. There are no acres of land included in this sub-classification at Green River Lake.

5.7 WATER SURFACE

There are four Water Surface sub-classifications at Green River Lake: Designated No-Wake, Restricted, Open Recreation, Designated No-Ski (a subset of Open Recreation), and Fish and Wildlife Sanctuary. While Fish and Wildlife Sanctuary is another water surface zone, Green River Lake does not have any water surface with this sub-classification. As part of managing the water surface areas at the Project, the USACE will seek to maintain and, if possible, improve water quality and fisheries habitat structure to support a productive sport fishery and maintain healthy populations of native fish species. Water quality monitoring of dissolved oxygen and temperature is performed for the Project annually from spring to fall. This data aides in conservation of the Project's aquatic resources. A related issue is sedimentation within the reservoir. The USACE will evaluate all plans and proposals to ensure that planned or permitted activities are not contributing to the sedimentation problem and ensure that Best Management Practices are followed to prevent excessive erosion. In the future, sustainable reservoir sediment management plans should be developed to address long-term efforts to address sedimentation.

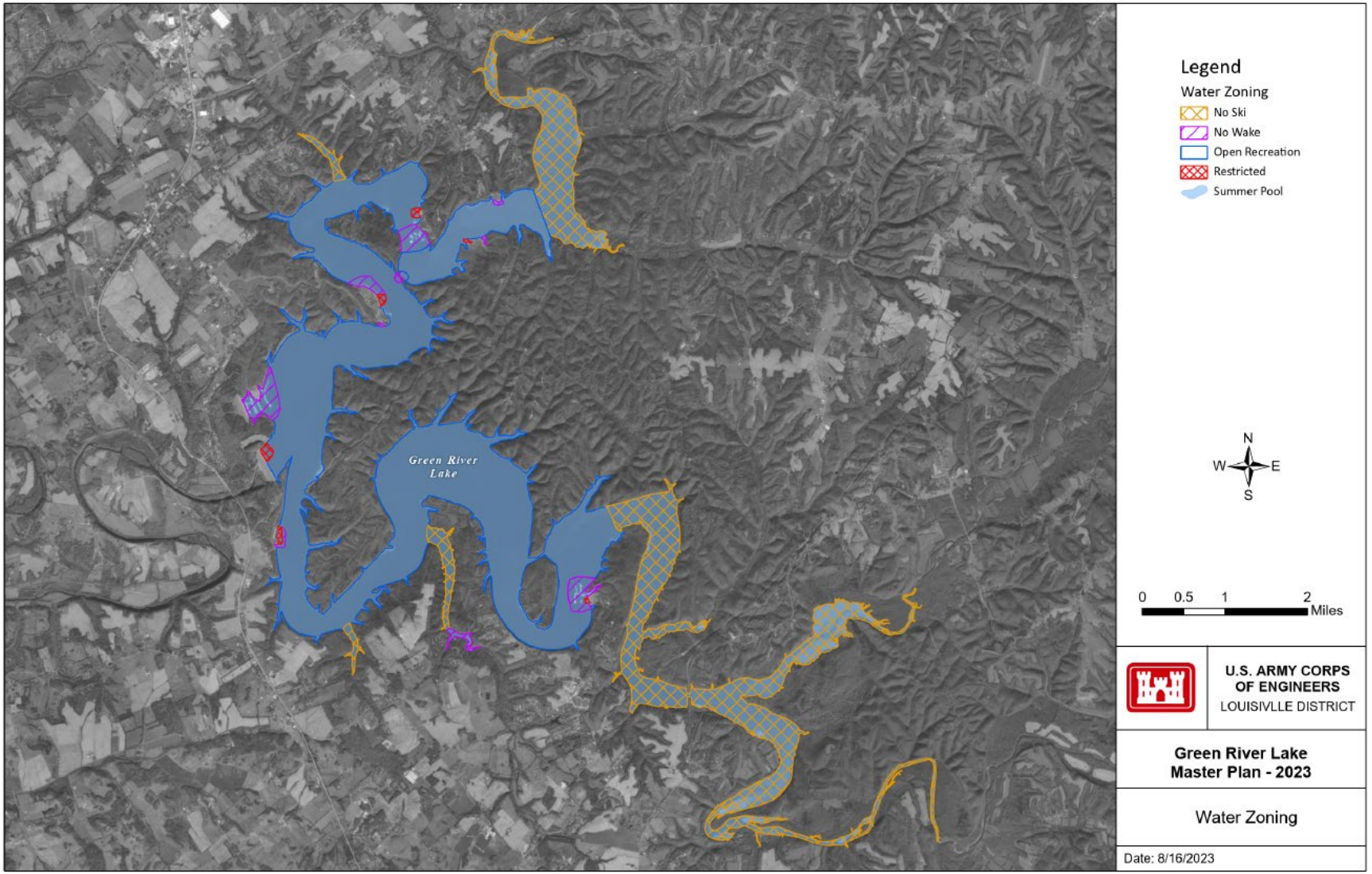

Figure 35. Water surface classification map

5.7.1 Designated No-Wake

Designated No-Wake zones are marked with buoys to protect environmentally sensitive shoreline areas, recreational areas (such as boat ramps and docks), and for public safety. Boats are required to slow down in these areas to prevent waves from impacting these areas. There are 286 acres of Designated No-Wake water surface at Green River Lake.

5.7.2 Restricted

Restricted areas include those where boats are not allowed due to Project operations or where their presence would cause a significant safety issue. There are approximately 35 acres of restricted boating at Green River Lake managed by USACE. These areas are located near each swimming beach and along the western side of the lake in the vicinity of the intake tower. These areas are delineated by a line of "NO BOATS" buoys across the lake.

5.7.3 Open Recreation

This subclassification measures approximately 5,402 acres in total. Open Recreation includes all water surface areas available for year-round or seasonal water-based recreational use. This classification encompasses the majority of the lake water surface and is open to general recreational boating. Boaters are advised through maps and brochures, or signs at boat ramps and marinas, that navigational hazards (such as "no ski zones") may be present at any time and at any location in these areas. Operation of a boat in these areas is at the owner's risk. Specific navigational hazards may or may not be marked with a buoy. "No ski zones" make up 2,487 acres of the Open Recreation water surface zoning designation at Green River Lake.

5.7.4 Fish and Wildlife Sanctuary

This Water Surface zoning designation applies to areas that have annual or seasonal restrictions to protect fish and wildlife species during periods of migrations, resting, feeding, nesting, and/or spawning. There are no Fish and Wildlife Sanctuary designated water surfaces at the Green River Lake.

5.8 SUSTAINABILITY

Sustainability is a multi-pronged aspect of responsible stewardship of USACE lands and is incorporated into the recommendations for each land classification. The outcome of sustainability initiatives is to have a program that can adapt to fiscal challenges, safeguards the environment, and continues to provide high quality recreational opportunities for the public. As the nation's largest provider of outdoor recreation, managing 12 million acres of lands and waters across the country, USACE is committed to implementing sustainable initiatives that link people to water.

The recreational mission of Green River Lake is to manage and conserve natural resources, while providing quality public outdoor recreation opportunities to serve the needs of the present and future generations. This is in-line, and indeed the underpinning of the Chapter 3 Resource Objectives, and of all the USACE goals for Green River Lake resources and management. The USACE 2011 Recreational Strategic Plan identifies several goals and objectives designed to build a more robust environmental and recreational program on USACE managed lands. Many of the goals center specifically on promoting environmental sustainability in all aspects of recreation resources management. This includes integrating environmental operating principles and other environmental regulations and initiatives into day-to-day decision making and long-range planning. The resource objectives combined with land classifications in the revised Master Plan for Green River Lake were developed with the intention of long-term resource management of the Lake's resources for years to come.

Other objectives include using Leadership in Energy and Environmental Design (LEED) certified personnel and projects in facility design and maintenance, adopting Sustainable Sites Initiative criteria where applicable on land-based recreation areas, and updating Project Master Plans to include environmental sustainability elements. For instance, the resource objectives in Chapter 3 refer to actively managing and conserving fish and wildlife resources, especially special status species, by implementing ecosystem management principles such as native species restoration.

Meeting the public's needs and continuing to provide a full range of outdoor recreation opportunities will require collaboration. In support of that, the USACE will maintain and enhance existing relationships while seeking new and innovative types of relationships with cooperating Federal, state, and local agencies, volunteers, non-government organizations, and others to provide certain recreation services and opportunities to the public. Besides pursuing and maintaining partnerships, it is important to continue to identify, analyze, and evaluate authorities and policies such as fee collection and retention and increased partnership capabilities. Areas identified for changes to meet the goals and objectives of this strategy include authorities for fee collection and retention without budgetary offset and policies that pertain to funding schedules for partnership projects.

The USACE Operations Division Natural Resources Management (NRM) Program Strategic Plan establishes a strategic vision with goals and objectives for development of a comprehensive program for USACE that will focus on direction for national efforts and activities that are aimed to support the field in the NRM mission with an emphasis on the role of land and water use management and public access controls. The sustainability program within the Strategic Plan seeks to make the USACE facilities more energy, water, and fuel efficient, while reducing our footprint on the land by expanding recycling, composting, and renewable energy programs. The integration of sustainability into the USACE mission and organizational culture is essential in achieving federal sustainability goals. More information on the NRM Strategic Plan can be found at this website:
https://corpslakes.erdc.dren.mil/employees/nrmstrategicplan/index.cfm

Efforts toward sustainable development at Green River Lake have already been made with the conversion of almost 95% of the lights on Project being converted to LED. Green River Lake will continue to seek avenues to improve efficiencies of appliances and fixtures upon replacement.

Through creativity, innovation, strong partnerships, and environmentally sustainable stewardship, quality recreational opportunities will continue to be available to the public. This will be done while simultaneously protecting the water, environment, and cultural resources for current and future generations.

CHAPTER 6 – SPECIAL CONSIDERATIONS

6.1 CHESTNUT BREEDING PROGRAM

Chestnut blight is caused by a fungus (*Cryphonectria parasistica*) that killed approximately 4 billion trees in the first half of the 20th century. Without active control measures, it is believed that the American Chestnut tree will become extinct in its native range. Breeding for blight resistance began around 1930. While these early attempts were ultimately unsuccessful, these efforts helped to identify species with resistance and developed methodologies for crossing chestnut species (Hebard, 2012).

In 1983, the American Chestnut Foundation (TACF) was founded to facilitate research on the hypothesis that backcrossing the American Chestnut with the Chinese Chestnut was the best technique for blight resistance. This method made it possible for trees to be produced that were genetically similar to the American Chestnut but also inherited the Chinese Chestnut trait of blight resistance (United States Department of Agriculture, 2022).

Today, the US Forest Service partners with the TACF to continue this breeding program throughout the country. Green River Lake participates in test plantings and is the site of a chestnut orchard that is used for research and education of the American Chestnut tree.

USACE recognizes the importance of this research and will continue to partner with the Forest Service and TACF. This Master Plan recommends continuing maintaining and operating the orchard to preserve the efforts of the Chestnut Breeding Program. Additionally, the orchard area at the Lake could be designated as an ESA in the future to protect the area from development.

6.2 INVASIVE SPECIES PREVENTION

With approximately 20,000 acres of forested area at Green River Lake, measures are needed to preserve healthy, native forests and control invasive species that out-compete native plants and decrease the quality of habitat for wildlife. Invasive species are discussed in Section 2.8.4 where common invasive species within the Project area are listed. Control of these invasive species is vital to the health of the land and water at the Project. These species are further discussed in Chapter 2.

Invasive species that impact aquatic habitat are a concern at the lake. Hydrilla is an exotic invasive aquatic plant that is known to occur in several of Kentucky's lakes. However, it has not yet been observed at Green River Lake, making it a priority to prevent its spread to the Project. Hydrilla is introduced by plant fragments that cling to boats and other watercraft that are transferred from one water body to another. Once introduced, even a small fragment of plant can start a new colony. Hydrilla form dense mats of vegetation that can grow up to 20 feet to the water surface, making swimming and boating difficult. Its rapid growth rate and density can also increase water pH and temperature and cause wide fluctuations in dissolved oxygen. The plant out-competes native plants, displaces fish, and once established, is very difficult to eradicate.

The Corps of Engineers and the KDFWR give the following instructions for lake users to help prevent the spread of hydrilla:

- Lake users are expected to check all water equipment thoroughly for mud or pieces of plant before leaving the lake. Mud and debris should be rinsed from equipment or wading gear before leaving the launch area.
- Do not release aquarium or water garden plants into the wild.
- Consider using native plants from your state in aquariums and water gardens.
- Contact the appropriate state authority if hydrilla is detected in any waterway at the KDFWR website.

Zebra mussels are another invasive species that is a problem throughout the U.S but have not yet been observed at Green River Lake. These highly invasive mollusks were introduced to North America in the 1980s, most likely from the release of ballast water from European ships that made its way into the Great Lakes. Since that time, zebra mussels have spread throughout the Great Lakes and through major waterways to over 30 states. These mussels filter out algae that is food for native mussels and can grow on other mussels, incapacitating them. They can also grow on boats and clog pipes, increasing maintenance costs. The full impacts of zebra mussels on native species may not yet be realized and once established, zebra mussels are nearly impossible to eradicate. Therefore, prevention is the best protection. The further spread of zebra mussels can be prevented by checking and properly washing water equipment to ensure that mussels are not transported (National Park Service, 2021).

As stated within the resource objectives, USACE will seek to partner with other agencies to find the best solutions to control invasive species and work to develop and implement invasive plant species control measures on USACE managed Project lands. USACE will also work to establish monitoring programs to measure the success of invasive prevention and control implementation and to detect new invasive species early.

6.3 CAMPBELLSVILLE TAYLOR COUNTY TRAIL TOWN CONNECTIVITY MASTER PLAN

Campbellsville Taylor County Trail Town is a nonprofit group comprised of a board of directors with community volunteers and supporters that work to develop the Campbellsville area trail and recreation network. This group works with existing Projects to ensure trail additions and usage. They are also involved in community education on the benefits of outdoor physical activity, funding opportunities for trails, and hosting special events that support trail development and the promotion of healthy lifestyles in the area.

In 2018, the Campbellsville Taylor County Trail Town group began developing a Connectivity Master Plan to study potential trail connections from downtown Campbellsville to Green River Lake and surrounding communities. This plan is conceptual in nature and is meant to begin a dialogue to promote positive planning efforts as determined by the community. As part of this study, public meetings were held to develop primary goals. These goals included increased public safety, connecting existing recreational elements, improving pedestrian accessibility and promoting Eco Tourism (Campbellsville Taylor Co Trail Town website).

USACE is supportive of the Trail Town effort and intends to cooperate with the group and other partners to increase accessibility and ensure safe connections where possible between existing trail and recreation infrastructure.

6.4 HISTORICAL RESOURCES

The Green River Lake area is home to several historical sites surrounding the Civil War. Descriptions of two of the sites are below. These sites offer opportunities for lake visitors to learn about the history of the area and can attract tourists to the area.

The Battle of Tebbs Bend has a 3-mile driving tour that details events that happened to John Hunt Morgan and his men travelling through the area. The Battlefield of Tebbs Bend is located approximately 3 miles from the Green River Lake Corps Office and can be enjoyed while visiting the lake.
The Atkinson Griffin Log Home was constructed in the 1830's by Joel Dupuy and Virginia Griffin.

Figure 36. An informational sign along the Battle of Tebbs Bend driving tour

The house is an example of a typical log home built in the 1800's. During the Battle of Tebbs Bend, in the 1860's, the Atkinson Griffin House was used as a Civil War hospital for the Confederate Soldiers. The Atkinson Griffin House was moved from its original location on HWY 55 to its current location near the Green River Lake Corps Office. Visitors can take self-guided tours of the log home daily; the key to access the log home is available in the Green River Lake Visitor Center.

CHAPTER 7- ENVIRONMENTAL EFFECTS

National Environmental Policy Act Overview

As an integrated section of the Master Plan document, this Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act of 1969, Pub. L. No. 91-190, 83 Stat. 852 (codified as amended at 42 U.S.C. §§ 4321, et seq.) (NEPA) and the Council on Environmental Quality's (CEQ) Regulations (codified at 40 C.F.R. Parts 1500-1508), as reflected in the USACE Engineering Regulation (ER) 200-2-2. ER 200-2-2 supplements, and applies in conjunction with, the CEQ regulations. Because ER 200-2-2 is in the process of being updated to conform to the CEQ regulations (as revised effective September 14, 2020), the CEQ regulations will control in the event of a conflict between ER 200-2-2 and the CEQ regulations.

The regulations above set forth a process whereby the USACE assesses the environmental effects of proposed major Federal actions and considers reasonable alternatives to these proposed actions. In general, federal agencies prepare an EA to evaluate whether a Federal action has the potential to cause significant environmental effects. If the agency determines that the action would significantly affect the quality of the human environment, the agency prepares an Environmental Impact Statement (EIS) to evaluate the proposed action and alternatives in greater detail. If the EA concludes that the action will not have significant environmental impacts, the agency will issue a Finding of No Significant Impact (FONSI) to document the basis for that conclusion. Certain Federal actions are "categorically excluded" from NEPA documentation requirements because the action does not "individually or cumulatively have a significant effect on the human environment" (40 C.F.R. § 1508.4). The Categorical Exclusions applicable to USACE actions include routine O&M activities at completed USACE Projects ER 200-2-2; 33 C.F.R. § 230.9(b). Per ER 1130-2-550 and EP 1130-2-550, NEPA categorical exclusions do not apply when a complete revision of a master plan is required, as is the case with this action.

The CEQ regulations do not contain a detailed discussion regarding the format and content of an EA, but an EA must briefly discuss the:

- Need for the proposed action;
- Proposed action and alternatives (when there is an unresolved conflict concerning alternative uses of available resources);
- Environmental effects of the proposed action and alternatives; and
- Agencies and persons consulted in the preparation of the EA.

SCOPE OF THE EA

NEPA requires Federal agencies to review potential environmental effects of Federal actions which include the adoption of formal plans (e.g., master plans) approved by Federal agencies upon which future agency actions will be based. Pursuant to ER 1130-2-550, this EA has been prepared to fulfill USACE's regulatory requirements under NEPA and provide USACE with the information needed to make an informed decision about the potential effects to the natural and human environment from the proposed adoption of the 2023 Green River Lake Master Plan.

In coordination with other management partners, USACE determined that the scope of the integrated 2023 Master Plan would be limited to actions on Project property. The intent of the proposed 2023

Master Plan is to develop land classifications that will guide the sustainable development of resources within the Project in the future. It is not feasible to define the exact nature of potential impacts for all potential future actions prior to the development of specific project proposals. Accordingly, this EA does not consider implementation of specific projects recommended within the 2023 Master Plan, as those projects are conceptual in nature. To ensure future environmental consequences are identified and documented as accurately as possible, additional NEPA analysis will be conducted, as appropriate, for future projects that are proposed to be carried out in accordance with the proposed 2023 Master Plan update (including those identified within the proposed 2023 Master Plan), once funding is available and detailed project planning and design occur.

PURPOSE AND NEED OF THE MASTER PLAN UPDATE

In accordance with Engineering Regulation (ER) 1130-2-550 Change 07, dated 30 January 2013 and Engineering Pamphlet (EP) 1130-2-550 Change 05, dated 30 January 2013, Master Plans are required for Civil Works Projects operated and maintained by USACE and must include all land (fee, easements, or other interests) originally acquired for the Project and any subsequent land (fee, easements or other interests) acquired to support operations and authorized missions of the Project. This revision of the Green River Lake Master Plan is intended to bring the document up to date to reflect current ecological, socio-demographic, and outdoor recreation trends that are affecting the Project, as well as those anticipated to occur within the planning period of 2023 to 2048.

Because the existing Green River Lake Master Plan was approved in 1981, it provides an inadequate basis with which to evaluate contemporary proposals. There have been changes in demand for recreation, regional population growth, changes in governing policies (i.e., land classification changes), and the construction of recreational amenities adjacent to USACE property, which dictate the need to revise the Master Plan for the Project.

The purpose of the revised Master Plan is to ensure that actions taken to promote the conservation and sustainability of the land, water, and recreational resources at the Project comply with applicable environmental laws and regulations and to maintain quality land for future use. The Master Plan is intended to serve as a comprehensive land and recreation management plan for the next 25 years and will reflect changes that have occurred since 1981 in outdoor recreation trends, regional land use, population, legislative requirements, USACE management policy, and wildlife habitat at Green River Lake. The 2023 Master Plan update would provide a comprehensive description of the Project, a discussion of factors influencing resource management and development, an identification and discussion of special considerations a synopsis of public involvement and input to the planning process, and descriptions of past, present, and proposed development.

SCOPE OF THE EFFECTS DISCUSSION

The effects of any actions, including planned or future construction activities, implemented to achieve the goals and objectives outlined in the 2023 Master Plan, are outside the scope of this EA. The USACE would continue to perform actions in the future to maintain and improve environmental and recreational resources at the Project. Future actions could possibly generate short term and minor adverse impacts to human environment. However, analysis of future unplanned actions is not feasible

and is outside of the scope of this EA. All future actions taken by USACE, recommended in the 2023 Master Plan or otherwise, would require appropriate environmental review and NEPA compliance.

ALTERNATIVES CONSIDERED

When preparing an Integrated Environmental Assessment, Federal agencies must consider a range of alternatives that could reasonably achieve the purpose and need that the proposed action is intended to address. The alternatives to be evaluated in this EA are a No Action Alternative of continuing to operate the Project under the 1981 Master Plan (MP), and the Proposed Action Alternative of implementing and operating the Project consistent with the 2023 Green River Lake Master Plan that is proposed for adoption and implementation. USACE initially considered other alternatives to the Proposed Action as part of the scoping process for the integrated Master Plan and EA document. During this process, the district and other management partners have worked to develop options for classifying Project lands and identifying Resource Objectives (Master Plan, Chapter 4) for these lands. The data collection, public comments, and findings of the planning team revealed that there was only one action alternative that would meet the purpose, need, and objectives of the master planning process. As such, no other alternatives beyond the No Action and Proposed Action Alternative (the Preferred Alternative) are being carried forward for analysis in the integrated Master Plan EA.

In developing and addressing these alternatives, it is important to note that the “action” this EA seeks to evaluate is the adoption and implementation of the specific master plan revision itself and not the potential future operation activities of the Project under the proposed 2023 Master Plan, if adopted. Future operation activities under the adopted plan will be subject to a future, independent NEPA analysis, to be determined and evaluated on a case-by-case basis.

No Action Alternative

Inclusion of the No Action Alternative (NAA) is required by CEQ regulations and serves as a basis for comparison against which the effects of the Proposed Action can be evaluated. Under the NAA, USACE would take no action and would not adopt the proposed 2023 Master Plan. The 1981 MP would remain in effect, and the NAA would result in "no change" from current management direction or level of management intensity. Master plans provide the basis for evaluating contemporary proposals, and the 1981 MP does not account for the many substantial changes that have occurred since then. The existing MP is capable of providing only minimal support to development and management of the Project. Future development decisions would therefore be assessed on an *ad hoc* basis without the benefit of a comprehensive assessment of recreation and natural resource conditions and opportunities at the Project.

Under the NAA, development and management of the Project area would likely take the same general direction outlined in the proposed 2023 Master Plan and, therefore, would generally share the same environmental consequences. However, future developments or resource management policies would require approval on a case-by-case basis without the benefit of evaluation in the context of a revised overall plan or analysis in an EA.

Proposed Action Alternative (Preferred Alternative)

Under this alternative, USACE would adopt and implement the 2023 Green River Lake Master Plan for the Project, which would replace the 1981 MP. The proposed 2023 Master Plan addresses important updates due to the considerable changes in the demographics, recreation demand, amenities within the Project, amenities on adjacent properties, current environmental conditions, and pertinent laws and policies. This alternative is the Agency Preferred Alternative because it would aid and support development and management of the Project and meet the need for sustainable management and conservation of natural resources of the Project while also providing for current and future quality outdoor recreational needs of the public and would satisfy USACE regulations governing master planning for civil works projects.

7.1 AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES

The National Environmental Policy Act and the Council on Environmental Quality's NEPA Implementing Regulations require that an EA identify the likely environmental effects of a proposed project and that the agency determine whether those impacts may be significant. Effects (or impacts) are changes to the human environment from the Proposed Action or alternatives that are reasonably foreseeable and have a reasonably close causal relationship to the proposed alternatives (40 C.F.R. § 1508.1(g)). Effects may include ecological, aesthetic, historic, cultural, economic, social, or health effects, and can be either beneficial or adverse.

The determination of whether an impact significantly affects the quality of the human environment must consider the action's potential to affect the environment and the degree of the impacts of an action (40 C.F.R. § 1501.3(b)). Significance varies with the setting of the Proposed Action, and agencies should consider the specific affected area and its resources where the Proposed Action is to occur. This includes a consideration of the short-term effects, long-term effects, effects on public health and safety, and effects that would violate Federal, state, tribal, or local law protecting the environment.
The potentially affected environment refers to the area in which the Proposed Action (or other alternatives) would take place and the potentially affected resources of the area (40 C.F.R. § 1502.3(b)). The affected environment includes reasonably foreseeable environmental trends and planned actions in the area, if applicable (40 C.F.R. § 1502.15). The degree of the effects of the Proposed Action generally refers to the magnitude of change that would result if the Proposed Action or alternatives were implemented.

All potentially relevant resource areas were initially considered for analysis in this EA. Some resource topics are not discussed, or the discussion is limited in scope, due to the lack of anticipated effect from the Proposed Action on the resource or because that resource is not located within the Project. Please note that the existing conditions for each resource analyzed in the following section is described in detail in Chapter 2.

This Section presents the adverse and beneficial environmental effects of the Proposed Action and the NAA. The section is organized by resource topic, with the effects of alternatives discussed under each

resource topic. Impacts are quantified whenever possible. Qualitative descriptions of impacts are explained by accompanying text where used.

Qualitative definitions/descriptions of impacts as used in this section of the EA include:

Degree:

- No Effect, or Negligible – a resource would not be affected, or the effects would be at or below the level of detection, and changes would not be of any measurable or perceptible consequence.
- Minor – effects on a resource would be detectable, although the effects would be localized, small, and of little consequence to the sustainability of the resource. Mitigation measures, if needed to offset adverse effects, would be simple and achievable.
- Moderate – effects on a resource would be readily detectable, localized, and measurable. Mitigation measures, if needed to offset adverse effects, would be extensive and likely achievable, and
- Significant – effects on a resource would be obvious and would have substantial consequences. The resource would be severely impaired so that it is no longer functional in the Project area. Mitigation measures to offset the adverse effects would be extensive, and success of the mitigation measures would not be guaranteed.

Duration:

• Short term – temporary effects caused by the construction and/or implementation of a selected alternative; and

• Long term – caused by an alternative and remain after the action has been completed and/or after it is in full and complete operation.

7.2 RESERVOIR, POOL, AND LAKE OPERATION

7.2.1 No Action

Current USACE guidance defines land classifications to provide for development and resource management consistent with authorized purposes and other Federal laws. The focus of the 1981 Updated Master Plan was to present a public use plan for the effective development and efficient utilization of the Project lands, waters, features, and facilities for public benefit. The plan provided for the development, use and administration of all Project lands and public use facilities. However, the 1981 Master Plan uses an obsolete classification scheme which fails to meet current standards and nomenclature. A key goal in preparing the 2023 Master Plan was examining prior land classifications and addressing the transition to updated land classification standards, as needed.

Under the NAA, a revised Master Plan would not be approved for the Project in the foreseeable future; there would be no updates to existing land classifications and resource use policies, and the operation and management of the Project would continue as outlined in the 1981 Master Plan and Operational Management Plan documents. While no adverse effects would be expected to occur to the reservoir,

pool, or lake operation as a result of continuing under the NAA, the continued use of existing guidance documents may not provide for the most efficient and effective utilization, development, and management of Project resources.

7.2.2 Proposed Action

Implementation of the ongoing Project management under the proposed 2023 Master Plan would result in no effect to the Project reservoir or lake operations. Operations are controlled by the Project's Operational Management Plan; the proposed 2023 Master Plan does not change lake operations. As such, there would be no effect on reservoir, pool, and lake operations from the implementation of the Proposed Action.

This EA does not consider implementation of specific projects recommended within the proposed 2023 Master Plan, as those projects are conceptual in nature. To ensure future environmental consequences to reservoir, pool, and lake operations are identified and documented as accurately as possible, additional NEPA analysis will be conducted on a case-by-case basis for future projects (including those that are proposed to be carried out in accordance with this Master Plan update) once funding is available and detailed project planning and design occur.

7.3 CLIMATE

7.3.1 No Action

Under the NAA, a revised Master Plan would not be approved for the Project in the foreseeable future; there would be no updates to existing land classifications and resource use policies, and the operation and management of the Project would continue as outlined in the 1981 MP and Operational Management Plan documents. While no adverse effects would be expected to occur to the local climate as a result of continuing under the NAA, the continued use of existing guidance documents may not provide for the most efficient and effective utilization, development, and management of the Project resources.

7.3.2 Proposed Action

Changes to land use classifications and other changes proposed under the Proposed Action would have no effect on local or regional climate. While visitation to the Project is highly variable, potential emissions associated with increased vehicular traffic would be localized, of relatively short duration, and would be expected to occur irrespective of the adoption of the Proposed Action.

This EA does not consider implementation of specific projects recommended within the proposed 2023 Master Plan, as those projects are currently conceptual in nature. To ensure future environmental consequences to climate are identified and documented as accurately as possible, additional NEPA analysis will be conducted, on a case-by-case basis once funding is available and detailed project

planning and design occur. It should also be noted that the proposed land classifications are resilient to future changes in climate.

7.4 AIR QUALITY

7.4.1 No Action

Under the NAA, a Master Plan revision would not be approved for the Project in the foreseeable future. As this alternative would result in the operation and management of the project, continuing as outlined in the 1981 MP, potential effects to air quality of the Project are expected to be negligible. While future development would likely still occur, they would be done without the benefit of a comprehensive planning document that reflects current and future policy standards and environmental conditions.

7.4.2 Proposed Action

The proposed alternative would result in an updated land use classification for the Project and management of the Project under the proposed 2023 Master Plan, which would have no effect on air quality. This EA does not consider implementation of specific future Project's recommended within the proposed 2023 Master Plan, as those projects are currently conceptual in nature. To ensure future environmental to air quality consequences are identified and documented as accurately as possible, additional NEPA analysis will be conducted, on a case-by-case basis once funding is available and detailed project planning and design occur.

7.5 TOPOGRAPHY, GEOLOGY, AND SOILS

7.5.1 No Action

Under the NAA, a Master Plan revision would not be approved for the Project in the foreseeable future. As this alternative would result in the operation and management of the Project continuing as outlined in the 1981 MP, and actions would still be addressed under appropriate NEPA and environmental compliance reviews, no effects to the topography, geology, or soils are anticipated.

7.5.2 Proposed Action

No additional development or ground disturbing activities are proposed in the 2023 Master Plan. While the proposed 2023 Master Plan includes recommendations for new, or modifications to, existing amenities (e.g., adding hiking trails or additional parking), this EA does not consider implementation of specific future projects recommended within the proposed 2023 Master Plan, as those projects are currently conceptual in nature. To ensure future environmental consequences to topography, geology, and soils are identified and documented as accurately as possible, additional NEPA analysis will be

conducted, on a case-by-case basis, once funding is available and detailed project planning and design occur. For this reason, adoption and implementation of the 2023 Master Plan would have no effect to topography, geology, and soils, and no effect is anticipated to prime and unique farmlands.

7.6 SURFACE WATER HYDROLOGY AND GROUNDWATER

7.6.1 No Action

Under the NAA, a Master Plan revision would not be approved for the Project in the foreseeable future. As this alternative would result in the operation and management of the Project continuing as outlined in the 1981 MP, and actions would still be addressed under appropriate NEPA and environmental compliance reviews, no effects to surface water hydrology or groundwater are anticipated.

7.6.2 Proposed Action

There would be no effect to the surface water hydrology or groundwater expected as a result of adopting and implementing the 2023 Master Plan. The land reclassifications and updated resource objectives in the 2023 Master Plan would allow land management and land uses to be compatible with the goals of good stewardship of water resources. Any future actions implemented to achieve the resource objectives outlined in updated Master Plan are outside the scope of this EA but would still be subject to all appropriate NEPA and environmental compliance reviews on a case-by-case basis.

7.7 WATER QUALITY

7.7.1 No Action

Under the NAA, a Master Plan revision would not be approved for the Project in the foreseeable future. As this alternative would result in the operation and management of the Project continuing as outlined in the 1981 MP, no effects to water quality are anticipated.

7.7.2 Proposed Action

No new development or activities that may negatively impact water quality of the Project or its tributaries are proposed in the 2023 Master Plan. However, the Master Plan revision does include recommendations to improve the health of the watershed and its water quality. While increased visitation and boat traffic may increase shoreline erosion in some areas, new resource objectives of evaluating shoreline erosion and sedimentation and developing alternatives to mitigate were added to the 2023 Master Plan. Water quality monitoring would continue with goals of reducing water quality impacts to ensure health of the aquatic system. Project staff would continue coordination, reporting, and data collection for the Louisville District Water Quality Team and KDOW. For these reasons,

adoption and implementation of the 2023 Master Plan would be expected to have a beneficial effect on water quality of the Project.

7.8 HABITATS

7.8.1 No Action

Under the NAA, a Master Plan revision would not be approved for the Project in the foreseeable future. As this alternative would result in the operation and management of the Project continuing as outlined in the 1981 MP, no effects to existing habitats are anticipated.

7.8.2 Proposed Action

The proposed 2023 Master Plan includes new or revised natural resource management objectives that would benefit the existing habitats of the Project (Chapter 5). Proposed management strategies involve diligent monitoring and swift reaction, which are key to successful invasive species management. Eradication is rarely attainable, but control is critical to managing invasive species. Management of the Project under the 2023 Master Plan would be expected to be beneficial to the quality existing habitats and have the potential to create additional habitat on Project lands.

This EA does not consider implementation of specific projects recommended within the proposed 2023 Master Plan, as those projects are currently conceptual in nature. To ensure future environmental consequences to habitats are identified and documented as accurately as possible, additional NEPA analysis will be conducted, on a case-by-case basis, once funding is available and detailed project planning and design occur. In general, the goal for natural resources at Green River Lake is to manage sustainably, with a focus on how management affects the quality of life for both present and future generations. The natural resource management resource objectives (Chapter 5) outlined in the proposed 2023 Master Plan borrow from the strategic goals of the 2020-2025 Kentucky SCORP to protect and sustain the natural environment in an effort continue the legacy of conserving high quality natural resources. At the Green River Lake Project, this is generally accomplished through the maintenance and monitoring of specific habitat areas for key species, management of wildlife programs, and improvement of forest and grasslands habitats occurring via management conducted by KDFWR and the USACE.

7.9 LISTED SPECIES

7.9.1 No Action

No changes to the listed species resources of the Project would be predicted as a result of implementing the NAA and no effects to listed species or critical habitat are anticipated. Under the NAA, a Master Plan revision would not be approved for the Project in the foreseeable future and there will be

no update in land classification and management which have the potential to more accurately identify and protect areas identified as environmentally sensitive. While USACE would continue to perform future actions with the goal of maintaining and improving environmental and recreational resources at the Project, it would be done without the aid of a comprehensive planning document.

7.9.2 Proposed Action

There are no changes to the operations of the Project as part of the proposed 2023 Master Plan. As such, there would be no effects to listed species and no consultation with the USFWS would be required. Changes to the land classifications and updated resource objectives for the Project as part of the proposed Master Plan would be expected to have no effect on the spectaclecase, fanshell, purple catspaw, northern riffleshell, snuffbox mussel, pink mucket, ring pink, sheepnose, clubshell, rough pigtoe, rabbitsfoot. northern long-eared bat, Indiana bat, gray bat, and the Kentucky Cave Shrimp. No ESA Section 7 consultation with the USFWS is required for a "no effect" determination. In addition, no effects are anticipated to bald eagles or ospreys.

Future development actions on the Project will be assessed individually and on a case-by-case basis to determine potential impacts to listed species, in compliance with the ESA and NEPA. In an effort to protect tree roosting bats, future development under the proposed action will be subject to the required seasonal restrictions on timber clearing in which the removal of trees over three inches diameter at breast height are restricted from April 1 through September 30.

7.10 DEMOGRAPHICS AND ENVIRONMENTAL JUSTICE

7.10.1 No action

Under the NAA, a Master Plan revision would not be approved for the Project in the foreseeable future and there would be no comprehensive planning for the Project. As this alternative would result in the operation and management of the Project continuing as outlined in the 1981 MP, no effect to the surrounding demographics, including minority or low-income populations are anticipated would be expected.

7.10.2 Proposed Action

Changes in population and associated stresses on the municipal resources and services over the past 30 years have occurred while the USACE has managed the Project. Adopting and implementing the 2023 Master Plan would be expected to have no effect on the demographic trends of the surrounding communities. The Proposed Action is expected to result in negligible effects to the local or regional socioeconomic environment. Changes to land use classification would have no impact on socioeconomics or to minority or low-income communities. Construction of future projects consistent with the updated Master Plan would be expected to have minor beneficial effects associated with

temporary employment of construction personnel and transportation of goods and materials to the construction sites. There would be no disproportionate adverse effects to minority or low-income communities since the Proposed Action would be located within Federal lands and projects would benefit local residents by enhancing recreational opportunities.

7.11 RECREATION AND VISITATION

7.11.1 No Action

Under the NAA, a Master Plan revision would not be approved for the Project in the foreseeable future and there would be no comprehensive planning for the Project. As this alternative would result in the operation and management of the Project continuing as outlined in the 1981 MP, a negligible effect on recreation or visitation.

7.11.2 Proposed Action

The proposed 2023 Master Plan adds the recreational objective to evaluate the demand for improved recreation facilities (i.e. campsites, picnic facilities, overlooks, all types of trails, boat ramps, courtesy docks, interpretive signs/exhibits, and parking lots), including universal access, and additional public access on USACE-managed public lands and water for recreational activities (i.e., walking, hiking, biking, boating, hunting, fishing, wildlife viewing, etc.), and to identify potential development nodes to address these demands.

Because there are no major new recreational amenities currently planned in the future, and most of the development at the Project involves minor improvements, replacements-in-kind, and facility improvements; none of these would be expected to substantially increase visitation. The proposed Master Plan revision does recommend a continued effort to identify opportunities and potential partnerships with those responsible for supporting local and regional recreational trails that are near or intersect with the Project to improve the visitor experience. While the effects on recreation and visitation from any specific opportunity or partnership that may be identified are outside the scope of this EA, USACE would continue to identify possible causes and effects of overcrowding and overuse and apply appropriate best management practices including site management, regulating visitor behavior, and modifying visitor behavior. For these reasons, the Proposed Action would be expected to have a beneficial effect on recreation and visitation at the Project.

7.12 CULTURAL RESOURCES

7.12.1 No Action

USACE would continue to perform actions in the future to maintain and improve cultural and recreational resources at the Project without the aid of a comprehensive planning document. Potential

future actions could possibly generate negative effects to cultural resources. However, analysis of future unplanned actions is not feasible and is outside of the scope of this EA. All potential future actions taken by USACE, while operating under the NAA, would require appropriate environmental review as well as NEPA and National Historic Preservation Act (NHPA) compliance. The National Historic Preservation Act, Pub. L. No. 89-665, 80 Stat. 915 (codified as amended at 54 U.S.C. §§ 300101-307108) (NHPA) as "any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on" the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior, "including artifacts, records, and material remains relating to the district, site, building, structure, or object." Section 106 of the original NHPA (now codified at 54 U.S.C. § 306108) requires Federal agencies to consider the effects of their undertakings on Historic Properties.

7.12.2 Proposed Action

This alternative would result in an updated land classification for the Project and management of the Project under the 2023 Master Plan. This would designate cultural sites as environmentally sensitive areas, and thus protect them from development and incompatible uses. As a result, the NAA would have a beneficial effect on cultural resources.

Within the proposed 2023 Master Plan, potential future actions that are recommended to meet goals outlined for the Project are included. Potential future actions could possibly generate negative effects to cultural resources through construction activities. However, analysis of future unplanned actions is not feasible and is outside of the scope of this EA. All potential future actions taken by USACE, recommended in the Master Plan or otherwise, would require appropriate environmental review and NEPA compliance. Prior to implementation of any ground disturbing activity, field surveys and coordination with the Kentucky State Historic Preservation Office (SHPO) pursuant to Section 106 of the original NHPA (now codified at 54 U.S.C. §§ 306101-306114) will be conducted by the USACE. Federal and state laws require Federal agencies to minimize or mitigate adverse impacts to historic properties (36 C.F.R. § 800.13). Should unanticipated historic or prehistoric resources be discovered during ground disturbing activities, work must cease immediately and the USACE will contact the SHPO.

7.13 AESTHETICS AND VISUAL QUALITY

7.13.1 No Action

Under the NAA, a Master Plan revision would not be approved for the Project in the foreseeable future. As this alternative would result in the operation and management of the Project continuing as outlined in the 1981 Master Plan, no effect on aesthetics or visual properties are anticipated.

7.13.2 Proposed Action

Implementing the proposed 2023 Green River Master Plan would be expected to have no long-term effect on the aesthetic character of the Project. Some short-term effects to the surrounding

environment may result during normal maintenance activities, but these are expected to be temporary and localized in nature. Comprehensive planning under the revised Master Plan has the potential to facilitate improved construction planning or management of the Project resources which can minimize potential effects to the aesthetic character of the Project. Revised land use classifications and resource management also has the potential to improve the aesthetic experience of Project visitors by increasing or improving the natural resources present there.

7.14 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

7.14.1 No Action

Under the NAA, a Master Plan revision would not be approved for the Project in the foreseeable future. As this alternative would result in the operation and management of the Project continuing as outlined in the 1981 Master Plan and there are no known Hazardous, Toxic, and Radioactive Waste (HTRW)s at the Project, no effects as a result of disturbance of existing or introduction of new HTRW materials to the environment are anticipated.

7.14.2 Proposed Action

Because there are no known HTRWs at the Project and no new actions involving generation of HTRWs are planned, the implementation of the 2023 Master Plan is expected to have no effect on the environment as a result of the disturbance of existing, or introduction of new, HTRW materials. Within the 2023 Master Plan there are future actions that are recommended to meet goals outlined for the Project. Future actions have the potential to create HTRW materials as a result of equipment malfunction or failure during construction, maintenance, or groundskeeping activities (e.g., fluid leaks heavy equipment). However, analysis of future unplanned actions is not feasible and is outside of the scope of this EA. All future actions taken by USACE, recommended in the proposed 2023 Master Plan or otherwise, would require appropriate environmental review and NEPA compliance.

7.15 NOISE

7.15.1 No Action

Under the NAA, a Master Plan revision would not be approved for the Project in the foreseeable future. As this alternative would result in the operation and management of the Green River Lake Project continuing as outlined in the 1981 Master Plan, no effects to existing noise levels are anticipated.

7.15.2 Proposed Action

Adopting and implementing the proposed 2023 Master Plan, including changes to land use classifications, would be expected to have no effect on the level of background or ambient noise character of the Project. It should be noted that this EA does not consider implementation of specific

future projects recommended within the proposed 2023 Master Plan, as those projects are currently conceptual in nature. To ensure future environmental consequences to noise are identified and documented as accurately as possible, additional NEPA analysis will be conducted, on a case-by-case basis, once funding is available and detailed project planning and design occur.

7.16 CUMULATIVE EFFECTS

The Master Plan is intended to guide the USACE toward achieving its goal of managing, conserving, and enhancing natural resources, while providing quality opportunities for outdoor recreation to the public. The plan is consistent with authorized Project purposes and relevant legislation and regulations and was developed in response to regional and local needs, resource capabilities and suitability, and expressed public interests. As previously discussed above, it is anticipated that the Proposed Action will have no effect or beneficial effects on the resources considered.

Since the 2023 Master Plan update would only have no effect or beneficial effects to the human environment, then there would be no potential for cumulative effects of the Proposed Action on these resources when added to the impacts of other past, present, and reasonably foreseeable future actions in the region.

7.17 SUMMARY OF ENVIRONMENTAL EFFECTS

The 2023 Master Plan provides guidelines and direction for future Project development and use and is based on authorized Project purposes, USACE policies and regulations on the operation of USACE Projects, responses to regional and local needs, resource capabilities and suitable uses, and expressed public interests consistent with authorized Project purposes and pertinent legislation. Careful planning, sound engineering, appropriate coordination with resource agencies and effective execution have developed the recreational resources at the Project while protecting and enhancing the important environmental resources; these practices would be expected to continue. Within the 2023 Master Plan, there are future actions that are recommended to meet goals outlined for the Project. Future actions have the potential to cause negative effects to all environmental resources analyzed. However, analysis of future unplanned actions is not feasible and is outside of the scope of this EA. All future actions taken by USACE, recommended in the 2023 Master Plan or otherwise, would require appropriate environmental review and NEPA compliance. As such, the effects caused by potential future actions would not be expected to be significant. Table 26 provides a summary of anticipated effects from implementation of the updated Master Plan to the resources evaluated in this integrated master plan.

Table 26. Summary of environmental effects from the Proposed Action

Resource Evaluated	Effect
Reservoir, Pool, and Lake Operation	No effect
Climate	No effect
Air Quality	Negligible

Resource Evaluated	Effect
Topography, Geology, and Soils	No effect
Surface Water Hydrology and Groundwater	No effect
Water Quality	Beneficial effect
Habitats	Beneficial effect
Listed Species	No effect
Demographics and Environmental Justice	No effect
Recreation and Visitation	Beneficial effect
Cultural Resources	Beneficial effect
Aesthetics and Visual Qualities	No effect
HTRW Materials	No effect
Noise	No effect

7.18 COMPLIANCE WITH ENVIRONMENTAL LAWS

Adoption and implementation of the 2023 Green River Lake Master Plan and the subsequent adoption of revised land classifications and resource objectives would not commence until the proposed actions achieve environmental compliance with the applicable laws and regulations, as described below.

Bald and Golden Eagle Protection Act (codified as amended at 16 U.S.C §§ 668-668c). *In compliance.* The Bald and Golden Eagle Protection Act imposes requirements on USACE Projects concerning bald eagles. Approval and implementation of the proposed 2023 Master Plan would not adversely affect bald eagles or their habitat.

Clean Air Act (codified as amended at 42 U.S.C. §§ 7401-7671q). *In compliance.* The purpose of the Clean Air Act is to protect public health and welfare by the control of air pollution at its source, and to set forth primary and secondary National Ambient Air Quality Standards to establish criteria for States to attain or maintain. The proposed 2023 Master Plan does not include major development of new facilities or other construction activities that could impact air quality from increased emissions. Negligible and temporary emissions would be expected to occur during continued maintenance activities of facilities at the Project. However, these emissions would be short term, small-scale, and air quality would not be affected to any measurable degree. Actions taken by the USACE at the Project that may impact air quality are subject to compliance with the General Conformity rule, which ensures that those actions do not interfere with the state's plans to attain and maintain national standards for air quality.

Federal Water Pollution Control Act (Clean Water Act) (codified as amended at 33 U.S.C. 1251-1387). *In compliance.* The objective of the Clean Water Act is to restore and maintain the chemical, physical and biological integrity of the Nation's waters (33 U.S.C. § 1251). The USACE regulates discharges of dredged or fill material into waters of the United States pursuant to Section 404 of the Clean Water Act. This permitting authority applies to all waters of the United States including navigable waters and wetlands. Section 404 requires authorization to place dredged or fill material into waters of the United States. If a Section 404 authorization is required, a Section 401 water quality certification from the state in which

the discharge originates is also needed. Adoption and implementation of the 2023 Master Plan would not be expected to result in the placement of dredged or fill material into water bodies or wetlands. Any future actions at the Project which would result in the placement of dredged or fill material into waters of the United States would be undertaken in compliance with Section 404 and Section 401 of the Clean Water Act.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). *Not applicable.* CERCLA governs (1) the release or substantial threat of a release of a hazardous substance into the environment; or (2) the release or substantial threat of a release of any pollutant or contaminant into the environment that presents an imminent threat to the public health and welfare. To the extent such knowledge is available, 40 C.F.R. Part 373 requires notification of CERCLA hazardous substances in a land transfer. The adoption and implementation of the 2023 Master Plan would not involve real estate transactions, and no release or threatened release of hazardous substances into the environment at the Project is known.

Endangered Species Act of 1973 (codified as amended at 16 U.S.C. §§ 1531-1544). *In compliance.* Section 7 of the Endangered Species Act (16 U.S.C. § 1536) states that all Federal departments and agencies shall, in consultation with and with the assistance of the Secretary of the Interior (Secretary), ensure that any actions authorized, funded, or carried out by them do not jeopardize the continued existence of any threatened or endangered (T&E) species, or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary to be critical. This EA represents the assessment and findings regarding the proposed revised master plan and serves as the Biological Assessment with a determination of no effect to the spectaclecase, fanshell, northern riffleshell, snuffbox mussel, pink mucket, ring pink, sheepnose, clubshell, rough pigtoe, rabbitsfoot, Indiana bat, northern long-eared bat, gray bat, and Kentucky cave shrimp. While sections of the Project are designated as critical habitat for the endangered rabbitsfoot mussel, these resources are not anticipated to be impacted by this action.

Environmental Justice (E.O. 12898). *In compliance.* The Executive Order governing environmental justice directs that every Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States. Adoption and implementation of the 2023 Master Plan would not disproportionately affect minority or low-income populations.

Fish and Wildlife Coordination Act (codified as amended at 16 U.S.C § 661) (FWCA). *In compliance.* The FWCA requires governmental agencies, including the USACE, to coordinate activities so that adverse effects on fish and wildlife would be minimized when water bodies are proposed for modification. No modifications to water bodies are proposed in association with the proposed Master Plan. Any comments received from resource agencies are located in the Appendix of this integrated EA.

Migratory Bird Treaty Act of 1918, 16 U.S.C. §§ 703-712(MBTA). *In compliance.* The MBTA is the domestic law that affirms, or implements, the United States' commitment to four international conventions with Canada, Japan, Mexico, and Russia for the protection of shared migratory bird

resources. The MBTA governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. The take of all migratory birds is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent over utilization. Executive Order 13186 (2001) directs agencies to take certain actions to implement the act. The USACE will consult with the USFWS (through their review of the draft EA) with regard to their consideration of the effects of the actions identified in the proposed Master Plan for potential effects on migratory birds. No effects are anticipated.

The National Historic Preservation Act of 1966, Pub. L. No. 89-665, 80 Stat. 915 (codified as amended at 54 U.S.C. §§ 300100-300708). *In compliance.* The NHPA requires that Federal agencies having direct or indirect jurisdiction over a proposed federal or federally assisted undertaking take into account the effect of the undertaking on any district, site, building, structure, or object that is included in, or eligible for inclusion in, the NRHP. Section 106 of the original NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties and to provide the Advisory Council on Historic Preservation (ACHP) with a reasonable opportunity to comment. In addition, Federal agencies are required to consult on the Section 106 process with State Historic Preservation Offices (SHPO), Tribal Historic Preservation Offices (THPO), Indian Tribes.

Archaeological Resources Protection Act of 1979, Pub. L. No. 96-95, 93 Stat. 721 (codified as amended at 16 U.S.C. §§ 470aa-470mm). *In compliance.* This 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.

Native American Graves Protection and Repatriation Act, Pub. L. No. 101-601, 104 Stat. 3048 (codified as amended at 25 U.S.C. § 3001, et seq.). *In compliance.* This act requires Federal agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their lineal descendants and their respective peoples.

National Environmental Policy Act (NEPA), (codified as amended 42 U.S.C. §§ 4321-4347) as amended, 42 U.S.C. 4321, et seq. *Pending.* This integrated EA and Finding of No Significant Impact (FONSI) has been prepared in accordance with the Council on Environmental Quality's NEPA Implementing Regulations (40 C.F.R. §§ 1500-1508). Because no significant impacts to the environment were identified, an Environmental Impact Statement (EIS) is not required. Signing of the FONSI will conclude compliance with the NEPA.

Noise Pollution and Abatement Act of 1972 (42 U.S.C. §§ 4901-4918). *In compliance.* The Noise Pollution and Abatement Act establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. Federal agencies are required to limit noise emissions to within compliance levels. Noise emission levels at the Project site may increase above current levels temporarily if construction of improvements or features identified in the proposed master plan revision is undertaken. Appropriate measures would be taken during those activities to keep the noise level within the compliance levels.

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403). *In compliance.* Section 10 of the Rivers and Harbors Act prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable

water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The actions identified in the proposed master plan update would not involve the construction of structures within Green River Lake.

Floodplain Management (E.O. 11988). *In compliance.* Section 1 of the Executive Order on floodplain management requires each agency to provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities. The actions identified in the proposed Master Plan would not affect the flood holding capacity or flood surface profiles of the Project.

Protection of Wetlands (E.O. 11990). *In compliance.* The Executive Order on protection of wetlands directs that Federal agencies shall take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities. Each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands, which may result from such use. The proposed action classifies the land use of all known wetlands as environmentally sensitive areas, which prohibits construction or agriculture and therefore gives added protection to the wetlands on the Project. The actions identified in the proposed master plan revision would not involve construction in, or effects to, wetlands.

CHAPTER 8 – PUBLIC AND AGENCY COORDINATION

8.1 PUBLIC AND AGENCY COORDINATION OVERVIEW

Public involvement is important to the overall success of the master planning effort. Stakeholder and public meetings were held in Spring 2022 with the intent of providing the public, stakeholders, and other public agencies opportunities to participate in developing the Master Plan (Appendix A). In addition to these meetings, the draft report is also released for a public and agency review for further input. The sections below discuss these reviews, as well as the initial input received at the beginning of the master planning process.

8.2 ENVIRONMENTAL JUSTICE AND PUBLIC OUTREACH

The master planning effort incorporated a proactive approach to environmental justice during the public and agency coordination process by providing a variety of methods supporting stakeholder and public interaction. In addition to the stakeholder and public meetings, a website, news releases, and social media postings were also developed to promote public involvement. This allowed for greater opportunity to provide comments and input and fostered a more collaborative environment in which to create a vision for the future of Green River Lake. Additionally, USACE improved this effort by conducting meetings that are both virtual and in-person to better accommodate those without access to computers or phones.

In the future, USACE presence at an informational booth or tent at conferences, festivals and other local events could facilitate discussions and provide in-person opportunities for the public to provide comments in a more casual environment as opposed to a formally organized meeting. Events where the local population would already be in attendance will facilitate access to a broader range of perspectives and feedback.

8.3 INITIAL STAKEHOLDER AND PUBLIC MEETINGS

The USACE policy guidance in ER 1130-2-550 and EP 1130-2-550 requires thorough public involvement and agency coordination throughout the Master Plan revision process, including any associated NEPA process. Public involvement is especially important at Green River Lake to ensure that future management actions are both environmentally sustainable and responsive to public outdoor recreation needs in the region.

On July 18, 2022, USACE employees hosted two public meetings, one for the stakeholders and one for the public, to allow opportunities to review and comment on the Master Plan process. The stakeholder meeting invitation was extended to various entities with financial and/or recreational development ties to the lake. The public meeting invitation was extended to the general public and was open to all interested persons to attend. The USACE Public Affairs Office (PAO) prepared a press release that was advertised on USACE websites and social media. Staff provided the participants with information on the structure of the public meeting and comment forms, and the Lake Project Manager provided a history of

Green River Lake and current conditions. Large scale maps and visual graphics were included in the presentations. A copy of the presentation provided during these meeting is included in Appendix A.

USACE employees were available to answer questions and receive comments during and after the meetings. Interested persons had the opportunity to comment about the Project using a variety of methods:

- Submitting comments to the Lake Project office via mail;
- Giving verbal comments;
- Submitting comments via an interactive online map; and
- Submitting comments using electronic mail.

There were nearly 30 attendees at the stakeholder meeting and 10 attendees at the public meeting. The public comment period was open from July 18, 2022 – August 19, 2022. All comments received were considered, and some proposals were integrated into the Draft Master Plan, as appropriate. Table 27 provides a summary list of comments and, if the comment was integrated into the Master Plan, the section where it was integrated. The full, uncondensed public comments are in Appendix C.

Table 27. Public comment summary

Public Comment	Master Plan Reference
Consider extending the no-wake area across lake at Holmes Bend Marina to prevent damage to boat and slips.	Master Plan Resource Objectives in Section 3.1.2 were modified to address comment through creation of an inventory of areas of the lake that may need additional protection.
Prevent private development around lake.	Master Plan Resource Objectives in Section 3.1.2 were modified to address sustainable development of Project resources as well as outreach to adjacent landowners on policies to reduce encroachment actions.
Need cooperative programs between local business and USACE to add business names to existing signage.	Master Plan Resource Objectives in Section 3.1.2 were modified to address partnerships with other managing agencies. However, adding private business advertisements to USACE signage is out of the scope of this Master Plan.
There is potential for horse trail development by working with Trail Town.	Master Plan Resource Objectives in Section 3.1.2 were modified to address the potential for additional horse trails around the lake.
There are good historical resources in the area such as Tebbs Bend, Site 1, Homeplace, and Hiestand House.	Master Plan Resource Objectives in Section 3.1.2 were modified to address protection and improved visibility of historic areas.
The lake provides good economic benefits to the community.	Economic benefits are discussed in Section 2.11.4.
The lake has good quality bird watching (Eagles/Ospreys)	Master Plan Resource Objectives in Section 3.1.2 were modified to address the stewardship of the lake to protect habitat and native species.
Interest in more lakefront campsites.	Master Plan Resource Objectives in Section 3.1.2 were modified to address facilities in need of

Public Comment	Master Plan Reference
	modification to prevent overuse, conflict, and public safety concerns.
The Green River is the 4th most biologically diverse in the country.	Master Plan Resource Objectives in Section 3.1.2 were modified to address the stewardship of the lake to protect habitat and native species.
The lake has strong partners such as Friends of Green River and Trail Town.	Master Plan Resource Objectives in Section 3.1.2 were modified to address partnerships with other agencies and volunteer groups.
The lake has many aging trees.	Master Plan Resource Objectives in Section 3.1.2 were modified to address removal and replacement of diseased trees.
Issues with invasives such as Multi Flora Rose, Bush Honeysuckle, Autumn Olive, and Tree of Heaven as well as fauna species like the Emerald Ash Borer. Prevention of invasives that haven't reached Green River Lake yet (hydrilla, zebra mussels)	Master Plan Resource Objectives in Section 3.1.2 were modified to address the stewardship of the lake to protect habitat and native species.
Issues with flooding, particularly the campgrounds near lake.	Master Plan Resource Objectives in Section 3.1.2 were modified to address erosion and protection of shoreline vegetation. However, some flooding of low-lying areas is expected and is not addressed within the Master Plan.
There are access issues due to steep terrain around lake.	Master Plan Resource Objectives in Section 3.1.2 were modified to address improved recreation facilities and increase public access on USACE managed lands.
Issues with aging infrastructure (roads, buildings, sewer lines, etc.)	Master Plan Resource Objectives in Section 3.1.2 were modified to address facilities in need of modification to prevent overuse, conflict, and public safety concerns.
Undersized campgrounds/recreation for visitation levels- need sustainable balance.	Master Plan Resource Objectives in Section 3.1.2 were modified to address facilities in need of modification to prevent overuse, conflict, and public safety concerns.
Opportunity for licensing for foraging (edible plants) or plant harvesting partnerships with tribal nations.	Master Plan Resource Objectives in Section 3.1.2 were modified to address evaluating opportunities for education and outreach regarding harvesting partnerships.
Opportunities for USACE outreach – Generational visitation and volunteer opportunities.	Master Plan Resource Objectives in Section 3.1.2 were modified to address increased outreach efforts with the community. Section 8.2 discusses environmental justice and outreach.
Invasive species such as hydrilla and zebra mussels that have not yet reached the lake are a threat.	Master Plan Resource Objectives in Section 3.1.2 were modified to address the stewardship of the lake to protect habitat and native species.

Public Comment	Master Plan Reference
Land misuse, vandalism and drugs are a threat.	Master Plan Resource Objectives in Section 3.1.2 were modified to address facilities in need of modification to prevent overuse, conflict, and public safety concerns.
Wake boats are washing away shorelines.	Master Plan Resource Objectives in Section 3.1.2 were modified to address erosion and protection of shoreline vegetation.
Climate change and its impacts are a concern.	Master Plan Resource Objectives in Section 3.1.2 were modified to address sustainability. Climate change is discussed in Section 2.2
The Campbellsville/Taylor County Trail Town Connectivity Master Plan proposes trail connections to the lake.	Master Plan Resource Objectives in Section 3.1.2 were modified to address improved recreation facilities and increase public access on USACE managed lands. Section 6.3 discusses the Trail Town Connectivity Master Plan specifically.
Make docks larger to accommodate larger boats.	Master Plan Resource Objectives in Section 3.1.2 were modified to address facilities in need of modification to prevent overuse, conflict, and public safety concerns.

8.4 PUBLIC AND AGENCY REVIEW OF DRAFT MP, EA AND FONSI

The draft final Master Plan with integrated Environmental Assessment was made available for public and agency review on TBD. The process of announcing the availability of the draft final Master Plan and the requirements for submitting comments was identical to the process described above for the initial scoping workshops held in July 2022. A list of agencies that were contacted during the public review period are in Table 28, below. Public and agency comments for the draft final Master Plan were accepted through TBD. At the end of the comment period a total of TBD written comments were received, TBD from the general public and TBD from an agency or organization. A summary of comments received and the USACE response to the comments is provided in Table 29, below. Copies of letters received from governmental entities are included in Appendix A. Upon incorporation of public comment into the draft final Master Plan with integrated EA and FONSI, final versions will be prepared and signed by the District Engineer for implementation. The final versions will be posted on the Louisville District website.

Table 28. List of agency and Tribal contacts for public review of the draft 2023 Green River Lake master plan.

Stakeholder Type	Stakeholder
Federal Agencies	U.S. Fish and Wildlife Service, Kentucky Field Office
	Environmental Protection Agency, Region 4 Office
	U.S. Geological Survey Ohio-Kentucky-Indiana Water Science Center
	National Resource Conservation Service, Kentucky Office
State Agencies	Kentucky Department of Fish and Wildlife Resources
	Office of Kentucky Nature Preserves
	Kentucky Heritage Council

	Kentucky Division of water
	Kentucky Department for Natural Resources
	Kentucky Division for Air Quality
	Kentucky Division of Waste Management
	Kentucky Transportation Cabinet
Local Officials	County Judge Executive
Non-Governmental Organizations (NGO's)	The Nature Conservancy of Kentucky
	The Sierra Club, Kentucky Chapter
	Kentucky Environmental Foundation
	Kentucky Heartwood
	Kentucky Waterways Alliance
	Kentucky Resources Council
	River Fields
Tribes	Shawnee Tribe
	Cherokee Nation
	Eastern Shawnee
	Absentee Shawnee Tribe
	United Keetoowah Band of Indians
	Eastern Band of Cherokee Indians

The Kentucky State Historic Preservation Office (SHPO) will respond in a letter that their office agrees or disagrees with the designation of cultural sites as environmentally sensitive areas (ESA) and the proposed action would have a beneficial effect on cultural resources. If the SHPO concurs, the locations classified as ESAs remain the same in the final Master Plan as presented in the [MP Date] draft.

INSERT COMMENT SUMMARY TABLE AFTER PUBLIC REVIEW

CHAPTER 9 – SUMMARY OF RECOMMENDATIONS

This Master Plan conceptually establishes and guides the orderly development, administration, maintenance, preservation, enhancement, and management of all natural, cultural, and recreational resources at Green River Lake. The Master Plan is a land use management document and does not address water management operations, associated prime facilities (dam, spillway, etc.), or shoreline management as those operations are outlined in separate documents. This Master Plan is stewardship-driven and seeks to balance recreational development and use with protection and conservation of natural and cultural resources.

The following are focal points within this document that will assist USACE management in facing contemporary challenges well into the future.

9.1 LAND CLASSIFICATIONS

A key component in preparing this Master Plan was examining prior land classifications and addressing the needed transition to the new land classification standards. During the public involvement process USACE sought public input into whether, besides the simple change in nomenclature, a shift in land classification was desired (for example, should lands with a recreation classification be reclassified to a wildlife classification or vice versa). Chapter 8 of the Plan describes the public input process.

The land classifications presented in the Plan were formulated based on these public comments and the USACE Green River Lake Project staff, Operations Division Staff and the master plan Project Delivery Team and based on first-hand experience, professional training, and best management practices.

There were approximately 26,000 acres reclassified or updated to a new land classification name and over 8,000 acres of water reclassified. All changes reflect historic and projected public use and new guidance from ER 1130-2-550 and EP 1130-2-550. A summary of acreage changes from prior land classifications to the current classifications is provided in Table 28, below.

Table 29. Land classification summary

CLASSIFICATION	2023 Master Plan Acres	1964 Master Plan Acres
LAND		
Project Operations	552	271
Specific Recreation Lands*	-	3,017
Intensive Recreation*	-	928
High Density Recreation	2466	-
Light Density Recreation*	-	4,010
Mitigation	-	-
Operations, Forest Reserve Land*	-	6,182

CLASSIFICATION	2023 Master Plan Acres	1964 Master Plan Acres
LAND		
Operations, Wildlife Management*	-	9,654
Environmentally Sensitive Areas (ESAs)	2,187	-
Multiple Resource Management Lands: Low Density Recreation***	7	-
Multiple Resource Management Lands: Wildlife Management***	20,942	-
Multiple Resource Management Lands: Vegetative Management	-	-
Multiple Resource Management Lands: Future/Inactive Recreation	-	-
Fish and Wildlife	-	-
WATER		
Designated No-Wake**	286	-
Restricted**	35	-
Open Recreation (does not include Designated No-Ski) Designated No-Ski	5402 2487	-
Fish and Wildlife Sanctuary**	-	-

*Classifications are now obsolete based on ER 1130-2-550 and EP 1130-2-550

**Water zoning was established in the 1981 update of the 1964 preliminary Master Plan, but acreages were not calculated

***Acreages reflect updates including the closure of Wilson Creek campground and transfer of 39 acres of Low Density land to Wildlife Management, expected to occur after September 2023

9.2 IMPROVED RECREATION

While Green River Lake provides comprehensive recreational opportunities throughout the Project, there are still some areas for improvement that will increase the overall recreational experience for users. New and improved recreation facilities and increased public access through trail connections, focus on stewardship and preservation of the lake's natural resources, and strong partnerships were all themes mentioned throughout the public input process.

Modernization and expansion of existing recreational facilities could greatly improve current conditions at Green River Lake. Modernization could include upgrades to boat docks and fishing piers, renovations or replacements of existing restroom facilities or additional restrooms, additional parking, and expanding or improving the campgrounds and trail system to provide a better experience.

Specific recommendations for individual Project Site Areas are provided in more detail in Section 5. These recommendations reflect the Resource Objectives provided in Section 3.1.2. Chapter 6 provides additional information regarding access and flooding concerns.

CHAPTER 10 – BIBLIOGRAPHY

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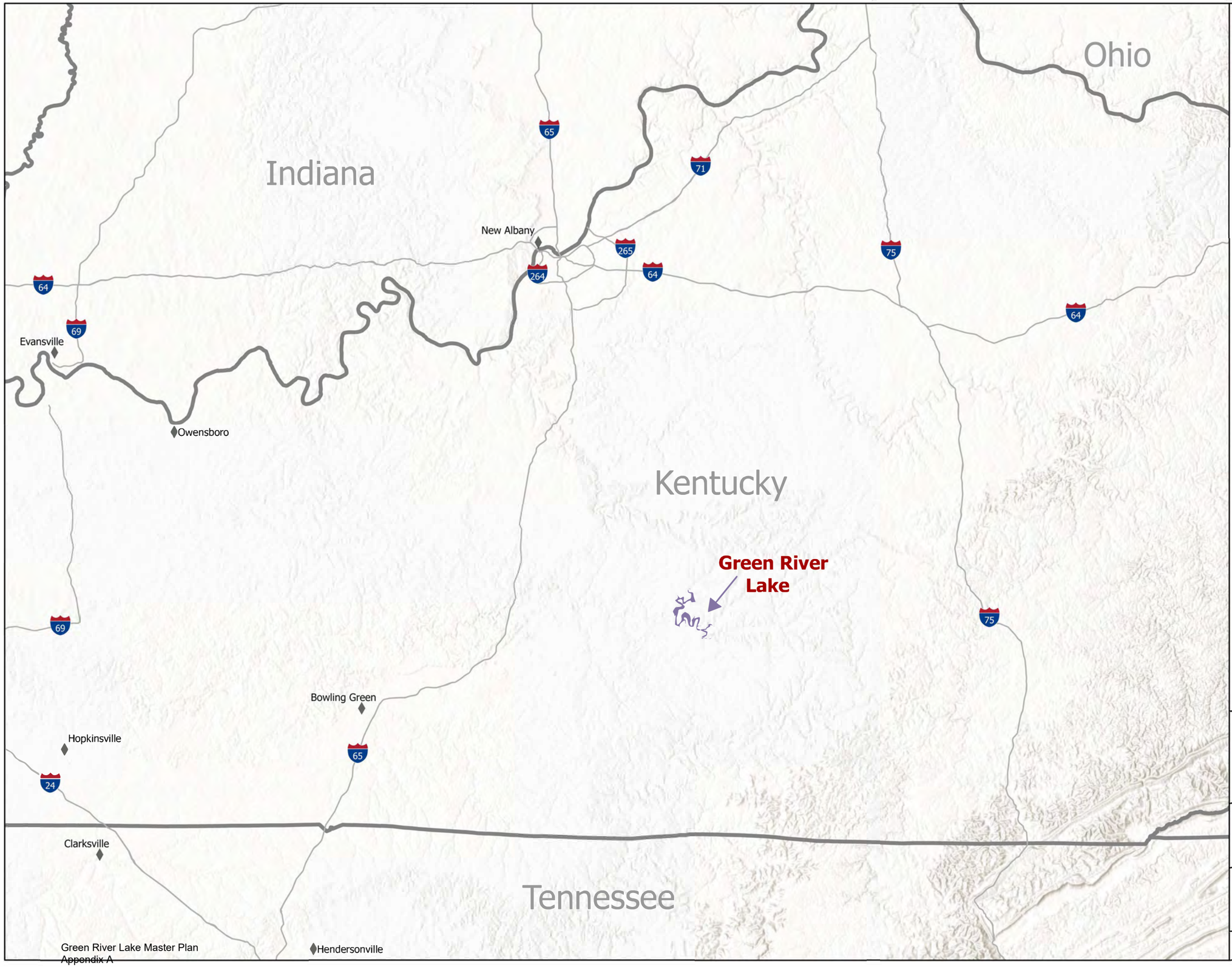
United State Army Corps of Engineers
Louisville District

Green River Lake Master Plan
2023

Appendix A:

Project Maps



Legend

- City
- Interstate
- Summer Pool
- State

N
W E
S

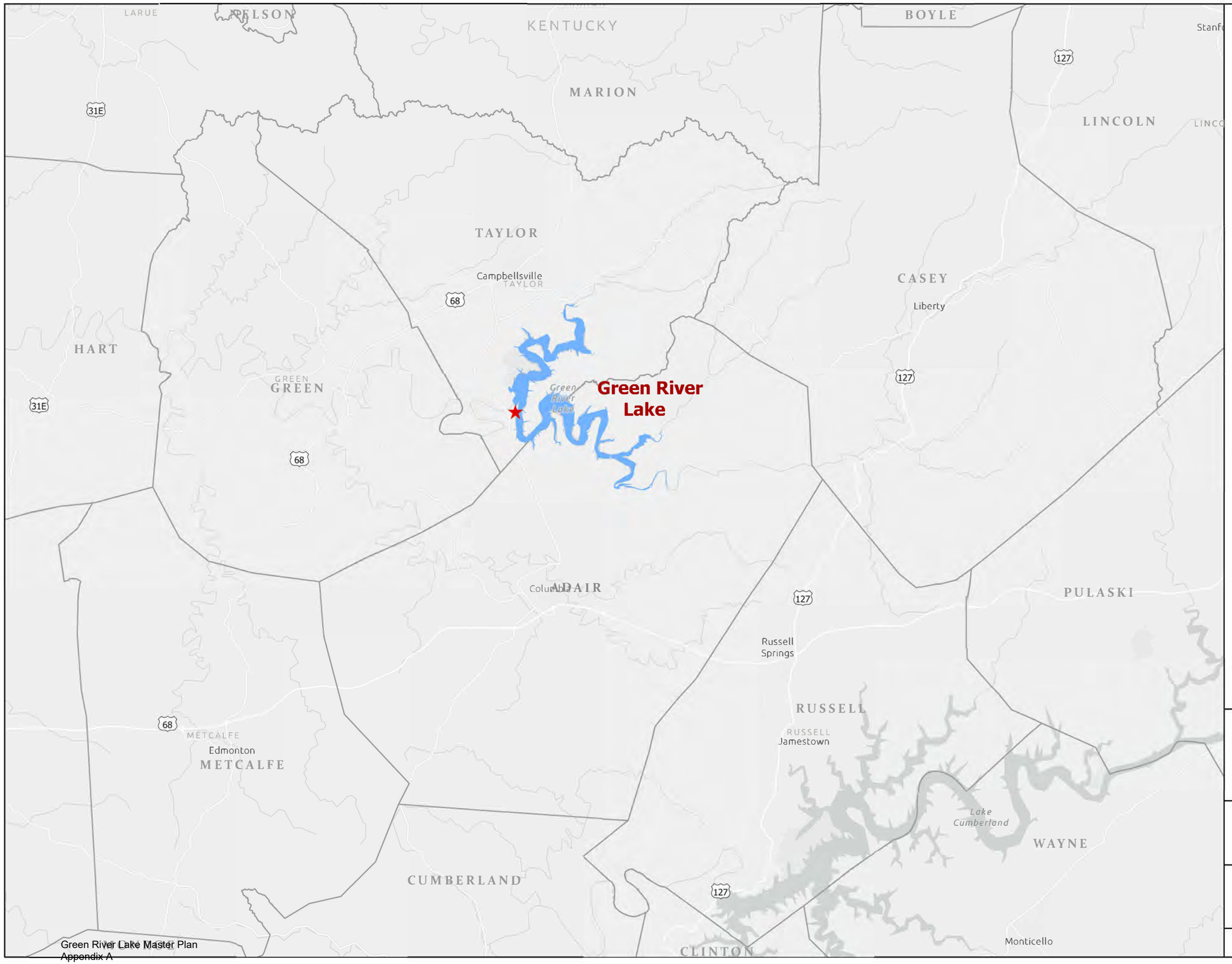
0 5 10 20 30 Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

State Map

Date: 10/18/2022



Legend

- Corps Office
- Summer Pool
- County

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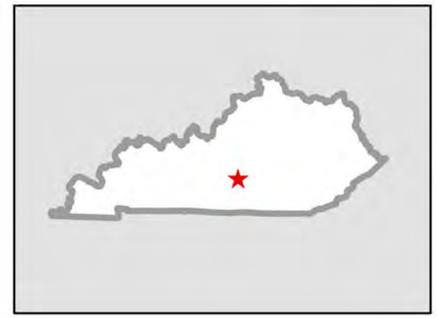
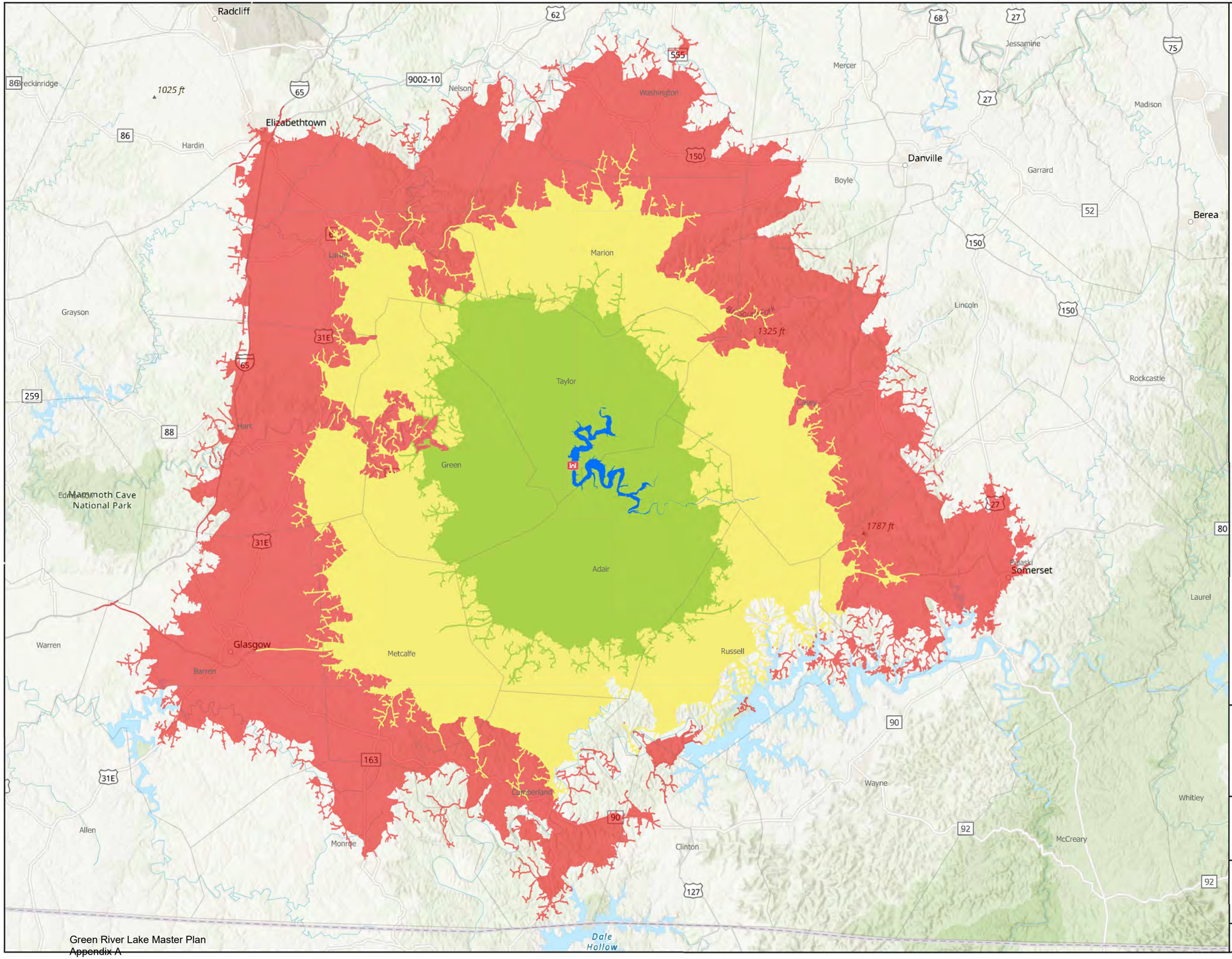


U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

Local Map

Date: 10/20/2022



Legend

- County
- USACE Office
- Summer Pool

Green River Lake Drive Time

- 0 - 30 Minutes
- 30 - 45 Minutes
- 45 - 60 Minutes

N
W E
S

0 3 6 12 18
Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

Drive Time

Date: 8/16/2022

Legend

- USACE Office
- Operations

N
W E
S

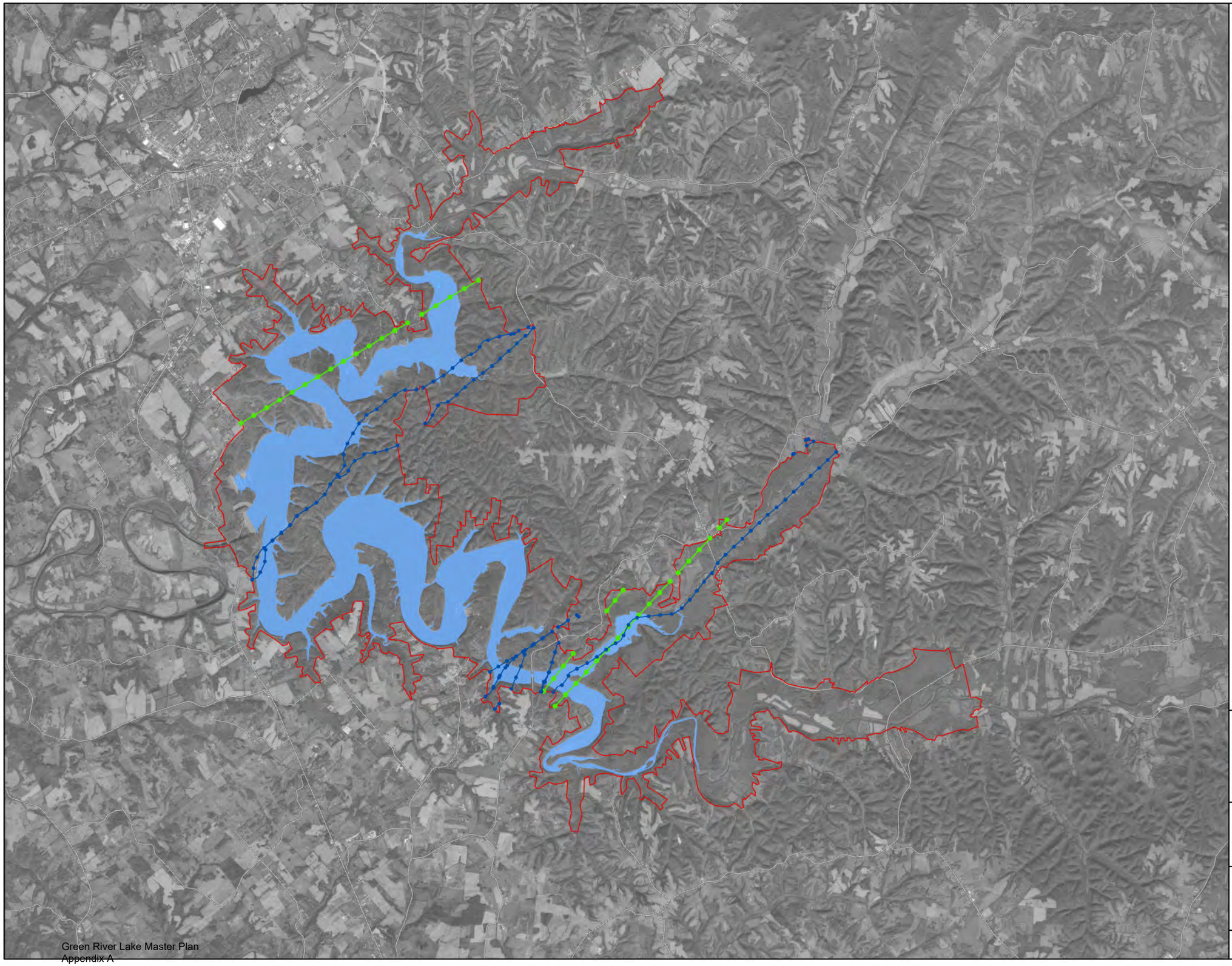
0 0.07 0.15 0.3
Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

Operations Area

Date: 8/16/2023



Legend

- Oil Natural Gas Pipelines
- Natural Gas Liquid Pipelines
- Summer Pool
- Fee Boundary

N
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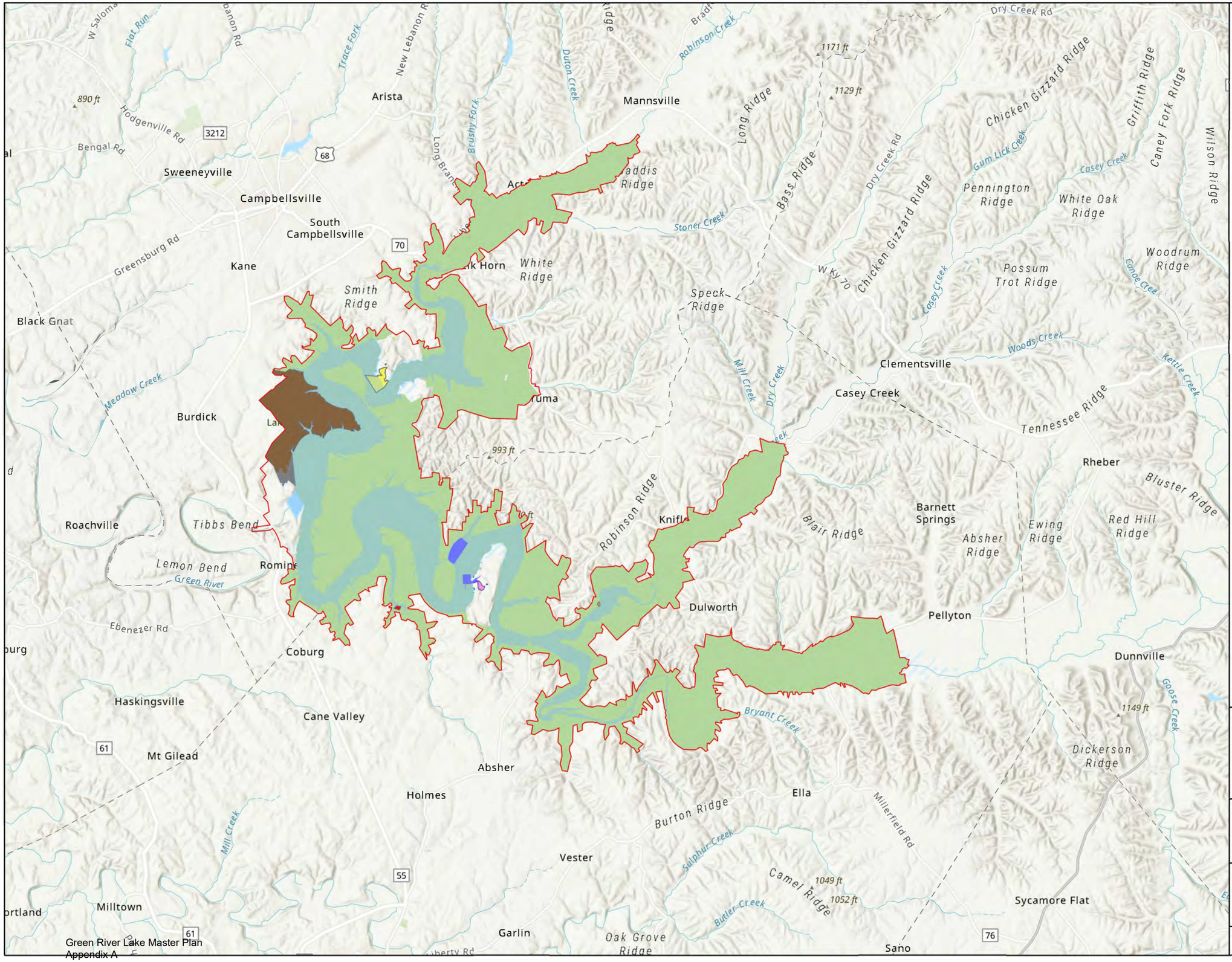
0 0.5 1 2 3
Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

Major Utility

Date: 8/16/2023



Legend

- Fee Boundary
- Summer Pool

Outgrant Type

- License to Commonwealth of Kentucky (KYDFWR) for Fish & Wildlife Activities - Wilson Creek WMA (871 Acres)
- Lease to David Butler for Holmes Bend Marina
- Lease to Adair County Fiscal Court for Parks and Rec (Arnold's Landing Boat Ramp)
- Lease to Emerald Isle Marina, Incorporated
- Lease to Adair County Fiscal Court for Parks and Rec (Butler Creek Access Site)
- Lease to Holmes Bend Rentals, Inc. for Holmes Bend Cabin Rentals
- 1,313 Acre Lease to Commonwealth of Kentucky for Parks and Rec

N
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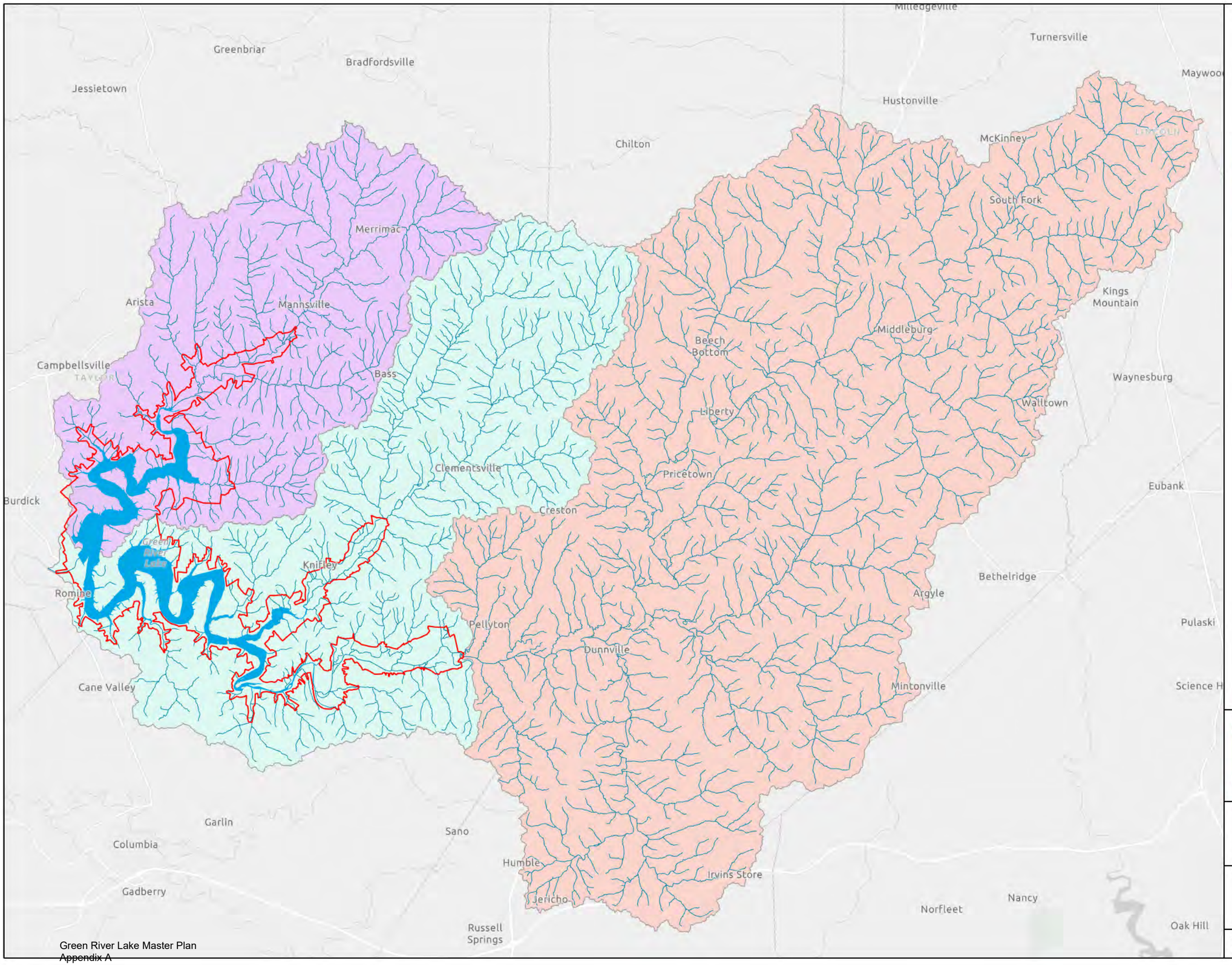
0 0.5 1 2 3 Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

Major Outgrants

Date: 10/6/2022


Greenbriar
Bradfordsville
Jessietown
Millcreek
Turnersville
Hustonville
Chilton
McKinney
South Fork
Merrimac
Arista
Mannsville
Kings Mountain
Middleburg
Beech Bottom
Campbellsville
Bass
Waynesburg
Liberty
Walltown
Clementsville
Pricetown
Eubank
Burdick
Creston
Knifley
Bethelridge
Romine
Argyle
Pellyton
Pulaski
Dunnville
Cane Valley
Mintonville
Garlin
Sano
Columbia
Humble
Irvins Store
Gadberry
Jericho
Nancy
Norfleet
Russell Springs
Oak Hill
Legend
Summer Pool
Fee Boundary
Tributaries
Major Watershed
Casey Creek-Green River
Robinson Creek
South Fork Green River-Green River
N
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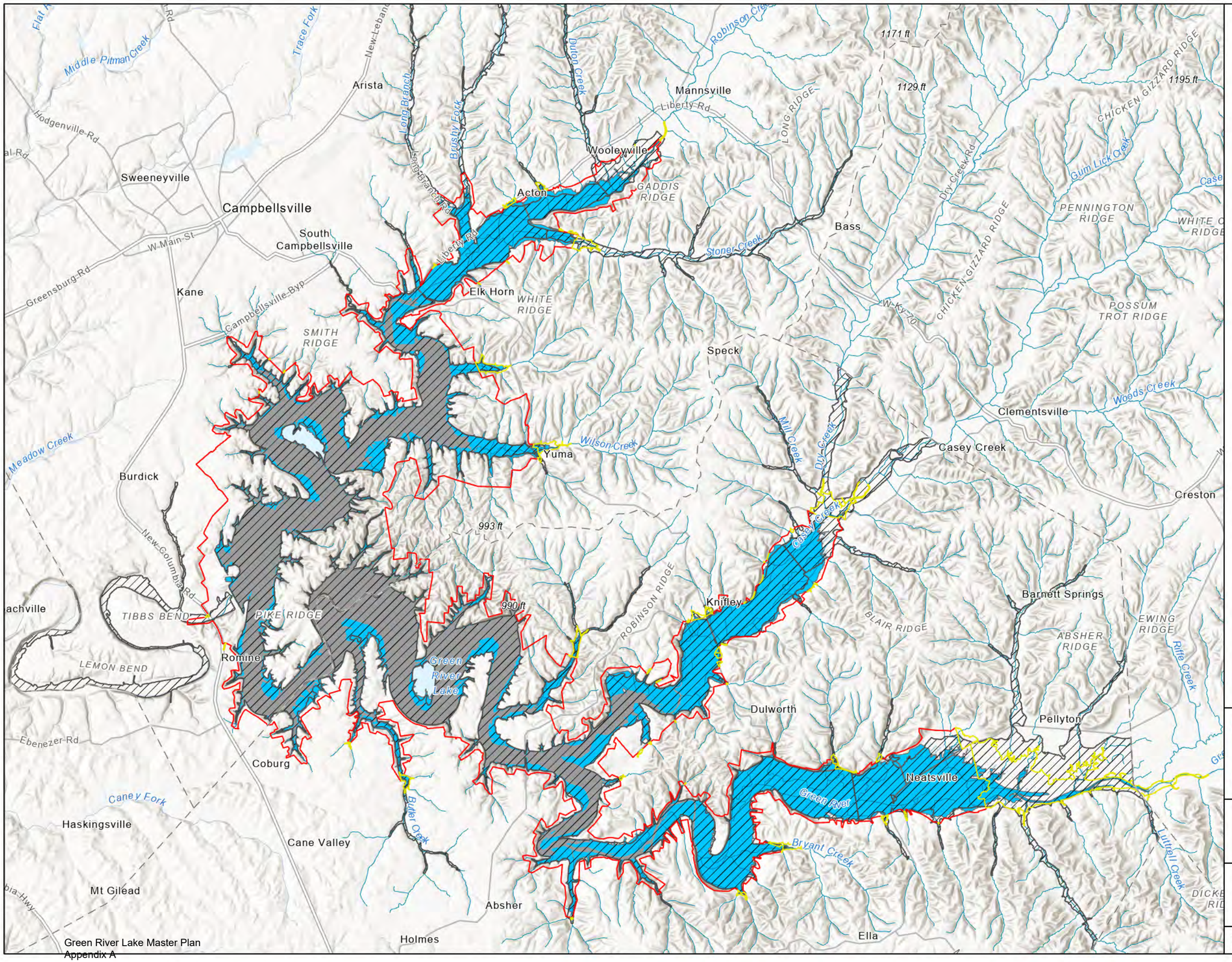
Miles
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
Green River Lake Master Plan - 2023
Upstream Watershed
Date: 8/16/2023

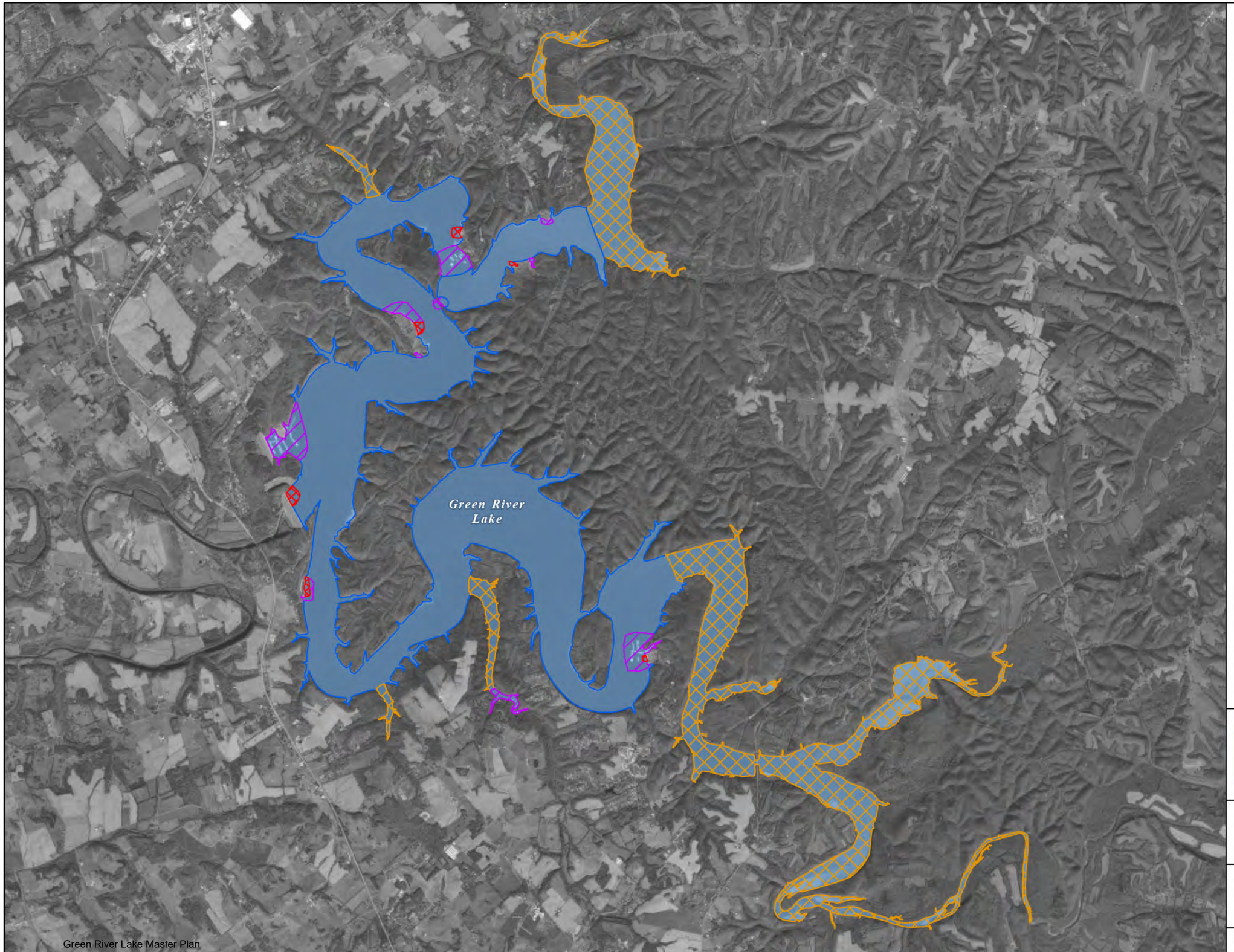


U.S. ARMY CORPS OF ENGINEERS
LOUISIVLLE DISTRICT

Green River Lake Master Plan - 2023

Hydrography

Date: 8/16/2023



Legend

Water Zoning

- No Ski
- No Wake
- Open Recreation
- Restricted
- Summer Pool

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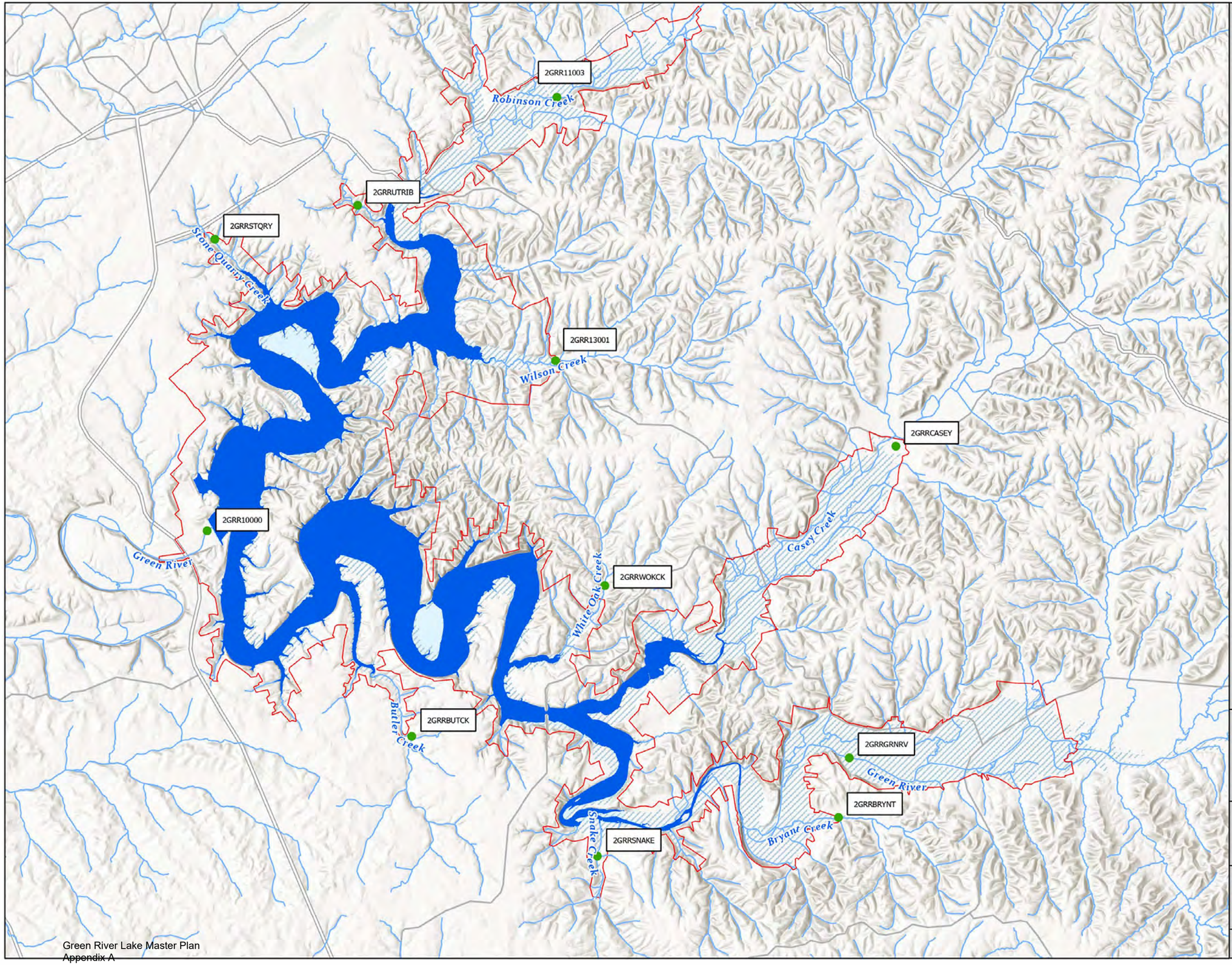
0 0.5 1 2 Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISIVLLE DISTRICT

Green River Lake Master Plan - 2023

Water Zoning

Date: 8/16/2023



Legend

- Bioassessment Samples
- Summer Pool
- Fee Boundary

N
W E
S

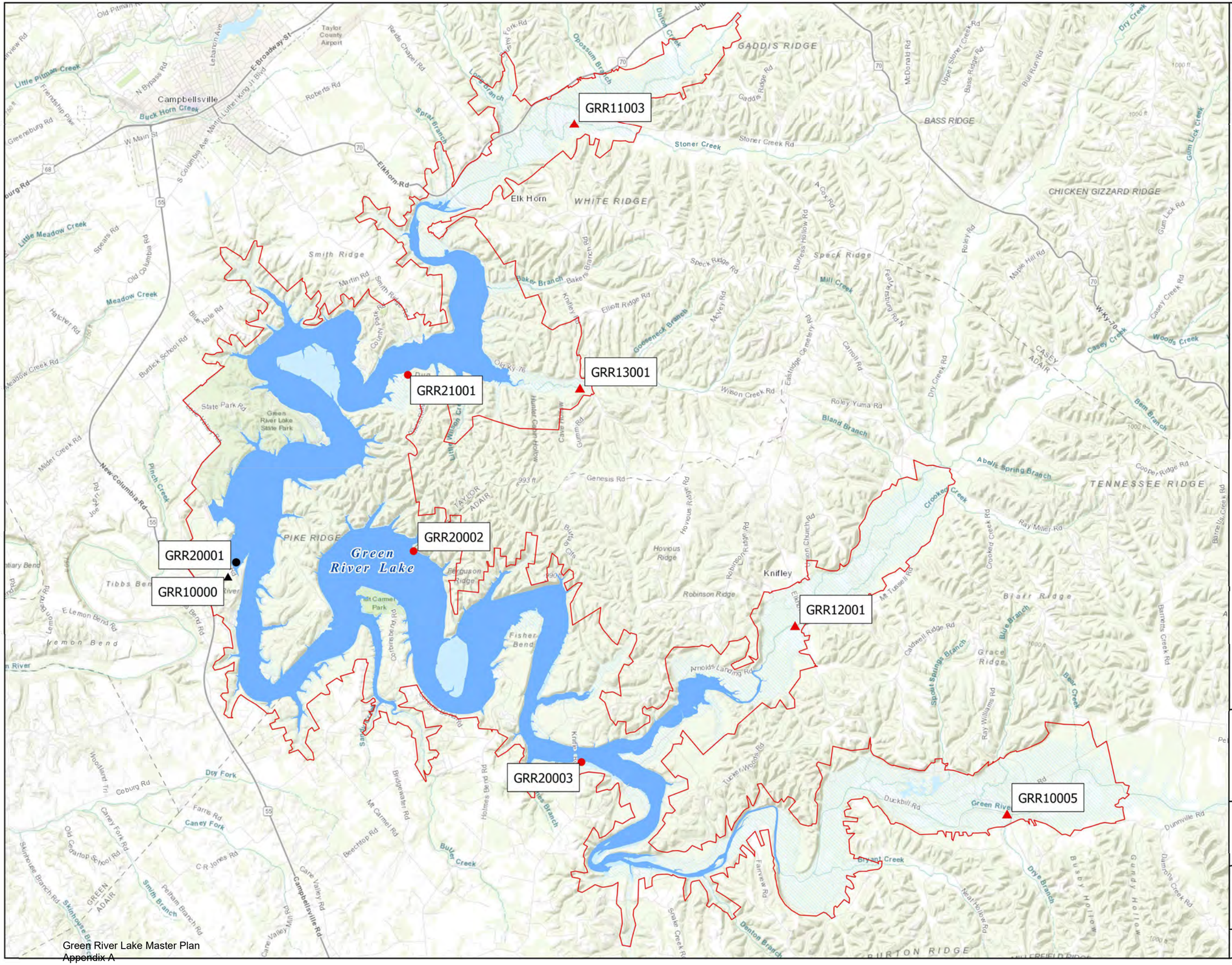
0 0.5 1 2 3 Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

2016 Macroinvertebrate Sampling Locations

Date: 12/14/2022

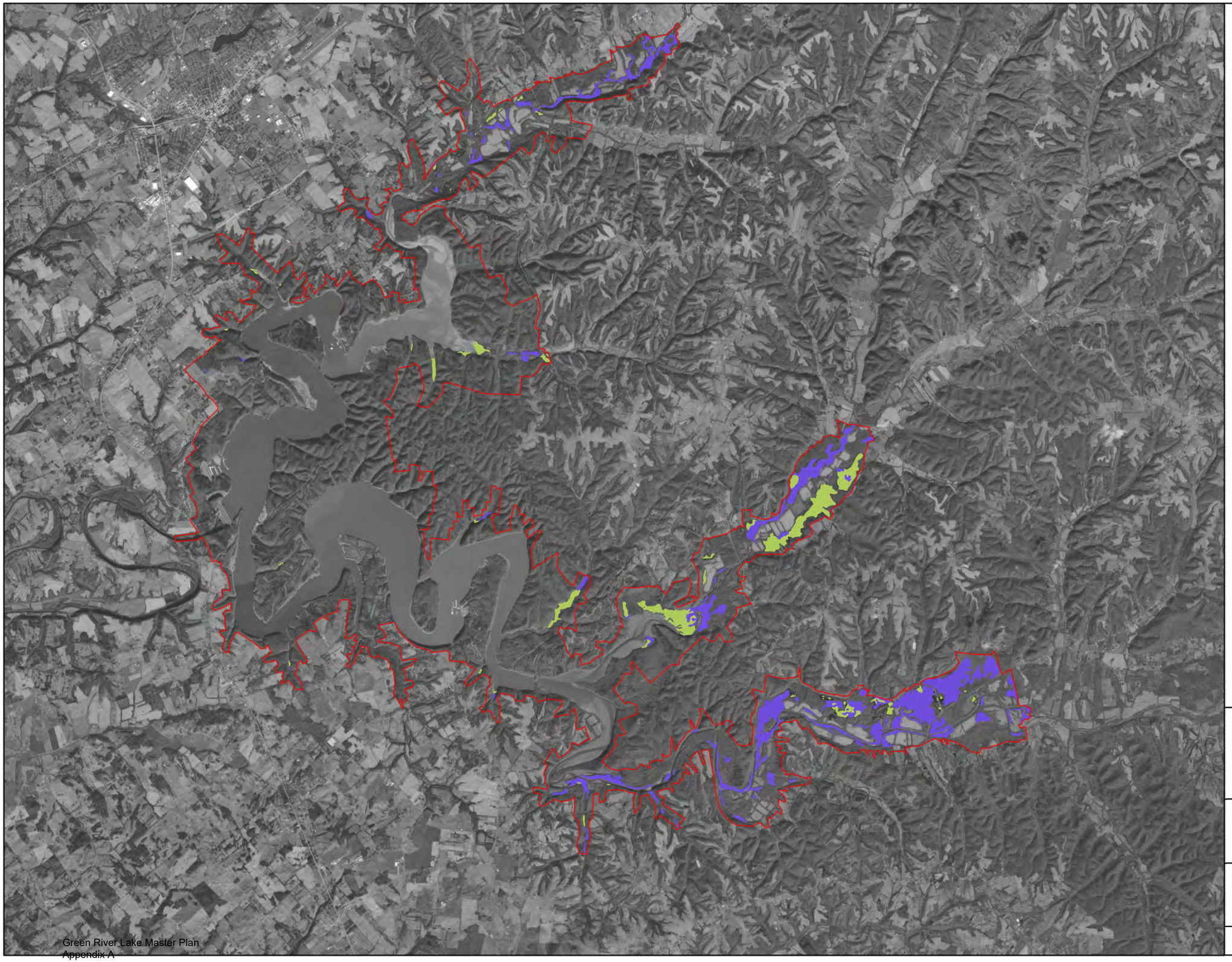


U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

Water Quality Sampling Locations 2020

Date: 12/20/2022



Legend

FeeBoundary

National Wetland Inventory (NWI)

Freshwater Emergent Wetland

Freshwater Forested/ Shrub Wetland

N

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0 0.5 1 2 3 Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

Wetlands

Date: 10/5/2022

Legend

May 1981 Land Allocation

- Operations: Recreation-Intensive Use
- Operations: Recreation-Low Density
- Project Operations
- Operations: Wildlife Management
- Operations: Reserve Forest Land
- Recreation Lands

N
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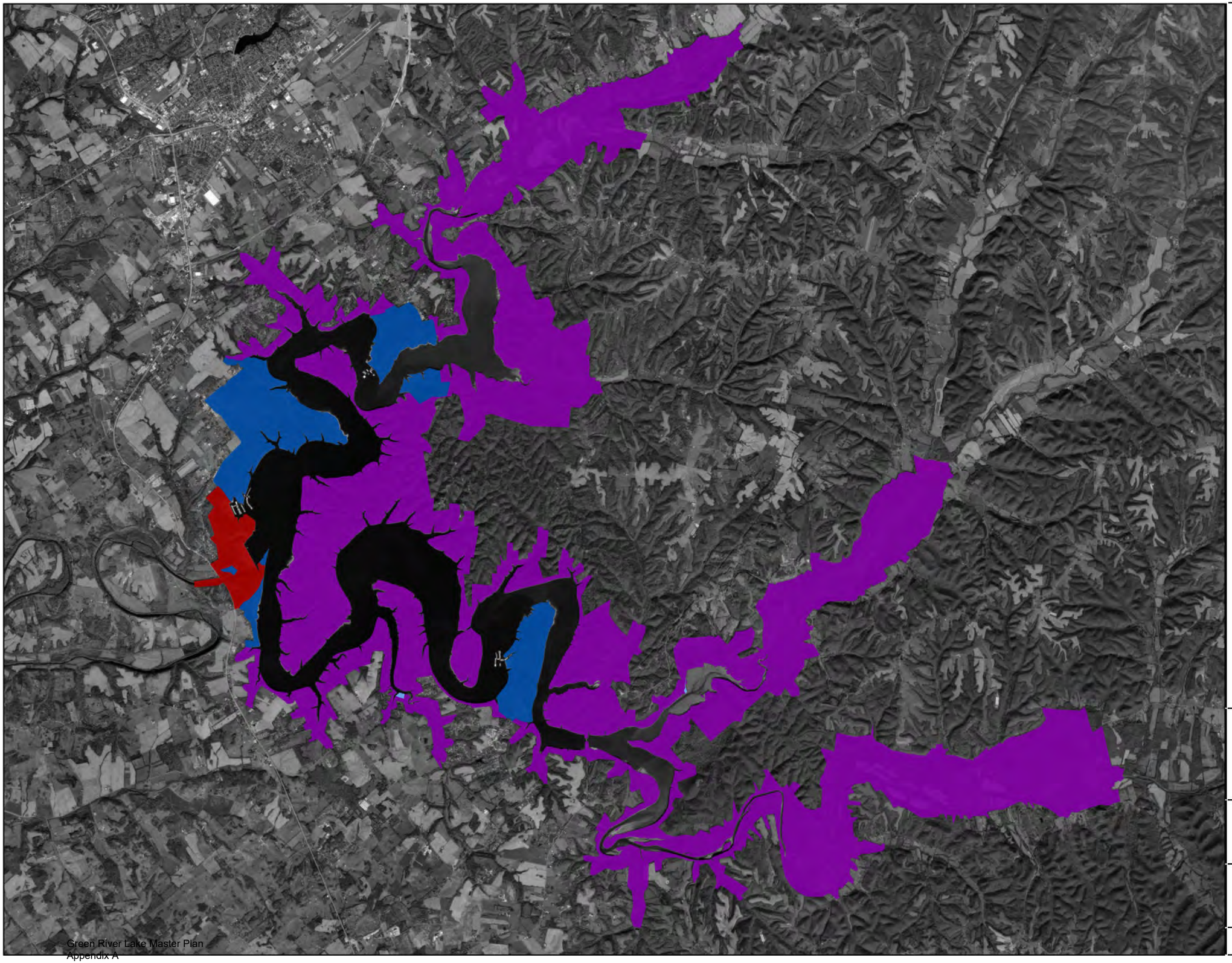
0 0.5 1 2
Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

Original Land Allocation
Published in May 1981 Master Plan

Date: 2/8/2023



Legend

- High Density Recreation Operations
- Multiple Resource Management Lands: Low Density Recreation
- Project Operations
- Multiple Resource Management Lands: Wildlife Management

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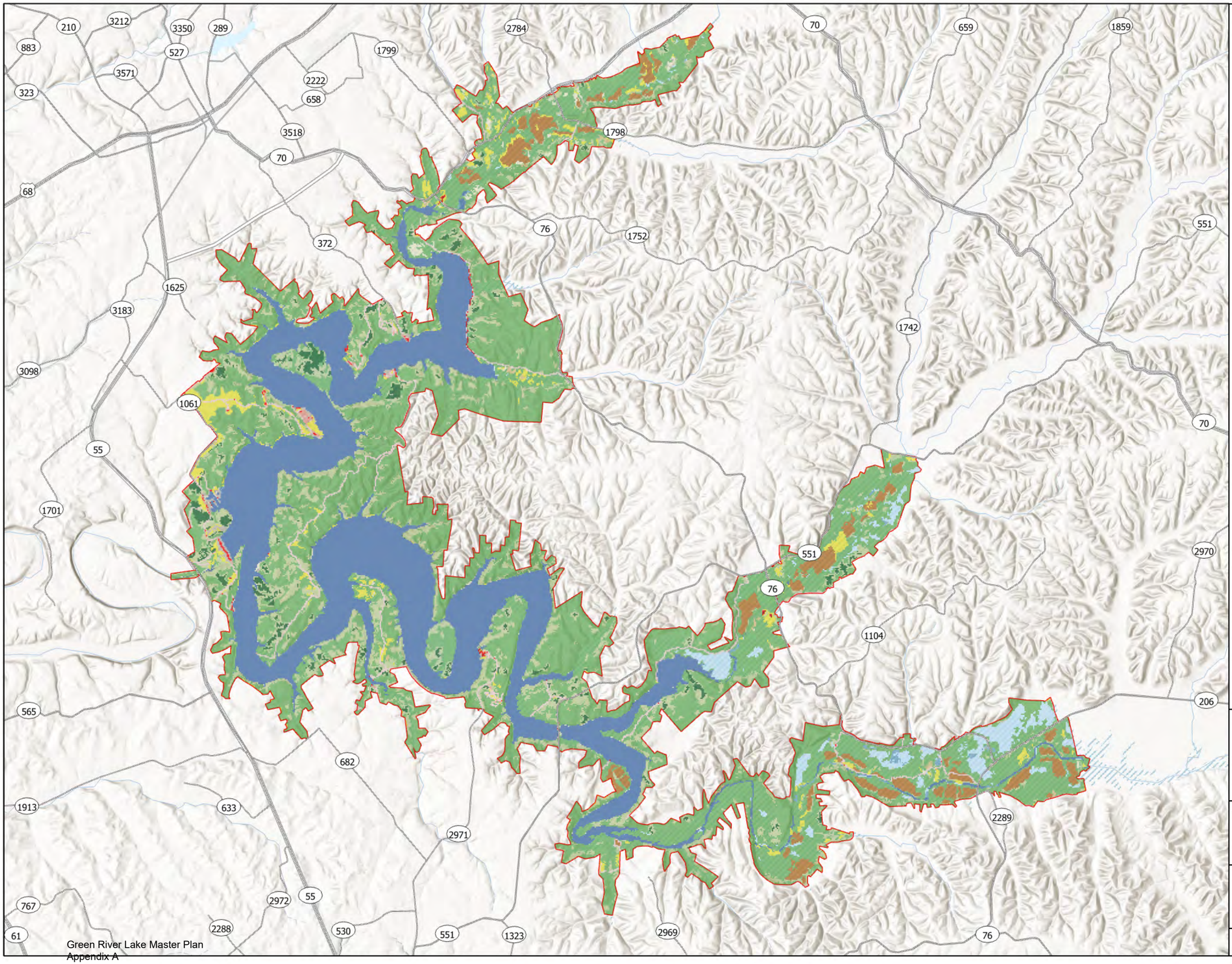
0 0.5 1 2
Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

Land Classification

Date: 5/16/2023



Legend

Landcover

- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Open Water
- Shrub/Scrub
- Herbaceous
- Hay/Pasture
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands
- Fee Boundary
- Major Road

N
W E
S

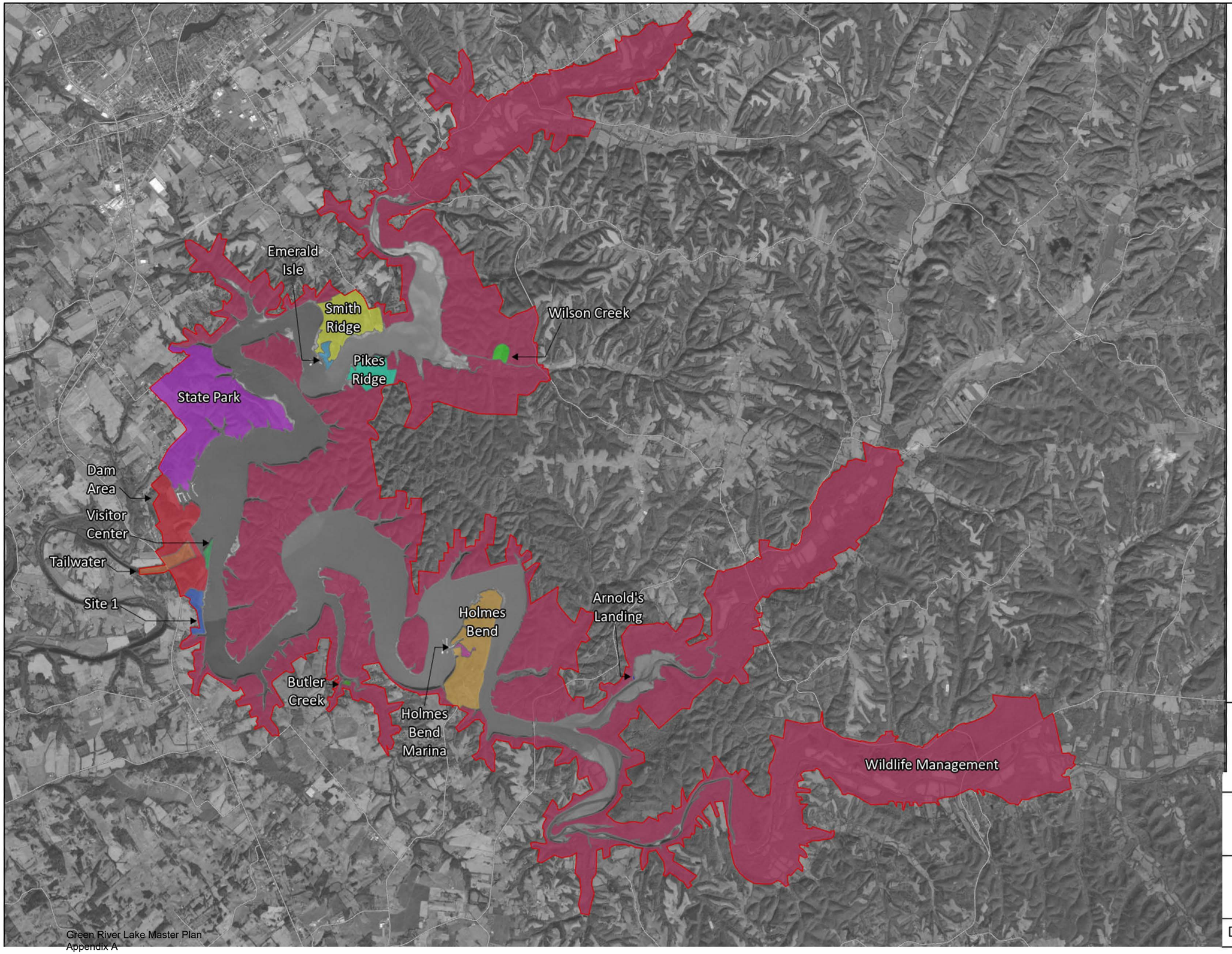
0 0.5 1 2 Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

Landcover

Date: 8/16/2023



Legend

- Arnold's Landing
- Butler Creek
- Dam Area
- Emerald Isle
- Holmes Bend
- Holmes Bend Marina
- Pikes Ridge
- Site 1
- Smith Ridge
- State Park
- Tailwater
- Vistor Center
- Wildlife Mangement
- Wilson Creek
- Major Roads
- Fee Boundary

N
W E
S

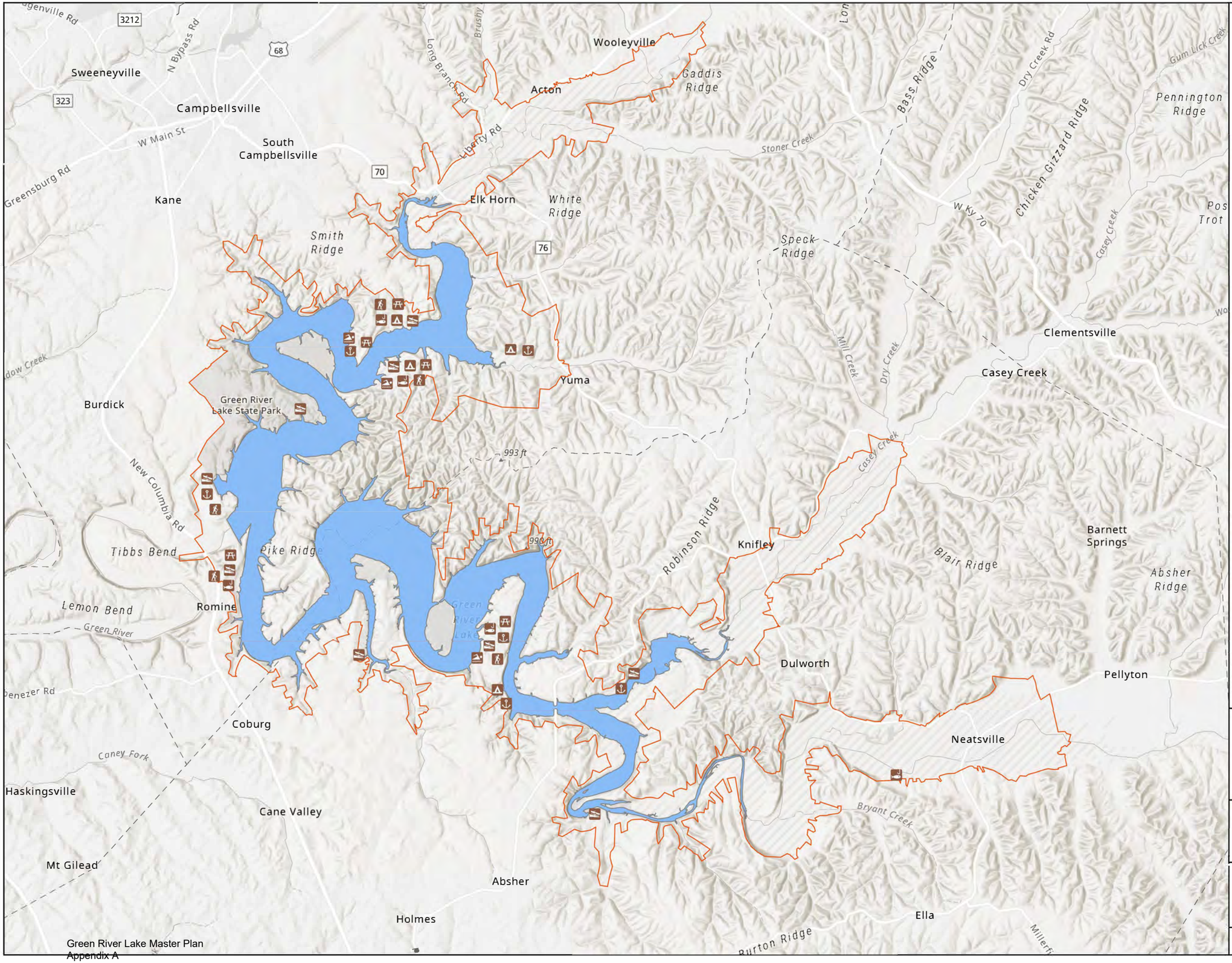
0 2 4 8 12 16
Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

Project Site Area

Date: 11/1/2022



Legend

- Summer Pool
- Fee Boundary
- Beach
- Trailhead
- Marina
- Fishing Feature
- Picnic Area
- Boat Ramp
- Campground

N
W E
S

0 0.25 0.5 1
Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISIVLLE DISTRICT

Green River Lake Master Plan - 2023

Recreation

Date: 8/31/2022

Legend

Percent Slope

- <15%
- 15%- 30%
- 30% - 45%
- 45% - 60%
- >60%
- Summer Pool
- Fee Boundary
- Major Roads

N

W E

S

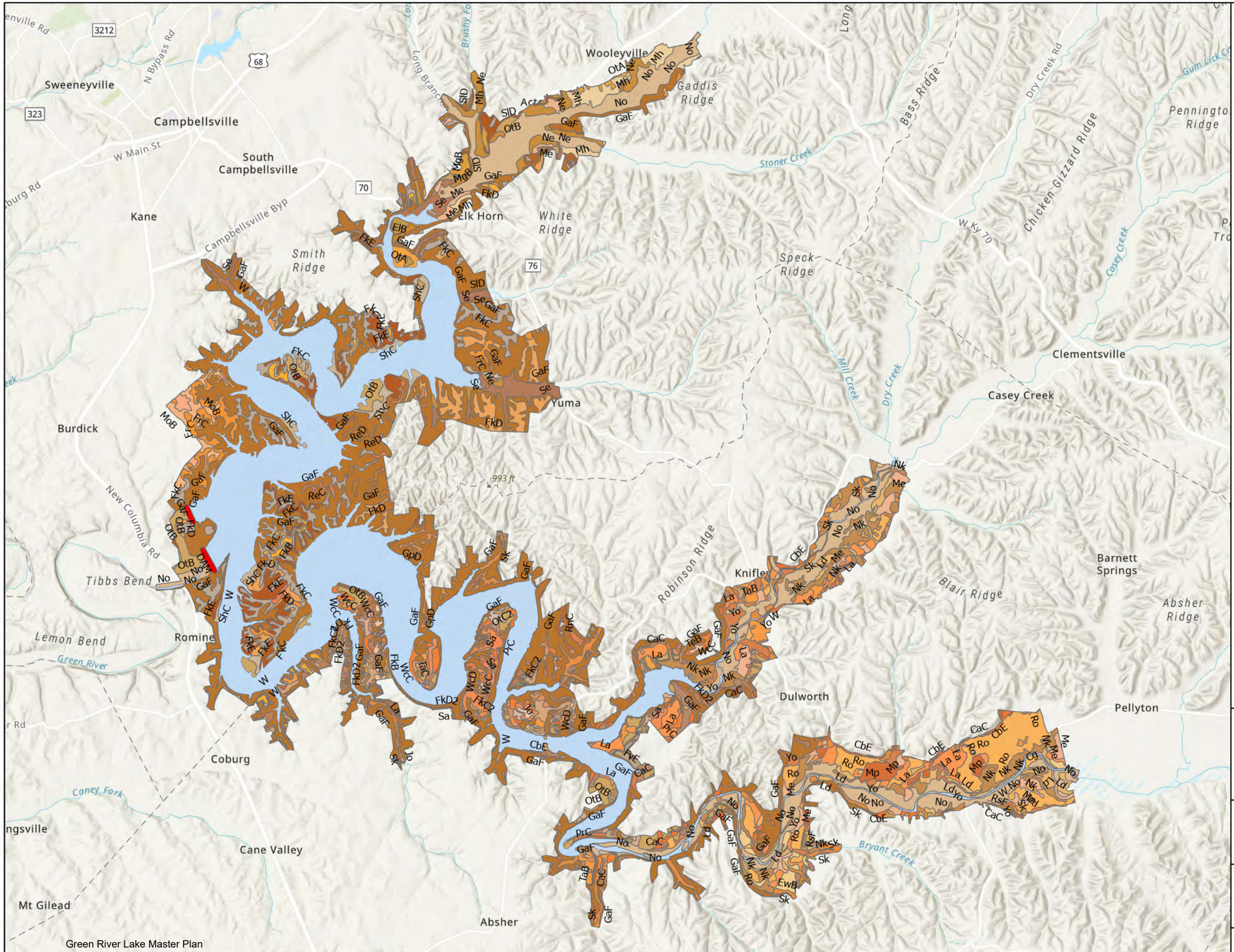
0 0.5 1 2 3 Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Green River Lake Master Plan - 2023

Slope

Date: 8/16/2023


Legend
NRCS Soil Type
CaC
CbE
Cg
CwB
DAM
DcB
ElB
ElC
EwB
FkB
FkC
FkC2
FkD
FkD2
FkE
FrB2
FrC
FrC2
FrD2
FvE
GaF
GpD
Jo
La
Ld
Me
MgB
Mh
MoB
Mp
Ne
Nk
No
OtA
OtB
OtC2
PrB
PrC
ReC
ReD
RnB
RnC
Ro
RsF
Sa
Se
ShB
ShC
Sk
SlD
TaB
TaC
TeB
Ud
W
WcC
WcD
Yo
N
W
E
S
0
0.75
1.5
3
Miles
Sweeneyville
Campbellsville
South Campbellsville
Kane
Burdick
Wooleyville
Gaddis Ridge
Elk Horn
White Ridge
Smith Ridge
Yuma
Speck Ridge
Clementsville
Casey Creek
Bass Ridge
Chicken Gizzard Ridge
Pennington Ridge
Dulworth
Knifley
Barnett Springs
Blair Ridge
Absher Ridge
Robinson Ridge
Pellyton
Romine
Coburg
Lemon Bend
Tibbs Bend
Cane Valley
Absher
Mt Gilead
Stoner Creek
Dry Creek
Mill Creek
Casey Creek
Bryant Creek
Green River
Caney Fork
New Columbia Rd
W Main St
Campbellsville Byp
N Bypass Rd
W Ky 70
993 ft
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT
Green River Lake Master Plan - 2023
Soils
Date: 8/16/2023
20

United State Army Corps of Engineers
Louisville District

Green River Lake Master Plan
2023

Appendix B:
Environmental
Assessment Support
Documentation

United States Department of Agriculture

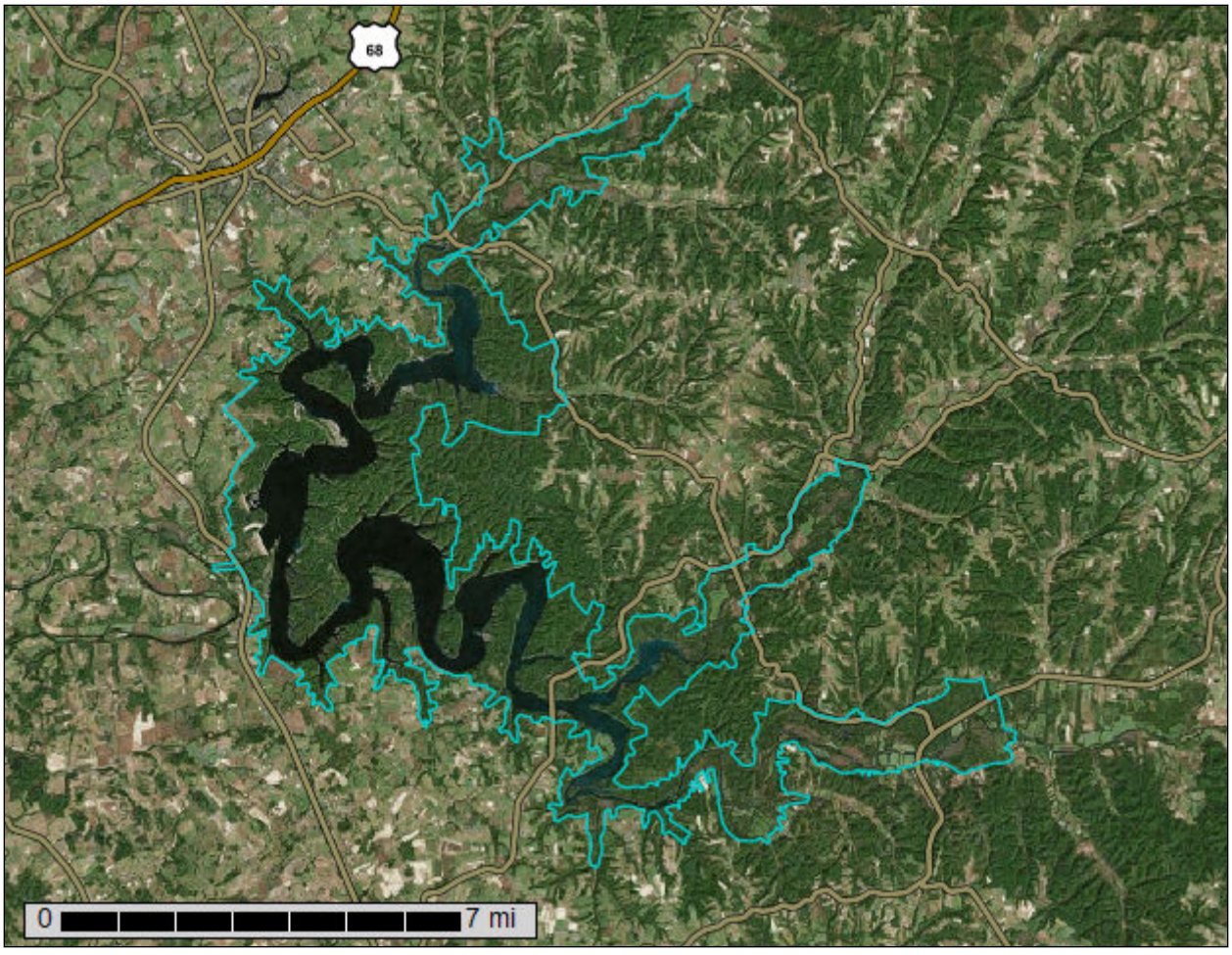
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Adair County, Kentucky, and Green and Taylor Counties, Kentucky

2022 Green River Lake Master Plan Update



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

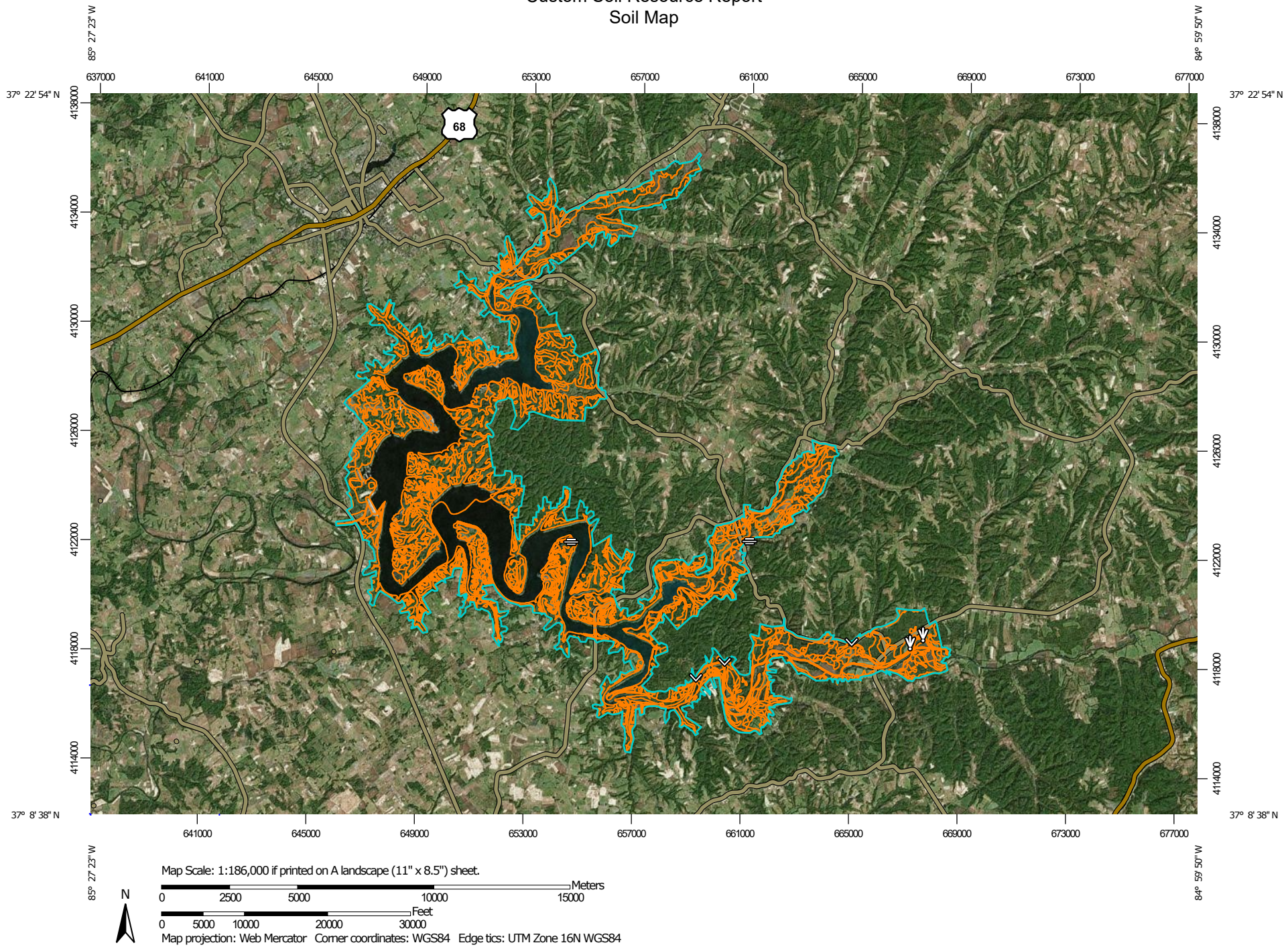
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Adair County, Kentucky
Survey Area Data: Version 19, Sep 8, 2021

Soil Survey Area: Green and Taylor Counties, Kentucky
Survey Area Data: Version 17, Sep 8, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CaC	Carpenter gravelly silt loam, 6 to 12 percent slopes	391.7	1.2%
CbE	Carpenter-Lenberg complex, 12 to 40 percent slopes	274.2	0.8%
Cg	Chagrin fine sandy loam, occasionally flooded	15.5	0.0%
CwB	Culleoka-Weikert complex, 2 to 6 percent slopes	10.7	0.0%
EwB	Etowah silt loam, 2 to 6 percent slopes	140.1	0.4%
FkB	Frankstown gravelly silt loam, 2 to 6 percent slopes	50.5	0.2%
FkC2	Frankstown gravelly silt loam, 6 to 12 percent slopes, eroded	273.3	0.8%
FkD2	Frankstown gravelly silt loam, 12 to 20 percent slopes, eroded	412.7	1.3%
FrB2	Frederick silt loam, 2 to 6 percent slopes, eroded	0.6	0.0%
FrC2	Frederick silt loam, 6 to 12 percent slopes, eroded	60.7	0.2%
FrD2	Frederick silt loam, 12 to 20 percent slopes, eroded	50.8	0.2%
FvE	Frederick-Caneyville complex, 20 to 40 percent slopes, rocky	52.8	0.2%
GaF	Garmon channery silt loam, 20 to 70 percent slopes	3,397.1	10.5%
GpD	Gilpin channery silt loam, 12 to 20 percent slopes	99.7	0.3%
Jo	Johnsburg silt loam	15.8	0.0%
La	Lawrence silt loam	594.9	1.8%
Ld	Lindside silt loam, occasionally flooded	282.2	0.9%
Me	Melvin silt loam, occasionally flooded	338.7	1.0%
Mp	Melvin silt loam, ponded	153.0	0.5%
Nk	Newark silt loam, occasionally flooded	878.6	2.7%
No	Nolin silt loam, occasionally flooded	1,555.8	4.8%
OtA	Otwood silt loam, 0 to 2 percent slopes, rarely flooded	21.1	0.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
OtB	Otwood silt loam, 2 to 6 percent slopes	403.6	1.2%
OtC2	Otwood silt loam, 6 to 12 percent slopes, eroded	46.9	0.1%
PrB	Pricetown silt loam, 2 to 6 percent slopes	1.8	0.0%
PrC	Pricetown silt loam, 6 to 12 percent slopes	94.1	0.3%
RnB	Riney loam, 2 to 6 percent slopes	3.9	0.0%
RnC	Riney loam, 6 to 12 percent slopes	35.4	0.1%
Ro	Robertsville silt loam, rarely flooded	942.3	2.9%
RsF	Rohan channery silt loam, 20 to 60 percent slopes	39.4	0.1%
Sa	Sano silt loam, 1 to 4 percent slopes	183.3	0.6%
Sk	Skidmore gravelly loam, frequently flooded	445.8	1.4%
TaB	Tarklin gravelly silt loam, 2 to 6 percent slopes	246.1	0.8%
TaC	Tarklin gravelly silt loam, 6 to 12 percent slopes	94.4	0.3%
TeB	Teddy silt loam, 2 to 6 percent slopes	41.9	0.1%
Ud	Udarents-Urban land complex, 2 to 20 percent slopes	4.8	0.0%
W	Water	3,747.5	11.6%
WcC	Weikert-Culleoka complex, 6 to 12 percent slopes	315.7	1.0%
WcD	Weikert-Culleoka complex, 12 to 20 percent slopes	183.4	0.6%
Yo	Yosemite gravelly silt loam, frequently flooded	306.0	0.9%
Subtotals for Soil Survey Area		**16,206.6**	**50.2%**
Totals for Area of Interest		**32,302.3**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DAM	Dam, large	43.4	0.1%
DcB	Dickson silt loam, 2 to 6 percent slopes	37.7	0.1%
ElB	Elk silt loam, 2 to 6 percent slopes	39.0	0.1%
ElC	Elk silt loam, 6 to 12 percent slopes	18.6	0.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
FkB	Frankstown silt loam, 2 to 6 percent slopes	98.7	0.3%
FkC	Frankstown silt loam, 6 to 12 percent slopes	1,164.8	3.6%
FkD	Frankstown silt loam, 12 to 20 percent slopes	603.3	1.9%
FkE	Frankstown silt loam, 20 to 30 percent slopes	657.9	2.0%
FrC	Frederick silt loam, 6 to 12 percent slopes	340.7	1.1%
GaF	Garmon-Shelocta complex, 25 to 60 percent slope	4,927.7	15.3%
Me	Melvin silt loam	71.4	0.2%
MgB	Monongahela silt loam, 2 to 6 percent slopes	64.6	0.2%
Mh	Morehead silt loam	272.4	0.8%
MoB	Mountview silt loam, 2 to 6 percent slopes	160.9	0.5%
Ne	Newark silt loam	402.4	1.2%
No	Nolin silt loam	1,041.0	3.2%
OtA	Otwood silt loam, 0 to 2 percent slopes, rarely flooded	72.2	0.2%
OtB	Otwood silt loam, 2 to 6 percent slopes	310.3	1.0%
ReC	Riney loam, 6 to 12 percent slopes	69.7	0.2%
ReD	Riney loam, 12 to 20 percent slopes	77.0	0.2%
Se	Sensabaugh gravelly silt loam	473.5	1.5%
ShB	Shelocta silt loam, 2 to 6 percent slopes	2.8	0.0%
ShC	Shelocta silt loam, 6 to 12 percent slopes	280.1	0.9%
SlD	Shelocta-Lenberg complex, 12 to 30 percent slopes	82.8	0.3%
W	Water	4,782.8	14.8%
Subtotals for Soil Survey Area		**16,095.6**	**49.8%**
Totals for Area of Interest		**32,302.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
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330 West Broadway
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In Reply Refer To: August 31, 2022
Project Code: 2022-0080636
Project Name: Green River Lake Master Plan Update

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

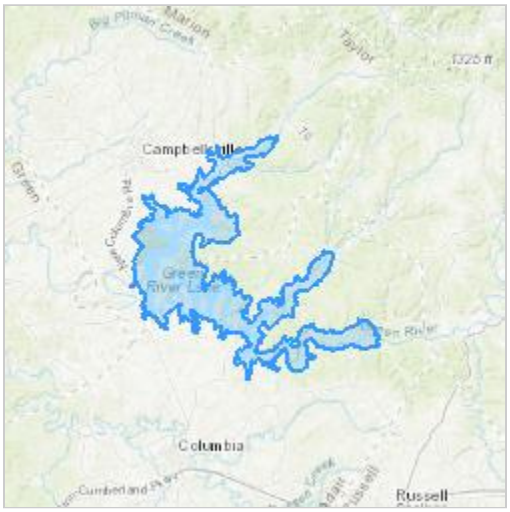
Kentucky Ecological Services Field Office
J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670
(502) 695-0468

Project Summary

Project Code: 2022-0080636
Project Name: Green River Lake Master Plan Update
Project Type: Operations and Maintenance of Facilities
Project Description: The Green River Lake Master Plan (Master Plan) is the strategic land use management document that guides the comprehensive management, development, and use for recreation, natural resources, and cultural resources that is efficient and cost-effective throughout the life of the Green River Lake project for the next 25 years. It is a vital tool for responsible stewardship and sustainability of the Project's resources for the benefit of present and future generations. This Master Plan guides and articulates USACE responsibilities pursuant to federal laws to preserve, conserve, restore, maintain, manage, and develop the land, water, and associated resources.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@37.26292385,-85.31975752876305,14z



Counties: Adair and Taylor counties, Kentucky

Endangered Species Act Species

There is a total of 14 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 3 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Gray Bat *Myotis grisescens*	Endangered

No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:

- The project area includes potential gray bat habitat.

Species profile: https://ecos.fws.gov/ecp/species/6329
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/UQT2PNJ7BJD6JKGTVL7X5AFU2E/documents/generated/6422.pdf

Indiana Bat *Myotis sodalis*	Endangered

There is **final** critical habitat for this species. The location of the critical habitat is not available.
This species only needs to be considered under the following conditions:

- The project area includes 'potential' habitat. All activities in this location should consider possible effects to this species.

Species profile: https://ecos.fws.gov/ecp/species/5949
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/UQT2PNJ7BJD6JKGTVL7X5AFU2E/documents/generated/6422.pdf

Northern Long-eared Bat *Myotis septentrionalis*	Threatened

No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:

- The specified area includes areas in which incidental take would not be prohibited under the 4(d) rule. For reporting purposes, please use the "streamlined consultation form," linked to in the "general project design guidelines" for the species.

Species profile: https://ecos.fws.gov/ecp/species/9045
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/UQT2PNJ7BJD6JKGTVL7X5AFU2E/documents/generated/6422.pdf

Clams

NAME	STATUS
Clubshell *Pleurobema clava*	Endangered
Population: Wherever found; Except where listed as Experimental Populations No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3789 General project design guidelines: https://ipac.ecosphere.fws.gov/project/UQT2PNJ7BJD6JKGTVL7X5AFU2E/documents/generated/5639.pdf	
Fanshell *Cyprogenia stegaria*	Endangered
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4822 General project design guidelines: https://ipac.ecosphere.fws.gov/project/UQT2PNJ7BJD6JKGTVL7X5AFU2E/documents/generated/5639.pdf	
Northern Riffleshell *Epioblasma rangiana*	Endangered
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/527 General project design guidelines: https://ipac.ecosphere.fws.gov/project/UQT2PNJ7BJD6JKGTVL7X5AFU2E/documents/generated/5639.pdf	
Pink Mucket (pearlymussel) *Lampsilis abrupta*	Endangered
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7829 General project design guidelines: https://ipac.ecosphere.fws.gov/project/UQT2PNJ7BJD6JKGTVL7X5AFU2E/documents/generated/5639.pdf	
Rabbitsfoot *Quadrula cylindrica cylindrica*	Threatened
There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5165 General project design guidelines: https://ipac.ecosphere.fws.gov/project/UQT2PNJ7BJD6JKGTVL7X5AFU2E/documents/generated/5639.pdf	
Ring Pink (mussel) *Obovaria retusa*	Endangered
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4128 General project design guidelines: https://ipac.ecosphere.fws.gov/project/UQT2PNJ7BJD6JKGTVL7X5AFU2E/documents/generated/5639.pdf	
Rough Pigtoe *Pleurobema plenum*	Endangered
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6894 General project design guidelines: https://ipac.ecosphere.fws.gov/project/UQT2PNJ7BJD6JKGTVL7X5AFU2E/documents/generated/5639.pdf	

NAME	STATUS
Sheepnose Mussel *Plethobasus cyphyus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6903 General project design guidelines: https://ipac.ecosphere.fws.gov/project/UQT2PNJ7BJD6JKGTVL7X5AFU2E/documents/generated/5639.pdf	Endangered
Snuffbox Mussel *Epioblasma triquetra* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4135	Endangered
Spectaclecase (mussel) *Cumberlandia monodonta* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7867 General project design guidelines: https://ipac.ecosphere.fws.gov/project/UQT2PNJ7BJD6JKGTVL7X5AFU2E/documents/generated/5639.pdf	Endangered

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Rabbitsfoot *Quadrula cylindrica cylindrica* https://ecos.fws.gov/ecp/species/5165#crithab	Final

IPaC User Contact Information

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State Listed Species Documented or Potentially Present at the Green River Lake Project

Common Name	Scientific Name	County	State Listing
Sharp-shinned Hawk	*Accipiter striatus*	Adair,Taylor	S
Spotted Sandpiper	*Actitis macularius*	Adair,Taylor	E
Elktoe	*Alasmidonta marginata*	Taylor	T
Slippershell Mussel	*Alasmidonta viridis*	Adair	S
Karst snowfly	*Allocapnia cunninghami*	Adair	T
Western Sand Darter	*Ammocrypta clara*	Taylor	E
Great Egret	*Ardea alba*	Adair,Taylor	T
Short-eared Owl	*Asio flammeus*	Adair,Taylor	E
Bottlebrush Crayfish	*Barbicambarus cornutus*	Adair,Taylor	S
Upland Sandpiper	*Bartramia longicauda*	Adair	H
American Bittern	*Botaurus lentiginosus*	Adair	H
Cattle Egret	*Bubulcus ibis*	Adair	S
Valley Flame Crayfish	*Cambarus deweesae*	Adair	S
Canada Warbler	*Cardellina canadensis*	Adair	S
Henslow's Sparrow	*Centronyx henslowii*	Adair,Taylor	S
Brown Creeper	*Certhia americana*	Adair, Taylor	T
Lark Sparrow	*Chondestes grammacus*	Taylor	S
Northern Harrier	*Circus hudsonius*	Adair,Taylor	T
Sedge Wren	*Cistothorus stellaris*	Adair,Taylor	S
Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	Adair,Taylor	S
Eastern Hellbender	*Cryptobranchus alleganiensis alleganiensis*	Adair,Taylor	S
Bobolink	*Dolichonyx oryzivorus*	Taylor	S
Sixbanded Longhorn Beetle	*Dryobius sexnotatus*	Taylor	T
Little Blue Heron	*Egretta caerulea*	Adair	E
Northern Riffleshell	*Epioblasma rangiana*	Taylor	E
Snuffbox	*Epioblasma triquetra*	Taylor	E
Peregrine Falcon	*Falco peregrinus*	Adair	E
American Coot	*Fulica americana*	Adair,Taylor	E
Longsolid	*Fusconaia subrotunda*	Taylor	S
Bald Eagle	*Haliaeetus leucocephalus*	Adair,Taylor	S
Chestnut Lamprey	*Ichthyomyzon castaneus*	Adair	S
Mountain Brook Lamprey	*Ichthyomyzon greeleyi*	Adair	T
Dark-eyed Junco	*Junco hyemalis*	Adair,Taylor	S
Devil Crayfish	*Lacunicambarus chimera*	Adair	S
Pocketbook	*Lampsilis ovata*	Taylor	E
Loggerhead Shrike	*Lanius ludovicianus*	Adair,Taylor	S
Little Spectaclecase	*Leaunio lienosus aquilonius*	Adair,Taylor	T
Kentucky Creekshell	*Leaunio ortmanni*	Adair	E
American Brook Lamprey	*Lethenteron appendix*	Taylor	T
Black Sandshell	*Ligumia recta*	Taylor	S
Hooded Merganser	*Lophodytes cucullatus*	Adair,Taylor	T
Gray Myotis	*Myotis grisescens*	Adair,Taylor	T
Little Brown Bat	*Myotis lucifugus*	Adair,Taylor	T
Northern Myotis	*Myotis septentrionalis*	Adair,Taylor	E
Indiana Bat	*Myotis sodalis*	Adair,Taylor	E
Spotted Darter	*Nothonotus maculatus*	Adair	T
Slender Madtom	*Noturus exilis*	Adair	E
Yellow-crowned Night-heron	*Nyctanassa violacea*	Adair	T
Black-crowned Night-heron	*Nycticorax nycticorax*	Adair	T
Osprey	*Pandion haliaetus*	Adair,Taylor	S
Savannah Sparrow	*Passerculus sandwichensis*	Adair,Taylor	S
Longhead Darter	*Percina macrocephala*	Adair,Taylor	E
Eastern Pipistrelle	*Perimyotis subflavus*	Adair,Taylor	T
Bachman's Sparrow	*Peucaea aestivalis*	Taylor	E
Double-crested Cormorant	*Phalacrocorax auritus*	Adair,Taylor	S
Stargazing Minnow	*Phenacobius uranops*	Adair,Taylor	S
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	Adair, Taylor	S
Clubshell	*Pleurobema clava*	Taylor	E
Pied-billed Grebe	*Podilymbus podiceps*	Adair,Taylor	E
Vesper Sparrow	*Pooecetes gramineus*	Adair,Taylor	E
A Cave Obligate Milliped	*Pseudotremia merops*	Adair	H
Bank Swallow	*Riparia riparia*	Adair,Taylor	S
Blackburnian Warbler	*Setophaga fusca*	Adair	T
Red-breasted Nuthatch	*Sitta canadensis*	Adair,Taylor	E
Northern Shoveler	*Spatula clypeata*	Adair, Taylor	E
Blue-winged Teal	*Spatula discors*	Adair,Taylor	T
Rabbitsfoot	*Theliderma cylindrica*	Adair, Taylor	E
Bewick's Wren	*Thryomanes bewickii*	Taylor	H
Purple Lilliput	*Toxolasma lividum*	Adair,Taylor	E
Barn Owl	*Tyto alba*	Adair,Taylor	S
Golden-winged Warbler	*Vermivora chrysoptera*	Adair	E

Total= 71 species

Status Definitions: E=endangered, T=threatened, S=special concern, H=historic (not seen since 1980 but not considered extinct or extirpated)

Source: (KDFWR, 2022)

http://app.fw.ky.gov/speciesinfo/SpeciesInfo.asp

United State Army Corps of Engineers
Louisville District

Green River Lake Master Plan
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Appendix C:
Public and Agency Comments

Comment	Commentor	Submitted via:	Category
Green River Lake is a beautiful place to live and work. I am the owner/manager at Holmes Bend Marina. We are very proud and thankful to be a part of Green River Lake. My family has been a concessionaire for the last 35 years. For the most part everything works well with all of us working together. Lori and her staff at the dam office do an incredible job and have been very helpful to us marina owners in the past. During this time of reworking the lake's master plan we at Holmes Bend would like to ask that the no wake area in front of our marina be extended across the lake. As you are aware, I am sure, we have substantial monetary investments in our slips as do our customers in their houseboats. The waves coming into our slips are tearing up our slips and our customers' boats. It is really bad. There is no way this area can be constantly patrolled and people are paying no attention to the buoys. They fly right through them. I believe if that whole area in front of the marina was a no wake zone they would have to idle through there. This was done at Emerald Isle on the north side of the lake and has proven to positively solve this problem. I believe if that marina can do this then ours should as well. This is all I ask to help protect our investment and our customers safety and investments. I have actually had people knocked down from the tremendous waves hitting the marina from the boats flying across in front of it. Someone is going to get seriously hurt not to mention the slips damaged beyond repair. Please take this into consideration when reworking your master plan. It would only take a couple of minutes to idle past the marina and would save everyone. I appreciate your attention and consideration into this matter.	[redacted]	Email	General or Recreation
We have boated on Green River for the last 20 years and are from Springfield, Ky. We now have a houseboat at the state dock. My only request is to continue to prevent development along the shores. Do not allow houses to be built along the banks. Please don't compromise the beauty of the lake with housing development.	[redacted]	Email	General or Environmental
There is a missing link in Campbellsville/Taylor County in cooperation with the lake: a connector trail linking the lake and our city. Our local Trail Town organization has a master plan that would be worth looking into and partnering with when completing the GRL Master Plan. An inclusive, durable trail has the ability to increase our economy and tourism awhile promoting a healthy lifestyles and safe travel for foot/bicycle (non-motorist) traffic. The city property near Stone Quarry Creek connects to the Northside of the lake where a trail can be implanted. The new Campbellsville Bypass was constructed with this future project in mind (hence the large land area below the 4-span bridge). Connecting from GRL property to S Columbia is roughly 1.75 miles. This project is possible and would love to see all parties, organizations, government and individuals to collaborate.	Anonymous	Email	Recreation
Wake and idle zones are damaging the boats and marina. Also, there are no wake violations. How can USACE help?	[redacted]	Stakeholder Meeting	General or Recreation
Need cooperative programs to have marina names/other businesses added to signs	Unknown	Stakeholder Meeting	General
Positive output of recreation on community, continue growth	[redacted]	Stakeholder Meeting	Recreation
Holmes Bend Marina and Emerald Isle - 2 difference leases (RE issue)	[redacted]	Stakeholder Meeting	General
Horse organization/Trailtown – potential future development for horse trails		Stakeholder Meeting	Recreation
Good historical resources in the area- Tebbs Bend, Homeplace, Eastend house, Pages Ford/Site 1		Stakeholder Meeting	Cultural
Good economic beneifts to community from lake		Stakeholder Meeting	General
Unique quality- no public lake shore development		Stakeholder Meeting	General
Eagle/osprey nesting – bird watching and wildlife viewing		Stakeholder Meeting	Environmental
21000 acres managed by FWS – small game hunting opportunity		Stakeholder Meeting	Recreation
Lake front campsites		Stakeholder Meeting	Recreation
Aquatic diversity – Green River is 4th most diverse in the US (fresh water jellyfish, mussel diversity)		Stakeholder Meeting	Environmental
Strong partners- Friends of Green River Lake and Trailtown		Stakeholder Meeting	Outreach and Education
Horse campground nearby		Stakeholder Meeting	General or Recreation
The docking area should be bigger to dock the boats while loading and unloading.		Stakeholder Meeting	Environmental
Emerald ash borer infected trees		Stakeholder Meeting	Environmental
Flooding, particularly campgrounds		Stakeholder Meeting	Environmental
Litter in creeks/tribs		Stakeholder Meeting	Environmental
Access issues due to steep terrain		Stakeholder Meeting	Recreation
Invasive plant species (multi flora rose, bush honeysuckle, Autumn Olive, Tree of Heaven)		Stakeholder Meeting	Environmental
Aging infrastructure(roads, buildings, sewer lines, etc)		Stakeholder Meeting	General
Undersized campgrounds/recreation areas for visitation levels – need sustainable balance		Stakeholder Meeting	Recreation
Opportunity for licensing for foraging (edible plants) or plant harvesting partnerships with tribal nations		Stakeholder Meeting	Environmental or Cultural
Opportunity for USACE outreach- Generational visitation and volunteer opportunities		Stakeholder Meeting	Outreach and Education
Threat-Invasive species that have not yet reached GRL (hydrilla, zebra mussels)		Stakeholder Meeting	Environmental
Threat- land misuse/vandalism/drugs		Stakeholder Meeting	General
Threat- KMA- wake boats washign away shoreline		Stakeholder Meeting	General
Threat- climate change		Stakeholder Meeting	Environmental
Reference to the Campbellsville/Taylor County Trail Town Connectivity Master Plan	[redacted]	Email	Recreation
The docking area should be bigger to dock the boats while loading and unloading.		[redacted]	Recreation

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Louisville District

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Appendix D:
Compliance Table

ER 1130-2-540 Appendix D

Reference	Compliance	Comments
16 USC 460d, Flood Control Act of 1944; Title 10 USC 2667; and 16 USC 4601-13. Leases: non excess property.	In compliance	
16 USC 470, PL 89-665, 80 Stat. 915, National Historic Preservation Act of 1966, as amended.	In compliance	
16 USC 469, PL 93-291, 88 Stat. 174, Archaeological and Historical Preservation Act of 1973.	In compliance	
16 USC. 470aa - 470mm, PL 100-588; 102 Stat. 2983, Archaeological Resources Protection Act (ARPA) of 1979, as amended.	In compliance	
PL 46 (Chapter 105) S.1006 69 Stat 66. Authority to enter into reciprocal agreements; waiver of claims; reimbursement; ratification of prior agreements.	Not applicable	No reciprocal agreement with any fire organization maintaining fire protection facilities in the vicinity of the project exists.
PL 85-624, Fish and Wildlife Coordination Act, (72 Stat. 563, 16 U.S.C. 661).	In progress	
PL 86-523, Reservoir Salvage Act of 1960, as amended.	In compliance	
PL 86-717, Forest Cover Act, (74 Stat. 817, 16 U.S.C. 580m et seq.), 6 September 1960.	In compliance	
PL 89-72, as amended, Federal Water Project Recreation Act of 1965.	In compliance	
PL 91-190, National Environmental Policy Act of 1969, as amended (42 USC 4231,et seq.), 1 January 1970.	In progress	
PL 92-516, Federal Insecticide, Fungicide, and Rodenticide Act of 1972, (86 Stat. 973), as amended.	Not applicable	No insecticides, fungicide, and rodenticides are used on the project.
PL 93-205, Endangered Species Act of 1973, as amended (87 Stat 884, 16 USC 1531(b)),	In progress	
PL 95-313. Cooperative Forestry Assistance Act of 1978 (92 Stat. 365, 16 U.S.C. 2101), as amended by PL 101-624, the Food, Agriculture, Conservation and Trade Act of 1990.	Not applicable	No cooperative forest stewardship agreement exists.
PL 95-341, American Indian Religious Freedom Act.	In compliance	
PL 98-63. Supplemental Appropriations Act of 1983, ref volunteers.	In compliance	
PL 99-662, Water Resources Development Act (WRDA) of 1986, Section 1134, ref: Private Use Facilities; Section 1135, ref: Project Modification for Improvement of the Environment.	In compliance	
PL 101-601, Native American Graves Protection and Repatriation Act (NAGPRA).	In compliance	

PL 101-640, Water Resources Development Act (WRDA) of 1990, Section 307(a).	In compliance	
PL 103-141, Religious Freedom Restoration Act of 1993.	In compliance	
33 CFR Part 328.3(b) U.S. Army Corps of Engineers 1987 Manual for Identifying and Delineating Jurisdictional Wetlands.	In compliance	
36 CFR Part 60. National Register of Historic Places.	In compliance	
36 CFR Part 79, Curation of Federally-Owned and Administered Archaeological Collections.	In compliance	
36 CFR Part 327, Rules and Regulations Governing Public Use of Water Resources Development Projects Administered by the Chief of Engineers.	In compliance	
36 CFR Part 800, Advisory Council on Historic Preservation, Protection of Historic Properties.	In compliance	
40 CFR Parts 150-189, reference to Pesticides.	Not applicable	No pesticides are in use.
40 CFR Parts 1500-1508. Council on Environmental Quality Procedures for Implementing the National Environmental Policy Act (42 U.S.C. 4331 et seq.)	In compliance	
41 CFR Part 101 - 47.103-12, Federal Property Management Regulations.	In compliance	
42 CFR 76.1 - 76.9, Performance Standards and Techniques of Measurement;" issued by the Department of Health and Human Services, to supplement Executive Order 11282.	Not applicable	42 CFR § 76.1 - 76.9 does not exist. Executive Order 11282 calls for agencies to ensure compliance with the Clean Air Act, as amended (42 U.S.C. § 7401, et seq.). The project is in compliance with the Clean Air Act statutes and applicable federal Clean Air Act regulations set forth in 40 CFR Parts 50-99.
EO 11990, Protection of Wetlands, 24 May 1977.	In compliance	
EO 12512, Utilization Surveys.	In compliance	
DOD 4150.7-M, Plan for Certification of Pesticide Applicators of Restricted-Use Pesticides, Armed Forces Pest Management Board, Defense Pest Management Analysis Center, Forest Glen Section, WRAMC, Washington, D.C. 20307-5001.	Not applicable	No presticides are in use.
Technical Information Manuals (TIM)21, "Pesticide Disposal Guide for Pest Control Shops," Armed Forces Pest Management Board (AFPMB), Aberdeen Proving Ground, MD 21010-5422, Tel. (301) 671-3773. U.S. Army Environmental Hygiene Agency, Guide for Medical Surveillance of Pest Controllers.	Not applicable	No pesticides are in use.
ER 190-1-50, Law Enforcement Policy, U.S. Army Corps of Engineers.	In compliance	

ER 200-2-2, Procedures for Implementing the National Environmental Policy Act.	In compliance	
ER 200-2-3, Environmental Compliance Operations and Maintenance Policies.	In compliance	
ER 385-1-90. Respiratory Prevention Program.	Not applicable	No respiratory program exists.
ER 405-1-12, Real Estate Handbook.	In compliance	
ER 1105-2-100, Policy and Planning, Guidance for Conducting Civil Works Planning Studies.	In compliance	
ER 1130-2-500, Work Management Policies.	In compliance	
ER 1130-2-550, Recreation Operations and Maintenance Policies.	In compliance	
ER 1165-2-131, Water Resources Policies and Authorities: Local Cooperation Agreements for New Start Construction Projects.	Not applicable	The ER sets the procedures and responsibilities for obtaining and approving Local Cooperative Agreements for new construction starts.
EP 1130-2-540, Environmental Stewardship Procedures.	In compliance	
EM 385-1-1, Safety and Health Requirements Manual.	In compliance	
Multi-agency Memorandum of Understanding on Implementing the Endangered Species Act, dated 29 September 1994.	In compliance	
Forest Service Form FS-3400-2, "Forest Pest Management Project Proposal."	In compliance	
Policy Statement Regarding Treatment of Human Remains and Grave Goods, Advisory Council on Historic Preservation, 27 September 1988.	In compliance	
Memorandum of Agreement between the U.S. Department of Agriculture and the U.S. Department of Defense for the Conduct of Forest Insect and Disease Suppression on Lands Administered by the Department of Defense, 11 December 1990.	In compliance	
North American Waterfowl Management Plan, developed by the U.S. Fish and Wildlife Service and Canada in 1986.	In compliance	
Multi-Agency Memorandum of Understanding on Watchable Wildlife Program, dated Dec. 1990 (extended through Dec. 1998).	In compliance	