United States Army Corps of Engineers
Louisville District

Rough River Lake Master Plan

2023

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

Breckinridge, Grayson, and Hart 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 Rough River Lake Master Plan, the EA evaluated alternatives and environmental impacts from revising and updating the 1961 Rough 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 1961 Rough River Lake Master Plan and considered potential impacts to natural, cultural, and socioeconomic resources. The recommended plan is to adopt and implement the 2023 Rough River Lake Master Plan, which includes updates to land classifications and resource objectives of the Rough River Lake Project and brings the Resource Management Plan (RMP) up to date to reflect current ecological, socio-demographic, and outdoor recreation trends that are affecting the Rough 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 1961 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	☐	☐	☐	☒
Hazardous, Toxic, and Radioactive Waste	☐	☐	☒	☐
Aesthetics and Visual Qualities	☐	☐	☒	☐
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.

There is no discharge of dredged or fill material or any other discharge into waters of the U.S. 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

_____
Eric D. Crispino
Colonel, U.S. Army
District Commander

Contents

FIGURES

TABLES

LIST OF APPENDICES

CHAPTER 1- INTRODUCTION

1.1 PROJECT AUTHORIZATION

The Rough River Lake Project (Project) was authorized by the Congress of the United States as part of the Flood Control Act of 1938, Pub. L. No. 75-761, 52 Stat. 1215. Post authorization changes include water supply and water quality control as Project purposes within the purview of the Water Supply Act of 1958, Pub. L. No. 85-800, 72 Stat. 319 (codified as amended at 43 U.S.C. § 390b) and the Federal Water Pollution Control Act Amendments of 1961, Pub. L. No. 87-88, 75 Stat. 204.

As a general authority applicable to all U.S. Army Corps of Engineers (USACE) reservoir projects, 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), authorized the Chief of Engineers to construct, maintain and operate public park and recreational facilities at USACE water resources development projects for free public use. The USACE may manage the levels of its reservoirs and time water releases, to a reasonable degree, to benefit recreation uses.

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.

The Endangered Species Act of 1973, Pub. L. No. 93-205, 87 Stat. 884 (codified as amended at 16 U.S.C. §§ 1531, et seq.), with the declared policy of Congress that "Federal agencies shall cooperate with State and local agencies to resolve water resource issues in concert with conservation of endangered species," provides additional authority to operate USACE projects to protect threatened or endangered fish, wildlife and plants. The Act declared it to be the policy of Congress "that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes" of the Endangered Species Act of 1973 and that Federal agencies "cooperate with State and local agencies to resolve water resource issues in concert with conservation of endangered species."

Operation of the Project for purposes of promoting recreation and fish and wildlife enhancement is also authorized by the Federal Water Project Recreation Act, Pub. L. No. 89-72, 79 Stat. 213 (1965).

1.2 PROJECT PURPOSE

Rough River Lake was designed, built, and is operated for the primary purpose of flood risk management. During the fall and winter months, when excessive rainfall is likely, the lake is kept at a relatively low level referred to as winter pool. Should heavy rains occur, surface water runoff is stored in the lake until swollen streams and rivers below the dam have receded and can handle the release of the stored water without damage to lives or property. In addition, secondary

purposes of the lake are to provide water supply, general fish and wildlife recreation, and to regulate outflows in the interest of water quality control per ER 1110-2-8154.

The reservoir serves as a unit in the system of reservoirs in the Green River basin and part of the comprehensive plan for the Ohio River Basin authorized by the Flood Control Act of 1938 and was completed in September 1959. The authorized purposes of the Project are flood control, and the dam shall be operated to encourage and develop collateral uses such as recreation, fish and wildlife propagation, conservation (Section 4 of the Flood Control Act approved 22 December 1944 – Public Law 534, 78th Congress, Chapter 665, 2d Session), and other purposes in the public interests. Development of the plan for public use of Rough River Reservoir has been conducted in general accordance with the basic policies defined in the applicable legislation supplemented by pertinent directives of USACE. The annual drawdown from summer pool to winter pool also provides incidental benefit to low flow augmentation and navigation, despite these not being authorized purposes.

1.3 MASTER PLAN PURPOSE AND SCOPE

Master Plans are addressed in ER 1130-2-550 Change 07, dated 30 January 2013 and EP 1130-2-550 Change 05, dated 30 January 2013. The requirement applies to Civil Works projects operated and maintained by the USACE and would encompass federally owned lands and lands occupied pursuant to easements, leases, or other non-ownership interests.

This revision of the Rough 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. This revision of the Rough River Lake Master Plan is intended to bring the Master Plan up to date so that it is useful for the next 25 years, per EP 1130-2-550.

Because the current Master Plan has exceeded its lifespan, it provides an inadequate basis with which to evaluate contemporary proposals. There have been changes in demand for recreation, adjacent population growth, and surrounding development, which contribute to the need for an update.

The Master Plan revision provides a comprehensive description of the Project, a discussion of factors influencing resource management and development, a synopsis of public involvement, input to the planning process, descriptions of past, present, and proposed development, and an outline of goals and objectives for Project resources. It 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. Further, it provides a District-level policy consistent with national objectives and other State and regional goals and programs.

The purpose of the revised Master Plan is to develop a guide for the future to ensure that actions taken to promote conservation or develop Project resources are in line with Project goals and

objectives that have been reviewed by stakeholders and the public. The USACE does not regulate boating therefore concerns of wake boats and the speed of boats is not a topic addressed by the Master Plan. The Master Plan also does not address the specifics of regional water quality or shoreline management with respect to private actions conducted by adjoining landowners such as vegetation modification. Additionally, the Master Plan does not serve as the environmental review or NEPA analysis of potential future actions at the Project, nor does it address details of design, management, or implementation of potential future projects. Finally, the operation and maintenance of primary Project operations facilities, including but not limited to the dam, spillway, and gate-controlled outlet, are not included in the Master Plan but are addressed in the Operational Management Plan (OMP) for the Project, therefore, changes to Project operation for risk management purposes are outside the scope of this master plan revision.

1.4 GENERAL WATERSHED DESCRIPTION

The Green River drains 9,430 square miles (24,425 square km), and its chief tributaries are Russell Creek, Mud Creek, Barren River, and Pond River, which flow from the south. Additional tributaries include the Nolin River and Rough River which both flow from the north.

Rough River is a 136-mile long tributary of the Green River in west-central Kentucky. By way of the Green and Ohio rivers, it is part of the watershed of the Mississippi River. The drainage area above the dam is 454 square miles, and at summer pool, the surface area of the lake is approximately 5,100 acres. A total of 15,197 acres of land was acquired in fee for the lake. About 4,860 acres are covered by water with the remaining acreage, 9,337 acres, available for public use and/or access. There are 260 miles of shoreline at summer pool (495 ft elevation). See Figure 1.

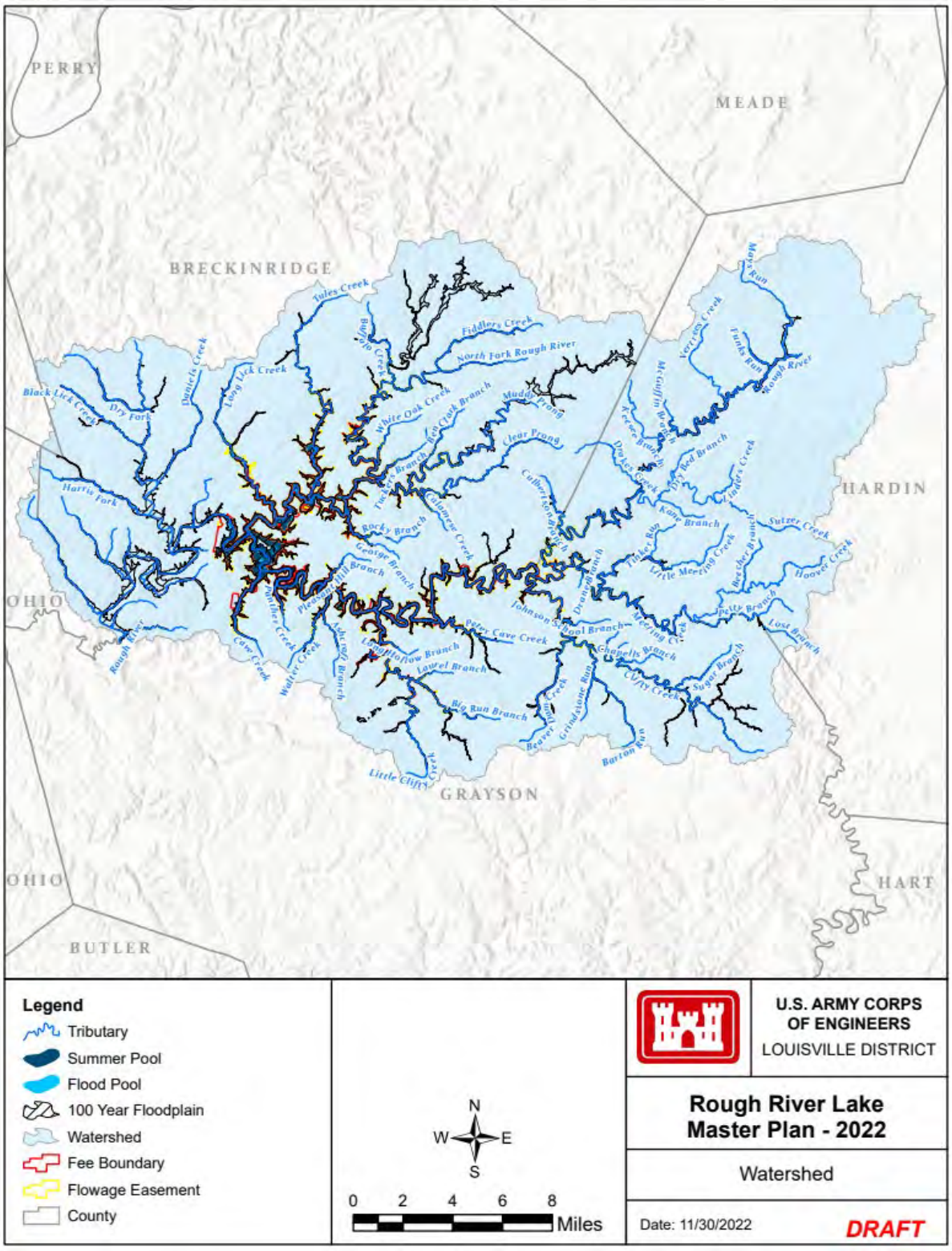

Figure 1- Rough River Lake Watershed

1.5 PROJECT LOCATION

Rough River Lake is situated in Breckinridge, Hardin, and Grayson counties in south central Kentucky. The dam is located on the Rough River near the community of Falls of Rough, about 20 miles from Leitchfield and 95 miles southwest of Louisville. The Army Corps of Engineers office is located in Falls of Rough, Kentucky, at 14957 Falls of Rough River Road (Highway 79), Falls of Rough, Kentucky 40119.

1.6 LISTING OF PRIOR DESIGN MEMORANDUMS

Rough River Lake has several Design Memorandums used for land use development and management at the Project. Updates to prior Design Memorandums were completed following the 1958 Preliminary Master Plan to respond to increased demand for facilities including public access sites boat launching ramps, new picnic areas, widening boat launching ramps, tree clearing, new bathroom facilities, expanding parking and improvements to access roads to those facilities. Pertinent revisions to prior Design Memorandums are listed in Table 1 below and select Design Memorandums are included in Appendix D. Please note that the information included in Appendix D is for reference and informational purposes only. The contents are an artifact of the time they were written and may not reflect the current conditions.

Table 1- Previously issued Design Memoranda

Design Memoradum No.	Title
1	General Design Memorandum - 1953
2	Outlet Works - 1953
3	Dam and Spillway - 1953
4	Dam and Spillway Supplement (No. 1 to No. 3) - 1956
5	Dam and Spillway Supplement (No. 2 to No. 3) - 1957
6	Report on Necessity for Relocation of Kentucky Highways 65, 108 and 100 - 1957
7	Real Estate Partial Reservoir Area (Segments A, B, C and D)- 1957
8a	Preliminary Master Plan- 1958
8b	Rough River Reservoir Master Plan, Part 1 - 1961
8b	Rough River Reservoir Master Plan, Part 2 - 1961
9	Real Estate Highway Relocation - 1958
10	Residences, Shop and Miscellaneous Items - 1958
11	Low Flow Regulation - 1958
12	Report on Necessity for Relocation of Electric Power and Telephone Lines - 1958
13	Report on Necessity for Relocation of County Roads - 1958
14	Channel Clearing of Rough River and Channel Improvement of Barnett Creek - 1959
15	Public Use Plan - 1970

1.7 LISTING OF PERTINENT PROJECT INFORMATION

The pool elevation unit of measure used in this Master Plan is based on the National Geodetic Vertical Datum of 1929 (NGVD29). Figure 2 shows the operating tower and outlet works and Tables 2 and 3 provide characteristics of the Project including physical data, hydrology, and operating levels.

Figure 2- Operating tower and outlet works

In addition to flood control regulations, in accordance with ER 1110-2-240, the lake also supplies drinking water to the surrounding area, as well as providing fish and wildlife habitat. There are currently two water supply users with active water storage agreements with Rough River Lake. The City of Leitchfield entered into a water storage agreement with the United States government on August 3, 1966. Upon execution of the agreement, approximately 120 acre-feet of water storage space was reallocated to accommodate a water supply yield of 1 million gallons per day (MGD) between 464.9 and elevation 464.0 mean sea level (MSL). The City of Leitchfield's joint-use Operations and Maintenance (O&M) obligation is billed annually, in which they are in good standing. Grayson County Water District entered into a water storage

agreement on November 20, 2017, to utilize 260 acre-feet between 470.0 and elevation 465.0 MSL and they are also in good standing.

The primary function of Rough River Reservoir is flood risk management, and it is operated as a unit in the Green River Basin and is part of the comprehensive plan for the Ohio River Basin authorized by the Flood Control Act of 1938.

In February of 2022 Rough River Lake's Water Control Manual was updated to meet format compliance with ER 1110-2-8156. A record of changes to pool levels are as follows:

(1) 27 October 1969, ORLED-H: *Report on Feasibility of Increasing Minimum Pool Levels, Barren, Nolin and Rough River Reservoirs*; January 1970 – minimum Rough River pool raised from 465.0 to 470.0
(2) December 2002 – minimum Rough River pool raised from 470.0 to elevation 475.0
(3) December 2012 – minimum Rough River pool lowered from 475.0 to elevation 470.0

Table 2- Pertinent Project Information

Physical Data		
Main Dam:		
Dam Type	Rolled Earth Fill	
Maximum Height	130 feet	
Length	1,590 feet	
Top Elevation	556 feet NGVD29 + 3-foot parapet wall	
Spillway Type	Uncontrolled open cut	
Spillway Crest Elevation	524 feet NGVD29	
Spillway Base Width	65 feet	
Outlet Works	Three 4.75 x 9.5 feet slide gates in an 12 x 12 feet semi-elliptical concrete conduit. Two 24-inch bypass pass pipes	
Conduit Inlet Invert Elevation	430 feet NGVD29	
Bypass Inlet Invert Elevation	449.8 feet NGVD29	
Hydrology		
Drainage Area	454 mi^2	
Basin Average Rainfall from PMP	27.83 inches	
Probable Maximum Flood (PMF) Peak Inflow	344,000 cfs	
Max. PMF Pool Elevation	556.7 feet NGVD29	
Maximum 6-Hour Inflow	54,400 cfs; 14 Feb 1989*	
Maximum Period-of-Record Release	6,400 cfs; 4 May 2011*	
Maximum Period-of-Record Pool Elevation	527.4 feet NGVD29; 4 May 2011*	
Maximum release and Minimum release during normal operation	3,000 cfs/50 cfs	
Mean Annual Discharge	680 cfs	
Maximum Design Discharge Capacity of the conduit and outlet works	5,600 cfs	
Discharge Capacity of the Bypass system with the Reservoir at seasonal pool	200 cfs	
Average Discharge from Dam site	670 cfs	
Operating Levels		
Pool	*Elevation (feet NGVD29)*	*Storage (acre-ft)*
Top of Dam	559	869,100
Top of Flood Control Pool (spillway crest elevation)	524	334,380
Seasonal Pool (April 14 – October 15)	495	120,010
Water Quality and Water Supply Pool	N/A	N/A
Minimum Pool	470	29,800
Upstream projects, River Mile, and Drainage Area	Not applicable	
**Values from district provided database.*		
***Storage above seasonal pool calculated as part of the hydrologic model development using the elevation storage curve developed using the Rough River Lake water control manual.*		
****From most recent Inspection Report*		

Table 3- Spillway Flood Control Regulation Schedule

Pool Elevation (ft- NGVD29)	Pool Conditions	Regulation
514-524		When precipitation forecasts indicate need to retain storage especially for local Rough River control, pass inflow only, up to the Maximum Release rate. However, unless a regulation based on such
524 and above		Release inflow up to capacity of conduit. If pool exceeds elevation 524 keep conduit open until pool returns to elevation 524. Maintain pool at elevation 524 by passing inflow until donwstream conditions permit return to Schedule B. (At such a time, the Reservoir Regulation Section will evaluate weather and river conditions to determine feasibility of releasing on recessino of downstream stages to regain storage capacity for possible storm recurrence.)

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

2.1 DESCRIPTION OF RESERVOIR

Rough River Lake is a Y-shaped reservoir located in Breckinridge, Hardin, and Grayson counties in Kentucky. The lake was created by the dam, which began construction in 1955 and was complete by 1961. During the summer months the lake is about 5,100 acres, has 260 miles of shoreline, is 45 miles long, and is 65 feet deep in the deepest portion of the lake which includes the area around the dam. In contrast to the summer months, during the winter, the lake decreases to 2,180 acres at an elevation of 470. The dam controls runoff from 454 square miles of the Rough River basin, contributing to the reduction of water surface elevations on the lower Green and Ohio Rivers during flood events.

2.2 HYDROLOGY (SURFACE WATER, GROUNDWATER)

Surface Water

The Rough River Basin lies entirely within Kentucky, with the headwaters originating in west central Hardin County. The Rough River meanders 141 miles in a west-by-southwesterly direction, draining portions of six counties, to its confluence with the Green River at mile 71.3. The watershed is roughly rectangular in shape, about 63 miles in length with an average width of 17 miles wide. The drainage area at the Rough River Dam is 454 square miles, and total drainage area of the Rough River Basin at the Green River confluence is 1,081 square miles. See Figure 3 regarding the Project area hydrology.

The Rough River valley lies in a relatively flat plain with an average slope of about 1.5 feet per mile. The channel below the dam has an average slope of 0.8 feet per mile, increasing over the next 38 miles to 1.9 feet per mile (USACE 2022). The upper 13 miles of the Rough River above the reservoir rises sharply with an average slope of 5.5 feet per mile. The elevation of the stream bed ranges from approximately 350 MSL at the confluence with Green River to approximately 568 MSL near the source. In the vicinity of the dam, the stream channel is about 30 to 40 feet wide at the bottom, about 100 feet wide at the top, and the banks are about 14 feet high.

Materials in the channel banks and bottom are generally silt and gravel with occasional rock and rock outcrops in the bottom (USACE 2022).

The Rough River basin lies in a region affected by frequent temperature changes, high humidity, and intense precipitation caused by passage of storms originating in southwestern United States and in the Gulf of Mexico and moving northeastwardly toward the north Atlantic Coast. Of the various types of meteorological disturbances which produce precipitation in the watershed, the cyclonic storm (mid-latitude cyclones) is the most frequent cause of excessive runoff. Storms of this type generally occur during the period from late winter to early spring when conditions are conducive to high runoff and have produced major floods in the Rough River basin. Convective storms which produce rainfalls of high intensity generally occur during summer months and seldom cause significant flooding, since they are localized, and transpiration and infiltration losses are high. The valleys of Rough River and its tributaries are subject to frequent flooding, usually once every year, and sometimes as frequent as six or seven times in wet years. Generally, major floods occur from winter to late spring. High pool events are generally associated with small to moderate successive rainfall events and the inability to release excess storage due to downstream flood control requirements, not necessarily a single, large magnitude storm. Some of the largest floods have occurred in 1937, 1950, 1989, 1997, and 2011 (USACE 2021). The highest annual historical pool elevations attained and maximum reservoir release during associated flood events are shown in Table 4 below (USACE 2022). (USACE 2022).

Table 4- Maximum Rough River Reservoir Flood Elevations (Period of Record: July 1959 through May 2020).

Date	Pool elevation attained	Maximum flood release
DD-MMM-YYYY	FT-NGVD29	CUBIC FEET PER SECOND
04-May-2011	527.35	6,400*
24-Feb-1989	521.61	2,160
22-May-1983	521.23	2,810
28-Sep-1979	520.90	1,850
22-Mar-1997	517.94	2,650

*5,500 cubic feet per second (cfs) through conduit and 900 cfs through spillway

Groundwater

Groundwater occurs throughout the Rough River basin and is influenced by the type and geometry of bedrock in the area. Surface and groundwater flows are controlled by the nature of these rocks and the associated surface features. The headwaters of the basin are in the Eastern Pennyroyal region, which is characterized by flat lying limestones, sandstones, and shales that underlie flat to gently rolling terrain. The limestone areas have well-developed karst topography, characterized by vast sinkhole plains that take a large proportion of surface water that comes to them and channel it through subsurface caves and smaller underground passages. Several springs in this region, discharging from major underground passages, are large enough to support municipal water systems. In soluble limestone terrain or karst regions, the underground drainage

may differ from the boundary of its surface watershed and flow through caves and cracks in the rocks beneath the surface ridges (Carey and Stickney 2001).

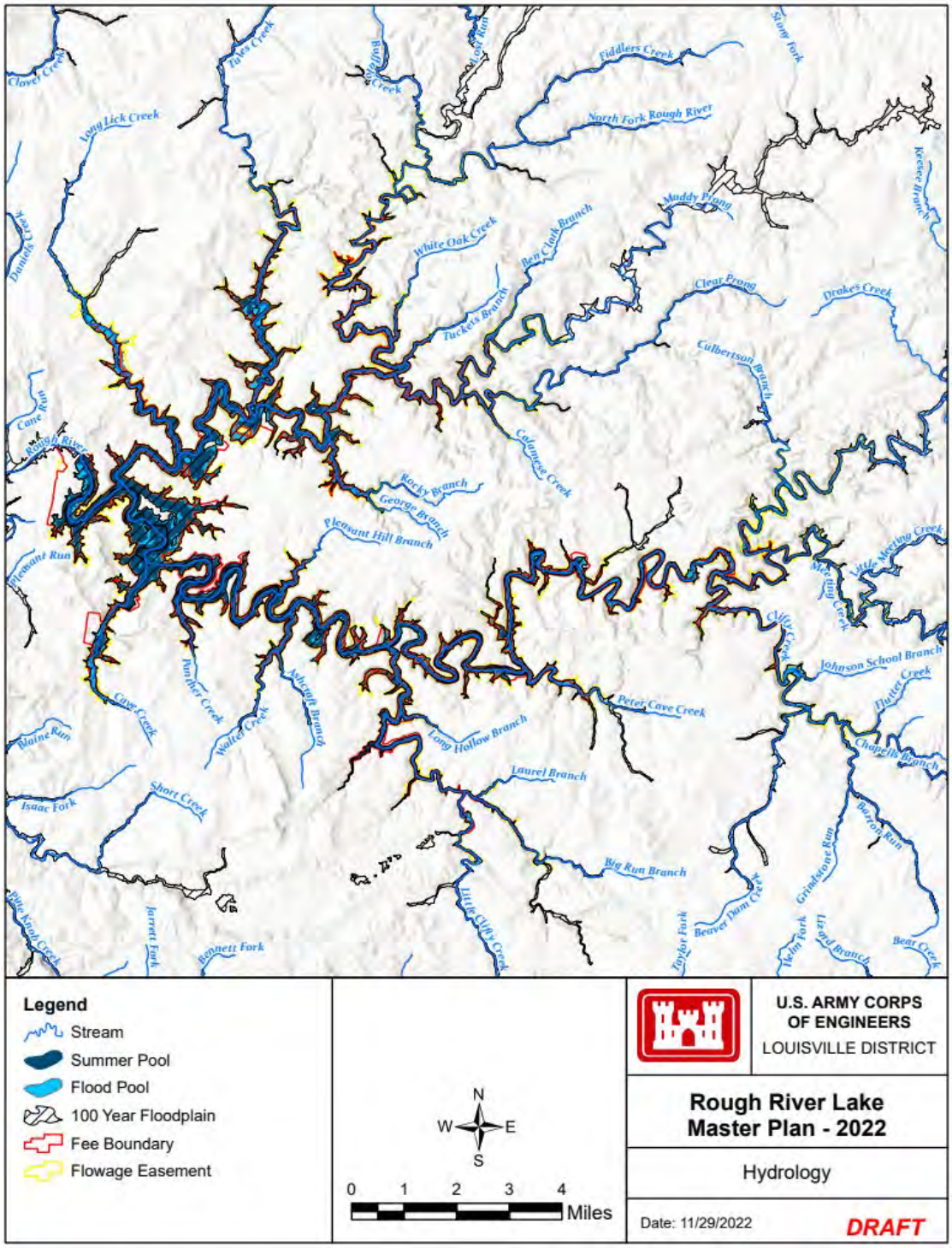

Figure 3- Rough River Lake Hydrology

2.3 SEDIMENTATION AND SHORELINE EROSION

Shoreline erosion has the potential to negatively impact water quality at Rough River Lake and is primarily caused by waves created by wind and boat action. Supporting factors include fluctuations in lake level and 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 in an effort to reduce soil erosion and run-off. Such practices have included minimizing soil disturbance activities, utilization of vegetative buffers, and shoreline stabilization using gabion baskets and other structures. 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 Rough River Lake. Accounting for sedimentation was included in the design and management of the reservoir. It is recommended that an updated sedimentation study be completed to characterize current sedimentation and potential impacts on the Project's authorized purposes.

2.4 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.

Water quality in Rough River Reservoir and its associated watershed is monitored by USACE, Kentucky Division of Water (KDOW), and water supply utilities. Data collected via the USACE 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 KDOW. Locations periodically sampled by USACE Louisville District (LRL) Water Quality team are shown in Figure 4.

During summer 2020, water quality in the dam's tailwater of Rough River Lake was also assessed by USACE personnel by analyzing collected data for exceedances of water quality criteria established by the KDOW. Rough River Lake had one exceedance for temperature at the tailwater. Trophic state index scores (TSI) for the three indices collected at the Project (i.e., total chlorophyll-a, total phosphorus, 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 all (n = 8) sample locations exceeded the United States Environmental Protection Administration (USEPA) nutrient criteria. Finally, the sampling showed there were three samples with cyanobacteria cell counts over 100,000 cells/mL at the time of sampling.

Watershed geology, morphology, and land use are primary factors in determining the quality of water within a watershed. Agricultural uses (hay/pasture and cultivated crops) make up approximately 45% of the surrounding watershed. Watersheds with heavy agricultural use commonly experience eutrophication, or the overloading of nutrients into water bodies due to the runoff of fertilizers and animal waste. The results documented during this study indicate that Rough River Reservoir accumulates high loads of nutrients which can have a significant effect on the aquatic ecosystem and have the potential to contribute to the production of Harmful Algal Blooms (HABs).

During summer 2016, macroinvertebrate samples were collected by USACE personnel at 13 sites on primary inflows and the tailwater of Rough River Lake (Figure 4, Table 4). Benthic macroinvertebrates are often used as bioindicators to assess short- and long-term trends in water quality (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, and sensitive species richness values. Collectively, these values are compared to reference conditions for the site 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 Rough River Lake were indicative of an impaired watershed. While the majority of sample sites received a score of *Fair* (n = 62%), there were a number of sites that received a score of *Poor* and one site received a score of *Very Poor*. These results 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 54 percent of all sample sites were characterized as *Poor* (Table 5). Low habitat scores suggest that riparian habitats surrounding the sample sites have been negatively impacted by human disturbance or other environmental perturbations.

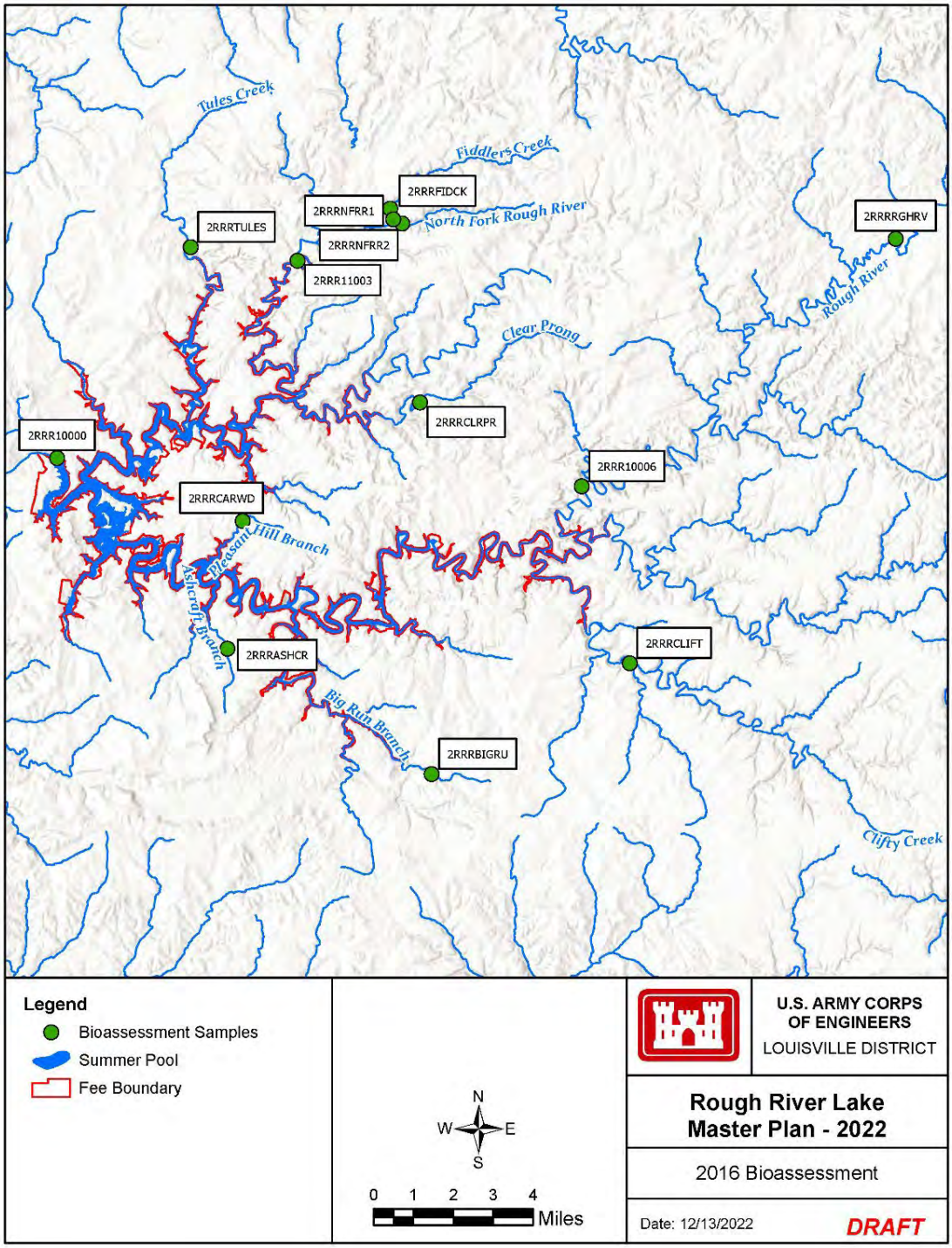

Figure 4-Location of 2016 bioassessment sample sites on Rough River Lake (Source: USACE 2022).

Table 5- Results of 2016 Bioassessment of Rough River Lake (USACE, 2022).

LOCATION	STREAM	MBI Score	MBI Rating	Habitat Rating	Taxa Richness	EPT Richness
2RRR10000	Rough River (tailwater)	24.19	Very Poor	Poor	14	2
2RRR10006	Rough River (tailwater)	59.17	Fair	Fair	33	8
2RRR11003	North Fork Rough River	41.26	Poor	Poor	23	6
2RRRASHCR	Ashcraft Branch	59.50	Fair	Fair	38	13
2RRRBIGRU	Big Run Branch	39.47	Poor	Fair	26	9
2RRRCARWD	Pleasant Hill Branch	27.84	Poor	Poor	21	6
2RRRCLIFT	Clifty Creek	53.42	Fair	Poor	29	5
2RRRCLRPR	Clear Prong	57.46	Fair	Poor	34	8
2RRRFIDCK	Fiddlers Creek	43.69	Poor	Good	29	6
2RRRNFRR1	North Fork Rough River	57.00	Fair	Poor	32	5
2RRRNFRR2	North Fork Rough River	56.22	Fair	Good	35	12
2RRRGHRV	Rough River	51.83	Fair	Poor	31	8
2RRRTULES	Tules Creek	50.71	Fair	Fair	32	8

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 Rough River Lake conducted by KDOW was in 2020. According to KDOW (2022), the lake was classified as fully supporting warm water aquatic habitat, primary contact recreation (swimming), secondary contact recreation (fishing/wading/boating), and domestic water supply (drinking water). The lake was classified as partially supporting fish consumption due to the presence of low levels of mercury and polychlorinated biphenyls in fish tissue samples (KDOW 2022).

Impacts to the surrounding watershed also have the potential to impact the water quality of the Rough River Lake Project. Bioassessments 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 the lake have been classified as impaired and contribute to water quality of Rough River Lake Project. The National Water Quality Inventory Report to Congress (305(b) report) is the primary means of informing Congress and the public about general water quality conditions in the United States. These reports consist of water quality assessments submitted by states, tribes and others and summarized by the USEPA for Congress. In addition to designated uses, the 305(b) report calls for a listing of impaired waters (Section 303(d)). States are required to develop and implement Total Maximum Daily Loads (TMDLs) for water resources listed on their respective 303(d) lists. 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.

According to the KDOW's 2016 Section 303(d) list, Rough River is impaired from river mile (RM) 55.1 to 64.35 (Adams Fork to Caney Creek), for exceeding approved concentrations of iron, fecal coliform, and *Escherichia coli*, impacting warm water aquatic habitat, secondary contact recreation (i.e., boating, wading, fishing), and primary contact recreation (swimming),

respectively. Rough River (RM 125.0 to 137.9) is characterized as *non-supporting* primary contact recreation (swimming) as a result of contamination by the fecal coliform *Escherichia coli*. This section of the stream is also currently 303(d) listed and was approved for a TMDL restoration plan in 2019. Potential sources of fecal coliforms to Rough River, and the basin as a whole, include publicly owned water treatment facilities, diffused pollution from agriculture, livestock near streams, failing or improperly maintained residential septic systems, and human waste from straight pipes (USEPA 2014).

Among the streams that form the headwaters of the Rough River Lake Project, Meeting Creek (RM 5.25 – 14.0) is classified as an Outstanding State Resource Water. However, the results of a 2007 bioassessment documented evidence of impairment due to excess nutrients and/or sedimentation in the stream. Long Lick Creek (RM 4.55 – 7.3) and Pleasant Hill Branch (RM 0.9 - 2.95) are both classified as *non-supporting* for warm water habitat based on poor benthic macroinvertebrate and habitat assessment scores. Potential causes of impairment of streams within the Rough River Lake watershed include human-caused perturbations that have altered the chemical, physical, biological integrity of streams including runoff or the alteration of the hydrological regime from agriculture and the loss or modification of riparian habitat.

2.5 CLIMATE

The Green River Basin has a temperate climate with relatively cold winters and hot, humid summers. The National Oceanic and Atmospheric Administration weather station at Leitchfield, Kentucky (Network ID GHCND: USC00154703) is considered representative of the Rough River Basin. The monthly temperature and precipitation data presented below are taken from the summary of monthly means from 1981-2010 (NCEI 2022).

Temperatures are generally moderate with few days greater than 100 degrees Fahrenheit and a few days less than zero degrees Fahrenheit. The maximum recorded temperature to date is 108 degrees Fahrenheit and the minimum recorded temperature is -27 degrees Fahrenheit. Mean annual temperature is approximately 57 degrees Fahrenheit, with monthly means varying from 37 degrees Fahrenheit in January to 76 degrees Fahrenheit in July. Approximate mean monthly temperatures for the Rough River Project are provided in Table 6.

Table 6- Approximate mean monthly temperatures (degrees Fahrenheit) for the Rough River Lake Project (Source: USACE 2022)

Month	Mean Temperature	Month	Mean Temperature
January	32.1	July	74.3
February	36.0	August	73.2
March	44.3	September	66.3
May	62.7	October	55.1
June	70.8	December	34.6

The average growing season (the last killing frost in spring until the first killing frost in fall) extends from late-April to mid-October with a median length of approximately 177 days (USACE 2022).

In general, precipitation in the Project area is evenly distributed throughout the year, with smaller amounts of rainfall occurring in late summer and fall. Average annual rainfall at the Rough River Reservoir weather station is approximately 49 inches. There are seven weather observation stations in close proximity to the Rough River watershed that measure precipitation (USACE 2022**)**. The average annual rainfall of the four stations considered to be the most representative of the watershed is 49.3 inches (Table 7).

Table 7- Mean monthly and annual precipitation at select weather stations within the Rough River Lake Project Area.

	Leitchfield	**Beaver Dam**	**Glendale**	**Rough River Lake**	**Average**
	(inches)	(inches)	(inches)	(inches)	(inches)
Station ID	*USC00154703*	*USC00150490*	*USC00153252*	*USC00156988*	
POR	*1895-2019*	*1903-2010*	*1951-2012*	*1940-2019*	
Jan	3.31	3.46	3.71	3.35	3.46
Feb	4.03	4.24	4.17	3.75	4.05
Mar	4.30	4.34	4.65	3.99	4.32
Apr	4.15	4.50	4.29	4.42	4.34
May	5.68	5.42	5.63	6.31	5.76
Jun	3.73	3.74	3.90	3.92	3.82
Jul	4.58	4.31	4.71	4.14	4.44
Aug	3.53	3.32	3.27	3.31	3.36
Sep	3.28	3.57	3.39	3.40	3.41
Oct	3.73	3.76	3.64	3.77	3.73
Nov	3.87	4.19	4.29	4.13	4.12
Dec	4.42	4.69	4.71	4.28	4.53
Annual	48.61	49.54	50.36	48.77	49.32

Source: (USACE 2022)

From 2002 - 2019, annual snowfall at the dam has averaged approximately 12 inches. In general, periods of extended snow and ice cover are unusual and snowmelt runoff does not significantly contribute to flooding of the Project area (USACE 2022).

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 weather episodes becoming more prevalent, longer, and more potent. The potential for climate and weather elements including temperature, precipitation, winds, humidity, evaporation to become less predictable and more susceptible to extreme changes suggests a need for review 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 Rough River Lake region is not expected to experience marked hydrologic regime changes that may negatively affect the operation of the Project until 2071 (Drum et al. 2017).

The pilot study addresses 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 both near- 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 Rough River Lake.

2.6 TOPOGRAPHY, GEOLOGY, AND SOILS

Rough River Lake is located within the eastern-most portion of the Western Kentucky Coal Field physiographic region near its boundary with the Mississippian Plateaus region of south-central Kentucky (Figure 5). The Mississippian Plateaus region is subdivided into the western Mammoth Cave Plateau and the eastern Pennyroyal Plateau, which are separated by the Dripping Springs Escarpment. The Green River marks the approximate southern boundary between the Western Kentucky Coal Field region and the Mammoth Cave Plateau (USACE 2022).

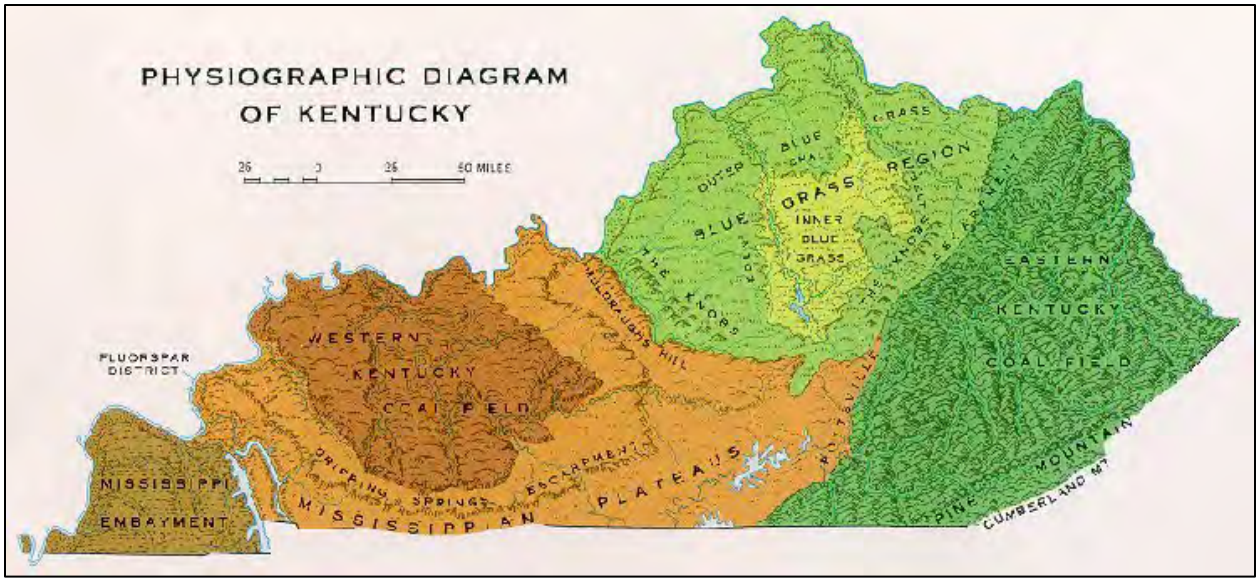

Figure 5- Physiographic regions of Kentucky (Source: KGS 2019).

The Mississippian Plateaus region of Kentucky is one of the most well-developed karst landscapes in the world. The development of the Mammoth Cave System has occurred within limestone of Mississippian age, divided stratigraphically (in ascending order) into the St. Louis, St. Genevieve, and Girkin formations. Overlying the Girkin is the Big Clifty Sandstone, also of Mississippian age, which acts as the protective cap rock for the Mammoth Cave Plateau. Geologic formations that are common to the Mammoth Cave Plateau are also present at the Rough River Dam site. Geologic formations exposed in the Project area range from the Girkin Limestone of the Lower Chester Series upward into the Caseyville Formation of the Lower and Middle Pennsylvanian Series. (USACE 2022). See Figure 6 for the geological regions of Kentucky.

Common rock strata found on the Rough River Lake Project are part of the Chester series, and the stratigraphy from top to bottom is as follows (USACE 2022):

- Hardinsburg Sandstone
- Golconda Formation (contains Haney Limestone, Big Clifty Sandstone Member, and Beech Creek Limestone)
- Elwren Shale, equivalent to Elwren Sandstone of Marlott
- Reelsville Limestone
- Sample Sandstone
- Beaver Bend Limestone

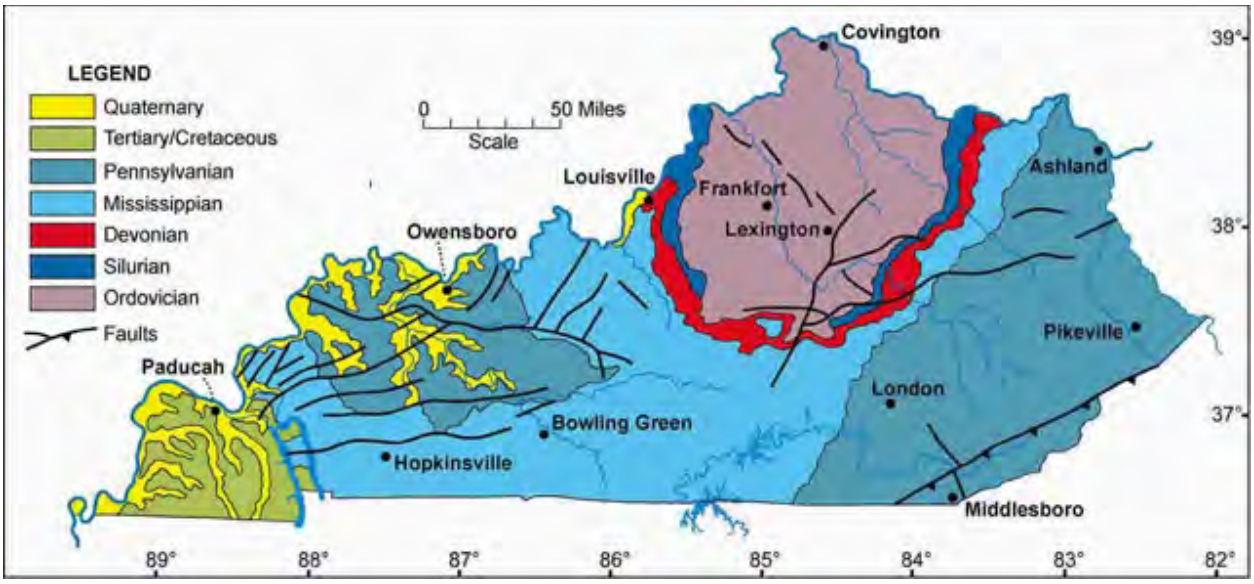

Figure 6- Geological regions of Kentucky (Source: KGS 2019)

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 present 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 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 A.

2.7 ECOLOGICAL SETTING AND TERRESTRIAL HABITATS

Vegetation in the Rough River basin is broadly comprised of forests, pastureland, and cropland. The basin is unique in comparison to other similarly sized basins, in that it encompasses four Level IV ecoregions. Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. The four ecoregions that make up the Rough River basin are the Caseyville Hills, the Crawford-Mammoth Cave Uplands, the Mitchel Plain, and the Knobs-Norman Upland. The immediate Project area is located in the Crawford Mammoth Cave Uplands.

The hilly Crawford–Mammoth Cave Uplands ecoregion is higher and more rugged than neighboring Mitchell Plains and Knobs-Norman Upland Ecoregions. Sandstone cliffs, dissected shale valleys, and less dissected limestone valleys with well-developed karst are prevalent. Upland streams are rocky and generally run cool and clear. Rivers are all meandering and deeply incised into bedrock. A mosaic of forests, pastureland, and cropland occur within the Project area.

The natural vegetation of these regions is characterized by oak-hickory forests. Near streams and in bottomlands of in this area, tree species such as sycamore (*Platanus occidentalis*), red maple (*Acer rubrum*), birch (*Betula* sp.), silver maple (*A. saccharinum*), box elder (*A. negundo*) , hackberry (*Celtis occidentalis*), black walnut (*Juglans nigra*), and sweet gum (*Liquidambar*

styraciflua) would be expected (Campbell 1996). This characterization is accurate for the portions of the immediate Project area that are still wooded. Other areas around the dam have been maintained in mowed grass and/or developed for recreational use or access to the tailwater and stilling basin.

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 (MRLC 2023).

NLCD analysis indicates that the dominant land cover category for the project is "deciduous forest" forested habitat, comprising 66.2% of terrestrial land cover on fee lands (Table 8). Project-wide, 28% percent (n = 2,996.6 acres) of total fee lands are classified as modified for human use or otherwise developed in some way, i.e., developed land, cultivated crops, hay fields, pasture, etc. Table 8 contains a detailed list of terrestrial habitat types and their relative acreages. Figure 7 includes NLCD land cover types present on the Project fee lands.

Table 8- Land Cover types present on the Rough River Lake Project (Source: NLCD 2019)

Land Cover Type	Acres
Developed, Open Space	146.3
Developed, Low Intensity	56.7
Developed, Medium Intensity	29.2
Developed, High Intensity	5.6
Barren Land	46.0
Deciduous Forest	3669.9
Evergreen Forest	59.4
Mixed Forest	224.0
Shrub/Scrub	0.7
Grassland/Herbaceous	75.7
Hay/Pasture	204.1
Cultivated Crops	9.2
Woody Wetlands	3.3
Emergent Herbaceous Wetlands	19.1

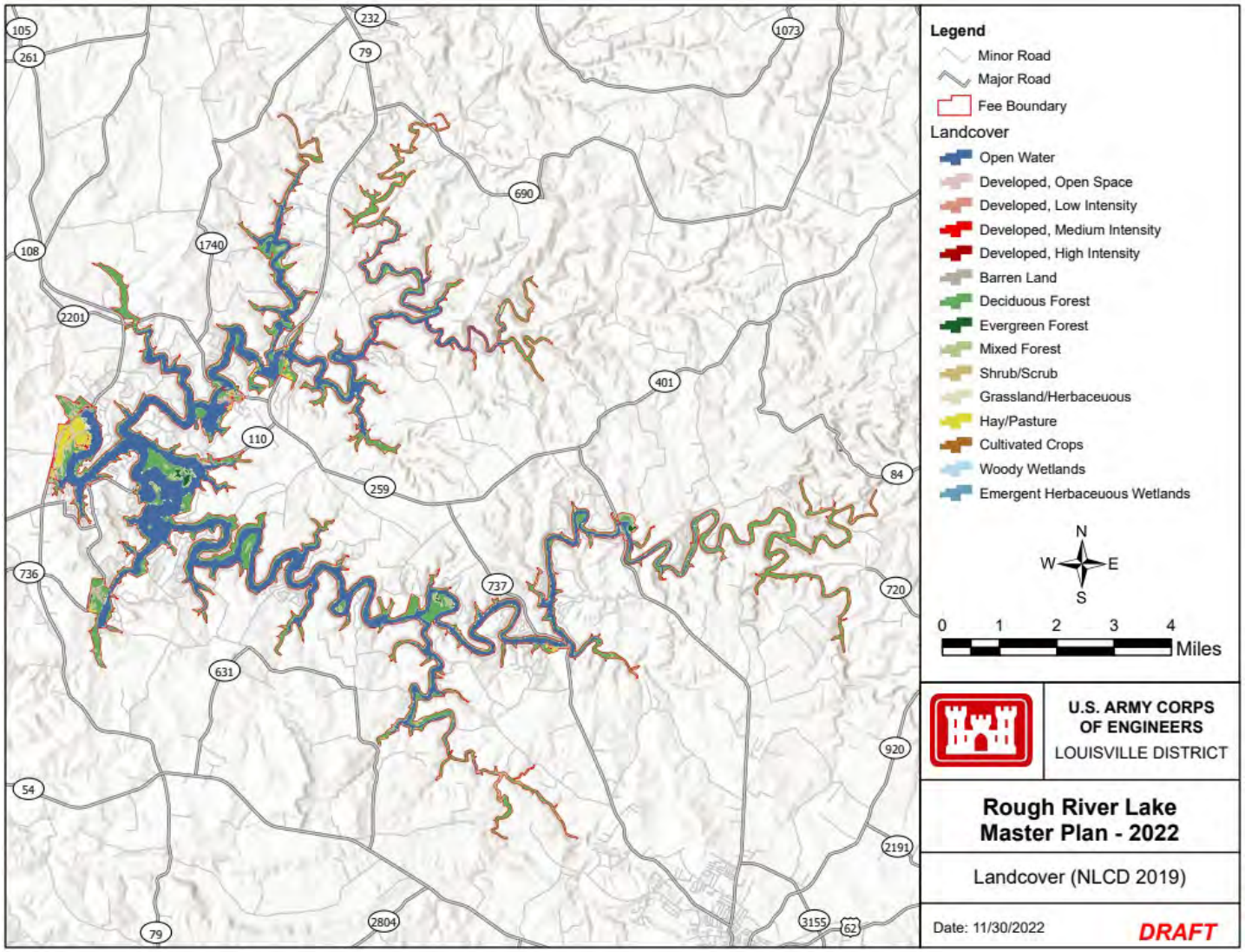

Figure 7- National Land Cover Classifications for Rough River Lake Project (NLCD 2019).

2.7.2 Wetlands

Analysis conducted via the United States Fish and Wildlife Services (USFWS) National Wetland Inventory desktop application indicate that approximately 48.2 acres of freshwater wetlands exist within the Rough River Lake fee boundaries (USFWS 2022). Wetland habitat types found on the Project include freshwater forested/shrub (40.4 acres), riverine (3.9 acres), freshwater emergent (3.4 acres), and pond (0.5 acres) habitat types. Additional wetland habitat types include lake and other habitat types. These areas are generally modified deep water habitats that occur as a result of impoundment or otherwise exist as a result of habitat manipulation.

Most wetland habitats are found within the floodplain and riparian zones of the backwater sloughs of the lake. Freshwater emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichen, which are "present for most of the growing season in most years (USFWS 2022). Some of these wetlands are seasonally flooded and some may be temporarily flooded, meaning surface water is present for brief periods (from a few days to a few weeks) during the growing season, but the water table usually lies well below the ground surface for most of the season. At least one potential freshwater forested/shrub wetland adjacent to the lake is considered forested with broad-leaved deciduous trees greater than 20 feet tall and is seasonally flooded. Figure 8 shows existing wetlands within the project boundary according to the USFWS National Wetland Inventory database.

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 bottomlands containing wetland habitats 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.

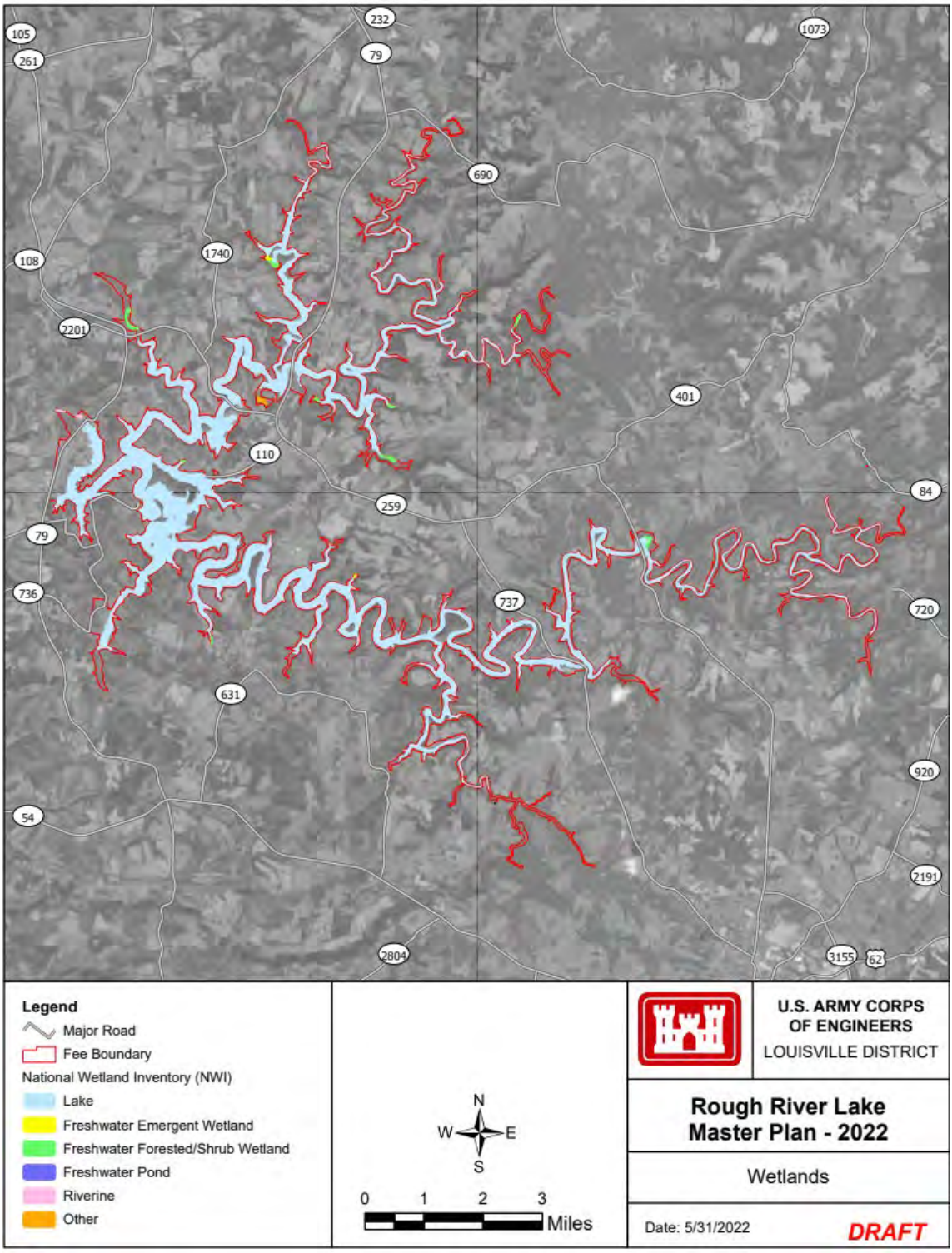

Figure 8- Wetland habitats within the project boundary (USFWS National Wetland Inventory 2022)

2.8 FISH AND WILDLIFE RESOURCES

Aquatic Wildlife

Fishing is available on Rough River Lake with management of the lake fish stocks conducted by Kentucky Department of Fish and Wildlife Resources (KDFWR). Rough River Lake supports healthy populations of several game fish species including largemouth bass (*Micropterus salmoides*), smallmouth bass (*M. dolomieu*). hybrid striped bass (*Morone* sp.), channel catfish (*Ictalurus punctatus*), flathead catfish (*Pylodictis olivaris*), white crappie (*Pomoxis annularis*), black crappie (*P. nigromaculatus*), and bluegill (*Lepomis macrochirus*). The main forage fish is gizzard shad (*Dorosoma cepedianum*).

The fishery resource of Rough River Lake is typical of most large Kentucky impoundments. The fishes most sought by lake anglers include bass, catfish, hybrid striped bass, crappie, and panfish. The lake suffers from lack of suitable cover for some fish species, a condition fairly typical of multi-purpose lakes. However, according to the KDFWR (2016), overall, the largemouth bass population assessment at Rough River Lake has averaged a "Good" rating since 1996 but has been in the "Excellent" range since 2012.

Terrestrial Wildlife

Terrestrial wildlife is defined as animals that are found on land and in the air and includes amphibians, birds, mammals, and reptiles. Habitat diversity around the lake provides for a relatively diverse composition of wildlife species. The area provides many habitats, ranging from sandstone cliffs to karst topography to bottomland woods, which allow for a large diversity of reptiles and amphibians. Habitat around the lake, ranging from upland forests to grasslands and marshes, also supports many varieties of birds. The Project area provides the opportunity to observe 230 bird species. These include 51 permanent residents, 25 winter residents, 65 summer residents and 89 migratory species. Thirty-three of these species are considered game birds (USACE 2019b). Dove, quail, and mallards are the most widely hunted. Sandhill cranes migrate through and over the basin in the spring and fall.

The Rough River basin is on the eastern most edge of the Mississippi Flyway. While wood ducks commonly nest in the area, most waterfowl are associated with wintering or migrating flocks. Hunting is limited, with mallards comprising the majority of the take on the lake and both mallards and wood ducks comprising the majority of take from the river. Forty-nine mammal species are known to inhabit the upper basin. Four game species- cottontail rabbit, fox and gray squirrels, and whitetail deer are the most sought after by hunters. The river otter (*Lontra canadensis*) has been re-introduced and other furbearers, such as muskrat (*Ondatra zibethicus*), woodchuck (*Marmota monax*), skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), gray fox (*Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*) and coyote (*Canis latrans*) are also common. Smaller mammals (bats, rodents, voles, etc.) comprise the remaining species.

In total, 119 state listed species have been documented or are known from Breckinridge, Grayson, and Hart counties, including the Project fee lands (KDFWR 2022). A list of these species is provided in Appendix A.

2.8.1 Threatened and Endangered Species

Lists of threatened, endangered, and species of special concern are maintained by USFWS and the State of Kentucky. Under the Endangered Species Act 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 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), 11 Federally listed species have been or are known to occur in the vicinity of the Project and are described in further detail below. Endangered freshwater mussel species listed include the spectaclecase (*Cumberlandia monodonta*), fanshell (*Cyprogenia stegaria*), northern riffleshell (*Epioblasma torulosa rangiana*), pink mucket, (*Lampsilis abrupta*), ring pink (*Obovaria retusa*), 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. 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 greater Green River watershed (which includes the Rough River), none are currently found within the Project fee boundary. 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 these bat species have very large ranges, their presence in the Project area is assumed (USFWS 2023). 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, even in areas in which they have not been previously documented. However, there are no known hibernacula or maternity caves used by the northern long-eared bat, Indiana bat, or gray bat occurring on fee lands of the Rough River Lake Project.

No Critical Habitat for Federally threatened or endangered species has been designated on the Rough River Lake Project (USFWS 2023).

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

2.8.2 Additional Protected Wildlife and State listed Species

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 state listed and are also 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). Bald eagles are known to nest on fee lands and transient individuals also visit the Project seasonally.

The Osprey (*Pandion haliaetus*) is also protected by the MBTA and is a frequent resident of the Project.

The Commonwealth of Kentucky designates certain species as endangered, threatened, or special concern species based on their conservation status within the state (KDFWR 2022). The KDFWR maintains a list of documented observations for Kentucky state listed species, which can be organized by county. Appendix A lists the state listed species which have been observed in Breckenridge, Hart, and Grayson counties, and may therefore be present on the Project fee lands. This list represents a diverse array of wildlife that includes 112 taxa, including 37 species classified as endangered (KDFWR 2022).

2.8.3 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 USACE. Invasive species are organisms that are not native (exotic) to a geographical region and displace native species, causing the form and function of the natural ecosystem to be altered. 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.

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 as part of timber stand improvement activities occurring on the Project. Each of these species has the potential to negatively impact native 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 EAB has been documented in Breckinridge, Grayson, and Hart counties of the Rough River Project area (EABIN 2022). 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 (EABIN 2021). However, green ash (*Franxinus pennsylvanica*) is an important component of the bottomland forest communities at the Project. As large ash trees die, forest

composition will change, and 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 Rough 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.

2.9 AIR QUALITY

The 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 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 December 2022, Breckinridge, Grayson, and Hardin counties were all in attainment for all NAAQS (USEPA 2022). Attainment is a designation given to areas of the United States that have met all air standards for human health by established deadlines using criteria set forth in the Clean Air Act.

2.10 CULTURAL RESOURCES

The Commonwealth of Kentucky’s geographic distribution of cultural resources has been divided into seven management areas primarily according to landform divisions and major drainage systems. Six of these management areas were further subdivided into sections specific to prehistoric cultural developments in different areas of the state (Pollack, 2008). Table 9 identifies these divisions and subdivisions relative to the counties in which they reside.

Table 9- Management Areas and Sections.

Management Area	Section	Counties (Figure 1.4)
1) Purchase	A) Mississippi River	Carlisle, Fulton, Graves, Hickman
	B) Ohio River I	Ballard, Livingston, McCracken
	C) Lower Tennessee\ Cumberland	Calloway, Lyon, Marshall, Trigg
2) Green River	D) Ohio River II	Breckinridge, Crittenden, Daviess, Hancock, Henderson, Union
	E) Western Coalfield	Butler, Hopkins, McLean, Muhlenberg, Ohio, Webster
	F) Pennyroyal	Allen, Caldwell, Christian, Logan, Simpson, Todd, Warren
	G) Upper Green River	Adair, Barren, Casey, Edmonson, Grayson, Green, Hart, Metcalfe, Taylor
3) Salt River	H) Salt River	Anderson, Boyle, Bullitt, Hardin, Jefferson, Larue, Marion, Meade, Mercer, Nelson, Oldham, Shelby, Spencer, Washington
4) Upper Cumberland	I) Lake Cumberland	Clinton, Cumberland, McCreary, Monroe, Pulaski, Russell, Wayne
	J) Southeastern Mountains	Bell, Harlan, Knox, Laurel, Whitley
5) Bluegrass	K) Central Bluegrass	Bourbon, Clark, Fayette, Franklin, Garrard, Harrison, Jessamine, Lincoln, Madison, Montgomery, Scott, Woodford
	L) Northern Bluegrass	Boone, Campbell, Carroll, Gallatin, Grant, Henry, Kenton, Owen, Pendleton, Trimble
	M) Eastern Bluegrass	Bath, Bracken, Fleming, Lewis, Mason, Nicholas, Robertson
6) Upper Kentucky/ Licking	N) Gorge	Estill, Lee, Magoffin, Menifee, Morgan, Powell, Rowan, Wolfe
	O) Interior Mountains	Breathitt, Clay, Jackson, Knott, Leslie, Letcher, Owsley, Perry, Rockcastle
7) Big Sandy	P) Lower Big Sandy	Boyd, Carter, Elliott, Greenup, Johnson, Lawrence, Martin
	Q) Upper Big Sandy	Floyd, Pike

Note: Reprinted from Pollack (2008). *The Archaeology of Kentucky: An update*. Volume One: State Historic Preservation Comprehensive Plan Report No. 3.

Rough River Lake falls within Management Area 2: Green River Management Area, Ohio River II/Upper Green River. The Green River Management area has the largest number of recorded site (n=5,834) in the state (Pollack 2008). The most abundant sites within this management area are open habitation without mounds (n-3,983), which account for over 68.3 percent of the sites. Historic farms account for only 11 percent of identified sites.

Rough River Lake has a spatiotemporal occupation of Native Americans spanning from the Paleoindians around 9,500 BC into the early 19th century with the Shawnee Indians; and to a lesser extent with the Delaware, Mingo, Miami, and Wyandotte. The Cherokee and Iroquois Confederacy were primarily located in parts of eastern Kentucky where the Cherokee claimed Kentucky as part

of their traditional hunting grounds and the Iroquois raided across the state and into Illinois country. Even though Euro-American contact with Native Americans occurred in this region sometime before 1750 when Europeans were exploring the region (Pollack 2008), it wasn't until the late 18th century to early 19th century when Euro-American settlement dominated the region after Native American's were forcefully displaced.

Prehistoric culture history is typically divided into a sequence of periods and sub-periods. The change from one sub-period to another is frequently marked by a shift in the morphology / typology of hafted bifaces or, in later periods, pottery. These changes in material culture often correlate with major climatic shifts in the past, as new environments require new adaptations. Against this backdrop of periodic shifts, several trends seem to have persisted over time. These trends include: a rise in population and population density; greater site permanence and complexity; and an increase in localization and settling into specific landscapes. As such, the cultural history of the Rough River Lake region has been divided into the following periods: Paleoindian (9,500 - 8,000 BC) with three subperiods; Archaic (8000-1000 BC) with three subperiods; Woodland (1000 BC to AD 1000) with three subperiods; Mississippian (AD 900 to 1,000); Fort Ancient (AD 1700-1750) and Historic (European contact and settlement, AD 1770-Present)(Pollack 2008).

A Cultural Resource Management Plan (CRMP) has been developed for Rough River Lake Project area. This plan documents the cultural periods described above in detail and discusses the known sites within USACE fee-title property at Rough River Lake. The CRMP ensures practical integration of cultural resource management with master planning activities and considers the responsibilities under all applicable laws and regulations for BMPs related to cultural resources. Details specific to the CRMP have been omitted from the Master Plan in order to protect the integrity of the cultural assets located within the Project area. The CRMP is used internally to assist with planning and/or any development which may infringe into or endanger areas of cultural significance.

2.10.1 Long-term Cultural Resources Objectives

As funding allows, actions stemming from the CRMP shall be developed and incorporated into the OMP in accordance with EP 1130-2-540. The CRMP provides a comprehensive program to direct the historic preservation activities and objectives at Rough River Lake. In consultation with the Kentucky State Historic Preservation Officer (SHPO), all currently known sites must be evaluated to determine their eligibility for the National Register of Historic Places (NRHP). In accordance with Section 106 of the National Historic Preservation Act (NHPA), any proposed project, activity, or program funded in whole in part under the direct or indirect jurisdiction of USACE, such as those described in this Master Plan or as may be proposed in the future by others for right-of-way easements, will require coordination with the 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 Rough River Lake must be coordinated with the 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.

2.10.2 Implications of Historic Resources on 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 the USACE in accordance with the CRMP executed on November 15, 2022.

2.11 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

The USEPA Envirofacts database was queried to identify HTRW sources within a five-mile radius of the Project boundaries. A total of 31 USEPA regulated facilities were identified within 5 miles of the Project. A total of six sites were identified within USACE property boundaries (USEPA 2022b). A list of these facilities is provided in Appendix A.

2.12 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.

2.13 AESTHETICS AND VISUAL QUALITIES

Shaped by erosion activity of the Rough 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 streams that make up the surrounding watershed which, when taken with the Rough 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.

The Rough River basin is unique in comparison to other similarly sized basins in that it encompasses four Level IV ecoregions. Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. Ecoregions are hierarchical, with Level 1 providing the broadest classification and Level IV being the most detailed. The four ecoregions that make up the Rough River basin include the Caseyville Hills, the Crawford-Mammoth Cave Uplands, the Mitchel Plain, and the Knobs-Norman Uplands. The immediate Project area is located in the Crawford Mammoth Cave Uplands.

While the areas surrounding the reservoir area are predominantly a mix of rural-residential and agricultural land use types, the valleys in the countryside making up the Rough River Lake area

are generally well entrenched with steep wooded side slopes which have great scenic value. Woodlands can also be a dominant component of the surrounding landscape in some areas, and the forests of the project are a mosaic floral communities of different age cohorts. The dominant forest type of the region is the central oak/hickory forest ecosystem which can contain as many as seven oak species in addition to numerous hickory, maple, ash, and magnolia species. The surrounding topographical diversity allows for the development of distinct forest communities in upland and lowland areas. Tree species such as sycamore, red maple, birch, black walnut, hemlock, hackberry, and sweet gum may be found in bottomlands near watercourses of the areas..

2.14 DEMOGRAPHICS

2.14.1 Market Area

Population within a 30-mile radius of the dam as projected to future years is forecasted in Table 10. A 30-mile market area shows at 20% or more population increase by 2040 for Hardin County. Though Louisville Metro (Jefferson County) is outside the 30-mile radius of the dam, a major part of the market share are Louisville Metro residents who own a vacation home along Rough River Lake.

Table 10- Population, Market Area, Rough River Lake

Population, Market Area, Rough River Lake			
Population			
County	2020	2030	2040
Breckinridge	20,060	19,600	18,800
Butler	12,300	12,100	11,300
Daviess	102,000	106,700	110,100
Edmonson	11,800	11,200	10,400
Grayson	26,400	26,400	26,100
Hancock	8,800	8,800	8,600
Hardin	112,500	124,100	134,900
Hart	18,700	18,900	18,900
Larue	14,300	14,300	14,050
Meade	27,400	26,000	24,000
TOTAL	354,260	368,100	377,150

Source: http://ksdc.louisville.edu/data-downloads/projections/

2.14.2 Local Population

The three counties in which the reservoir is located are: Breckinridge, Grayson, and Hardin counties. Population trends identified in Table 11 show a slight decrease through 2020 consistent in each county followed by projected increases in the future.

Table 11- Population Trends, Counties in the Rough River Lake Area

	Population					
County	**2010**	**2020**	**2025**	**2030**	**2035**	**2040**
Breckinridge	20,060	20,000	19,900	19,600	19,200	18,800
Grayson	25,750	26,400	26,490	26,400	26,280	26,100
Hardin	105,500	112,500	118,400	124,100	129,600	134,900
TOTAL	151,310	158,900	164,790	170,100	175,080	179,800

Source: http://ksdc.louisville.edu/data-downloads/projections/

2.14.3 Environmental Justice Executive Order 12898

Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (Exec. Order No. 12,898, 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. 14,008, 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 Area (Census Tracts 21085950700 and 21085950300) indicates that this area is identified as a “disadvantaged” community because it meets more than one burden threshold and the associated socioeconomic threshold. Identified factors that indicate this community is disadvantaged

include a relatively high proportion of households living in poverty, high rates of heart disease and diabetes, low life expectancy, barriers to transportation, and high energy costs.

2.15 ECONOMIC BENEFITS

USACE recognizes the importance of Rough River Lake and the activities on USACE lands and waters as being an important part of the local economy. Aside from 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 evidenced by the growing number of residents adjacent to USACE properties. Table 12 shows an economic benefit comparison for Fiscal years 2016 and 2019 in areas within 30 miles of Rough River Lake. Figure 9 shows a visitation comparison from 2017 to 2021 in which the last year data that was obtained was the highest visitation the lake has experienced in several years. The 2020 dip in visitation coincides with the Covid-19 shutdowns. Other than this anomaly, the trend has shown increased visitation yearly.

Table 12- Population Trends, Counties in the Rough River Lake Area.

Economic Benefits	**Economic Benefits**
Economic Data in FY 16	**Economic Data in FY 19**
Visitaion per year resulted in: · $82,511,295 in visitor spending within 30 miles of the Corps lake. · $40,676,998 in sales within 30 miles of the Corps lake. · 665 jobs within 30 miles of the Corps lake. · $16,340,630 in labor income within 30 miles of the Corps lake. · $21,101,028 in value added within 30 miles of the Corps lake. · $14,786,410 in National Economic Development Benefits. With multiplier effects, visitor trip spending resulted in: · $59,375,526 in total sales. · 810 jobs. · $22,031,633 in labor income. · $31,097,339 in value added (wages & salaries, payroll benefits, profits, rents, and indirect business taxes).	Visitaion per year resulted in: · $111,875,195 in visitor spending within 30 miles of the Corps lake. · $50,955,553 in sales within 30 miles of the Corps lake. · 963 jobs within 30 miles of the Corps lake. · $19,817,615 in labor income within 30 miles of the Corps lake. · $26,110,756 in value added within 30 miles of the Corps lake. · $15,648,539 in National Economic Development Benefits. With multiplier effects, visitor trip spending resulted in: · $75,006,395 in total sales. · 1,149 jobs. · $27,187,897 in labor income. · $38,802,059 in value added (wages & salaries, payroll benefits, profits, rents, and indirect business taxes).
Benefits in Perspective	
Recreation experiences increase motivation to learn more about the environment; understanding and awareness of environmental issues' and sensitivity to the environment. (USACE Recreation 2016 & 2019 Lake Report, https://www.iwr.usace.army.mil/Missions/Value-to-the-Nation/)	

Figure 9- Visitation comparison for Rough River Lake 2017 to 2021

There is also information about the revenue the Green River Area, a system of four USACE flood control lakes in the region including Barren River Lake, Nolin River Lake, Green River Lake, and Rough River Lake, collected on a 5-year average (FY 2016-FY2020). The revenue includes Day Use fees, special events/permit fees, shelter reservation revenue and camping fees. This information is displayed as a bar graph below (Figure 10). In relation to trends, an increase in visitation will result in an increase in economic benefits overall. A significant economic driver for Rough River Lake comes from Louisville in the way of lake homes for the weekend or vacationing. More detailed visitation information is provided below in section 2.16.2.

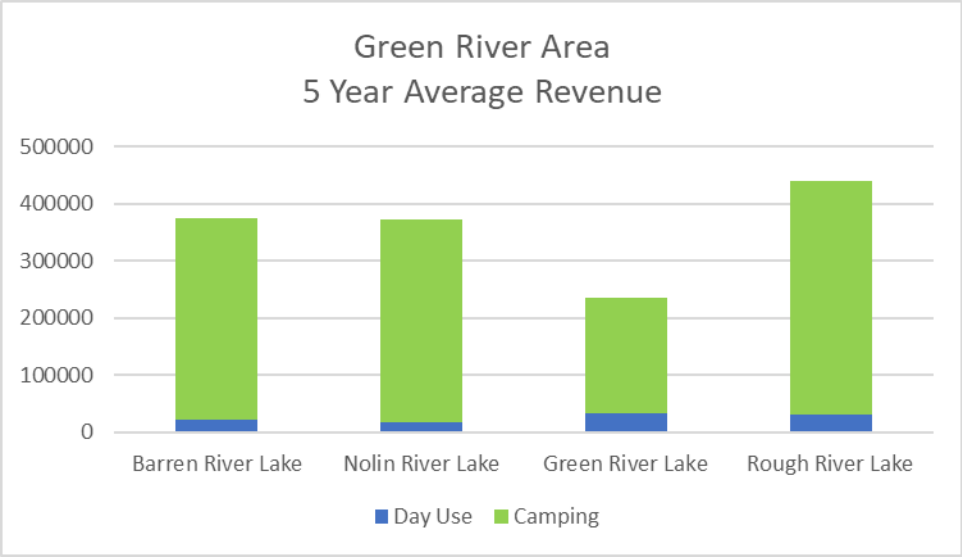

Figure 10- Green River Area 5-year average revenue

2.16 RECREATION FACILITIES, ACTIVITIES AND NEEDS

2.16.1 Zones of Influence

The existing and future potential recreational opportunities of Rough River Lake is of great importance within the project's 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 that are no more than a 30-minute drive from the lake. The largest cities in relation to the Lake's locations are Bowling Green, slightly within the 30-to-45-minute drive, and Elizabethtown which is within the 45-to-60-minute drive. Although Louisville is more than a 60-minute drive, as mentioned earlier, there is a large percentage of patrons and property owners surrounding the lake from Louisville. See Figure 11 which displays the zone of influence.

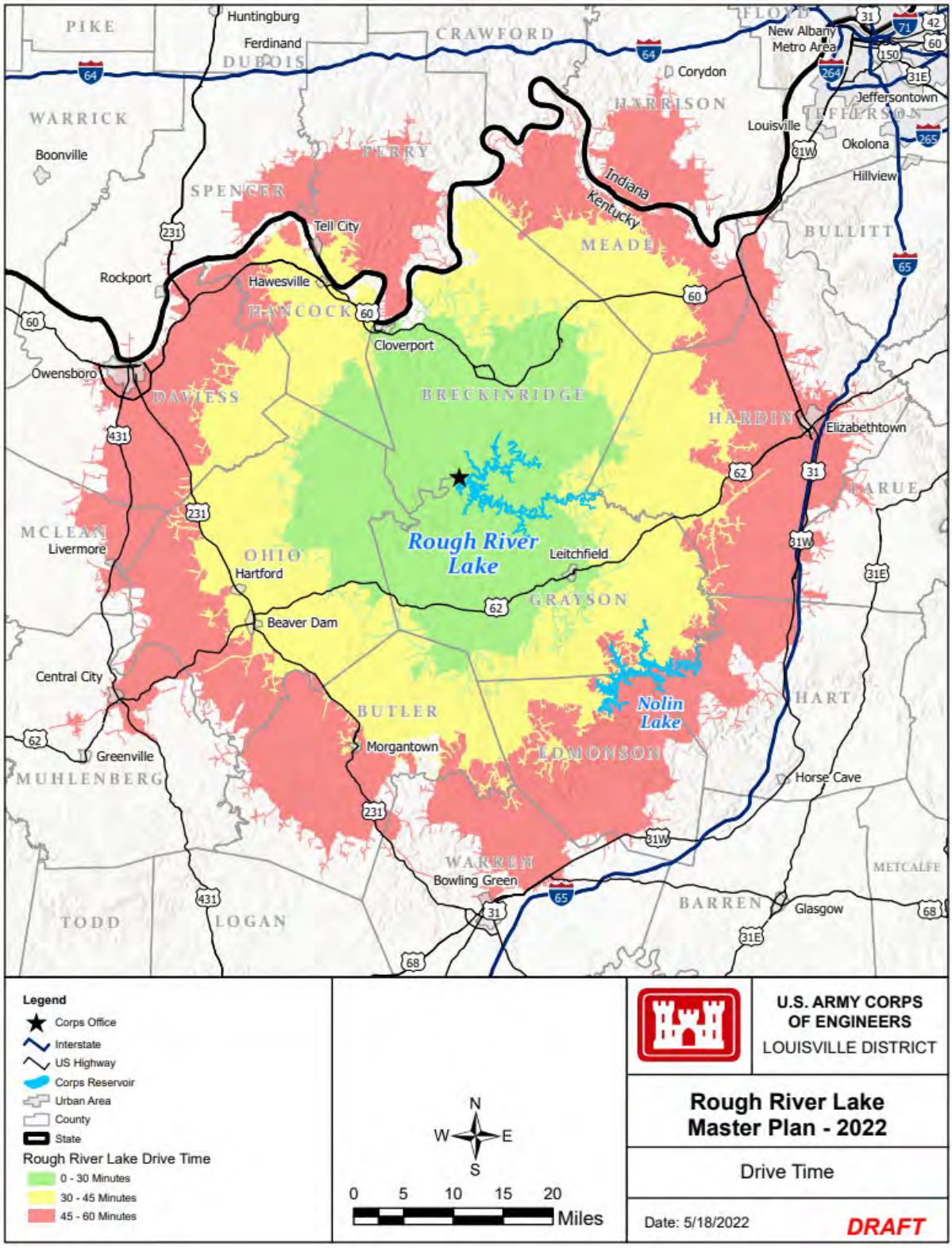

Figure 11- Zones of influence by drive time to Rough River Lake

2.16.2 Visitation Profile

Rough River Lake provides a wide array of recreational opportunities utilized by both the local population and traveled visitors and USACE collects visitation data specific to the various activities on a fiscal year cycle. The most recent data was compiled in FY 2019 and utilized an updated collection method intended to improve the accuracy of the information. Whereas Table 13 shows a comparison between FY 2016 and FY 2019 that includes the two collection methods, it is generally believed to be a good representation of the upward trend of most activity participation.

Table 13- Activity participation by visitor (2016 and 2019).

Visits (person-trips) in FY 2016	Visits (person-trips) in FY 2019
· 1,661,544 in total	· 1,858,164 in total
· 52,339 picnickers	· 199,484 picnickers
· 34,137 campers	· 183,977 campers
· 324,466 swimmers	· 336,104 swimmers
· 201,459 water skiers	· 101,868 walkers/hikers/joggers
· 1,131,359 boaters	· 1,159,503 boaters
· 265,813 sightseers	· 179,954 sightseers
· 504,971 anglers	· 102,637 anglers
· 3,130 hunters	· 39,303 special event attendees
· 216,728 others	· 37,302 others

There is also a series of data from Fiscal Year (FY) 2015 to 2021 on the average visitation compared to nearby USACE lakes within the Green River Area. The data is shown in the following bar graphs in Figures 12-14. The bar graph for day use visits is higher with Rough River Lake and with many of the day use visitors owning private property adjacent to the lake.

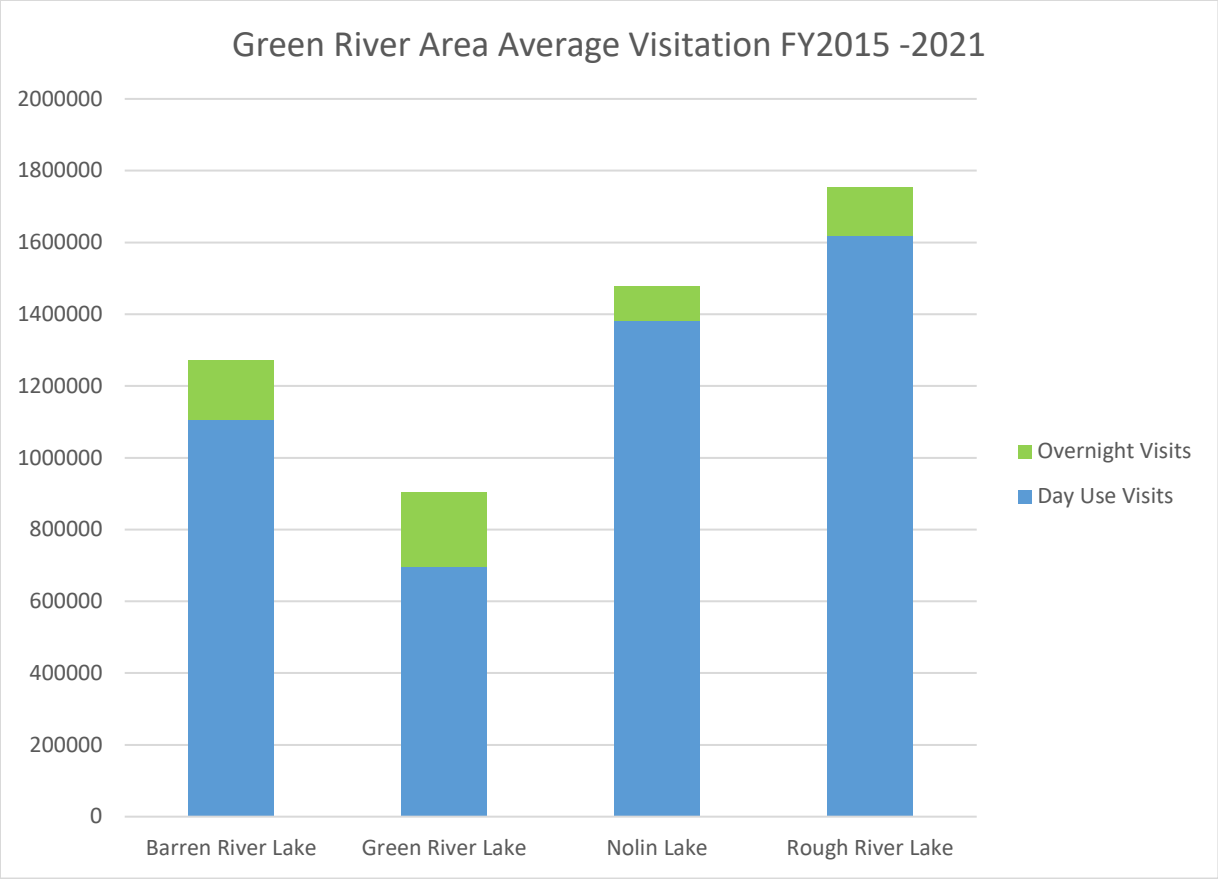

Figure 12- Green River Area average visitation FY 2015-2021.

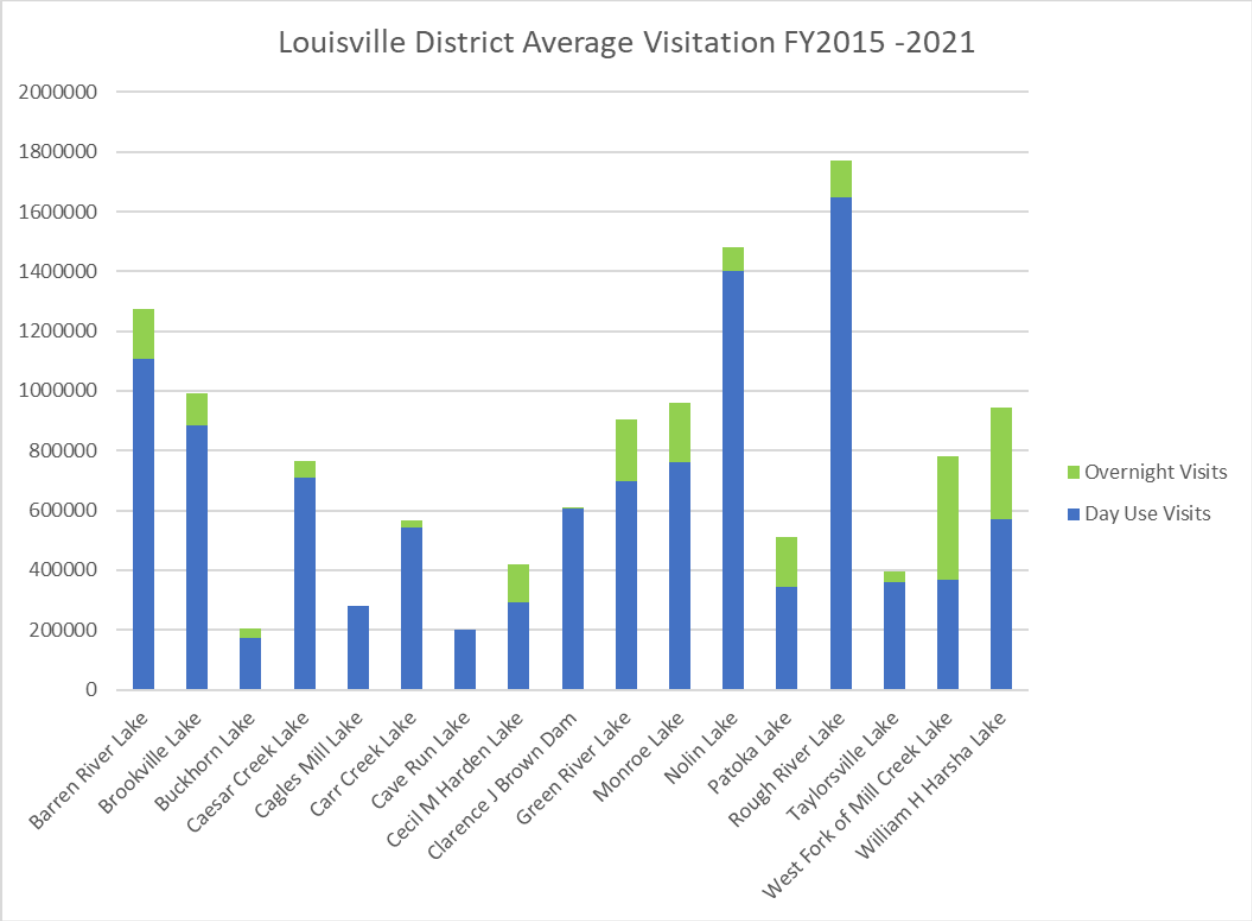

Figure 13- Louisville District average visitation FY 2015-2021.

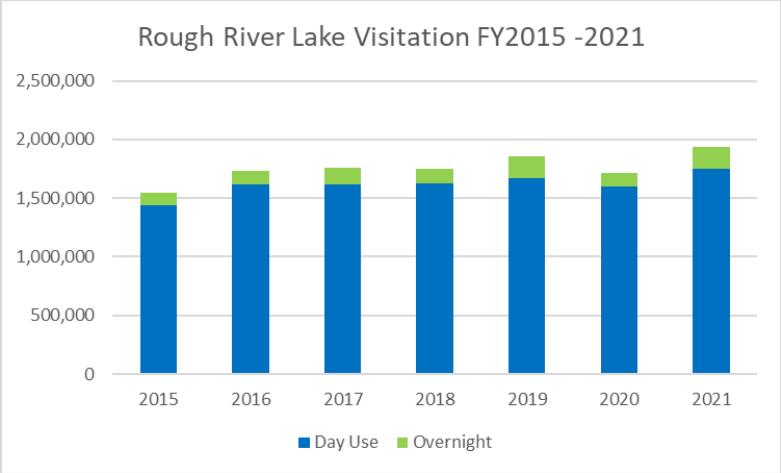

Figure 14- Rough River Lake visitation FY 2015-2021

2.16.3 Recreation Areas and Facilities

Table 14 lists recreational facilities provided at Rough River Lake through governmental agencies as well as commercial concessions. Specifics on recreational areas are listed in detail in Chapter 5 which also lists amenities for each site. Table 15 displays Day Use totals only for annual visitor counts for each recreation area. Most are from FY 2021; however, some have most recent totals from FY 2020 which are denoted in the table.

Table 14- Available Activities by Recreation Area.

= Available Recreation Area	Camping	Lodging	Showers	Boat Ramps	Marina	Fishing facilities	Picnic	Playground	Swimming Area	Trails	Golf	Amphitheater	Grocery/Snack Bar	Operating Agency
Axtel	■		■	■		■		■	■	■				USACE
Axtel Marina					■		■						■	Business/Concessionaire
Cave Creek	■			■		■		■						USACE
Eveleigh				■										USACE
Forrl Visitor Center							■			■				USACE
Laurel Branch	■		■	■		■	■	■		■		■		USACE
North Fork	■		■	■		■	■	■	■					USACE
Peter Cave	■		■	■	■								■	Business/Concessionaire
Rough River State Park	■	■	■	■	■		■	■	■	■	■		■	KY Dept. of Parks
Tailwater						■	■	■						USACE

Table 15- Visitors by Recreation Area

Recreation Area	Visitor Totals
Adkins	28,408*
Axtel	42,456
Axtel Marina	29,924
Browns Hideaway	19,464*
Cannon's Point	5,509*
Cascade Acres	3,305*
Cave Creek	22,617
Eveleigh	15,191
Fernwood	1,469*
Fox Cliff	4,039*
Holiday Rough	13,942
Indian Valley	9,617
Laurel Branch	43,714
Mills	6,975*
North Fork	107,399
Panther Creek	1,469*
Peter Cave	12,768
Pine Ridge	734*
State Park	229,792
Tailwater	77,868
* FY 2020 Data	

Table 16- Facilities available across Recreation Areas

Facilities in FY 2016	Facilities in FY 2019
· 19 recreation areas	· 21 recreation areas
· 39 picnic sites	· 38 picnic sites
· 489 camping sites	· 489 camping sites
· 9 playgrounds	· 12 playgrounds
· 6 swimming areas	· 4 swimming areas
· 3 number of trails	· 0 number of trails
· 2 trail miles	·2 trail miles
· 0 fishing dock and pier	· 3 fishing docks and piers
· 19 boat ramps	· 20 boat ramps
· 624 marina slips	· 694 marina slips

Until FY 2020, licensed boat ramps were considered recreation areas. They were removed as recreation areas because they did not fit the Project Site Area (PSA) requirements to be considered as such. This explains the difference with quantities of recreation areas between Table 15 and Table 16. From June through September of 2019, patrons of Rough River Lake gave input through comment cards obtained at the recreational facilities and distributed by USACE lake staff. These comment cards solicited public input on existing facilities, employees, and environmental settings. The rankings used a scale of 1 to 5 with 5 being the most positive ranking. The lake received a mean response of 4.9 across all categories. Patrons also provided written comments on what improvements they would like to see at various sites around the lake. Below is a summary of responses for potential improvements at all locations mentioned.

Laurel Branch

- More electric campsites
- Showers/bath house
- Additional maintenance of beach area (rocks and roots)
- Tree trimming over the campsite driveways
- Additional scheduled cleaning of bathrooms

Cave Creek

- Additional dump station and existing station to be more level
- All camper sites paved
- Level campsites and additional electric and water sites
- More activities (swim areas, putt-putt and scavenger hunts)

Axtel

- Additional directional signage and signs for no dogs on beach
- Remove nearby sewer plant
- Upgrade of fire pits and small tables at all sites
- More enforcement of no parking on the grass
- Ice machines, vending and wood for purchase
- Installation of speed bumps
- Improvements to bathroom (paint, soap re-fill, drains in shower)
- More paved campsites

North Fork

- Handicap ramp extension
- No dogs on lower park beach
- Landscaping
- Improve showers and cleanliness

2.16.4 Recreation Analysis – Trends

The 2020-2025 Kentucky Statewide Comprehensive Outdoor Recreation Plan (SCORP) outlines strategies and recommendations for addressing outdoor recreation to promote healthy lifestyles, boost outdoor recreational activities and boost tourism in our communities. This plan ensures that Kentucky remains eligible to receive federal Land and Water Conservation Funds for outdoor recreational projects throughout the Commonwealth. The 2020-2025 Kentucky SCORP presents a summary and analysis of the state's outdoor recreation resources with ten strategic goals:

1) Expand and improve the quantity and variety of outdoor recreation opportunities, with emphasis on areas and population segments where these are most lacking.
2) Develop and promote the recreational opportunities that are associated with tourism.
3) 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.
4) 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.
5) Preserve the state's natural, environmental, historical, and cultural assets.
6) Establish and maintain a strong element of public participation in the planning, development, and management of outdoor recreation facilities and programs.
7) 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.
8) Make the most efficient use of existing recreation facilities and resources.
9) Fully exploit all existing funding resources for recreation and seek to develop other funding possibilities; and
10) Promote the use of SCORP as a planning tool and the progressive implementation of its identified objectives.

A public participation survey was completed in 2019 in support of the development of the 2020-2025 Kentucky SCORP. 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. As part of the survey, respondents provided activities that they or another family member in their household participated in over the last five years.

Most respondents indicated that they had visited a beach or lake or river (89.3%), walked for pleasure or exercised or leisurely enjoyed the outdoors (84.3%), 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%). See Figure 15 for a bar chart showing activities percentages.

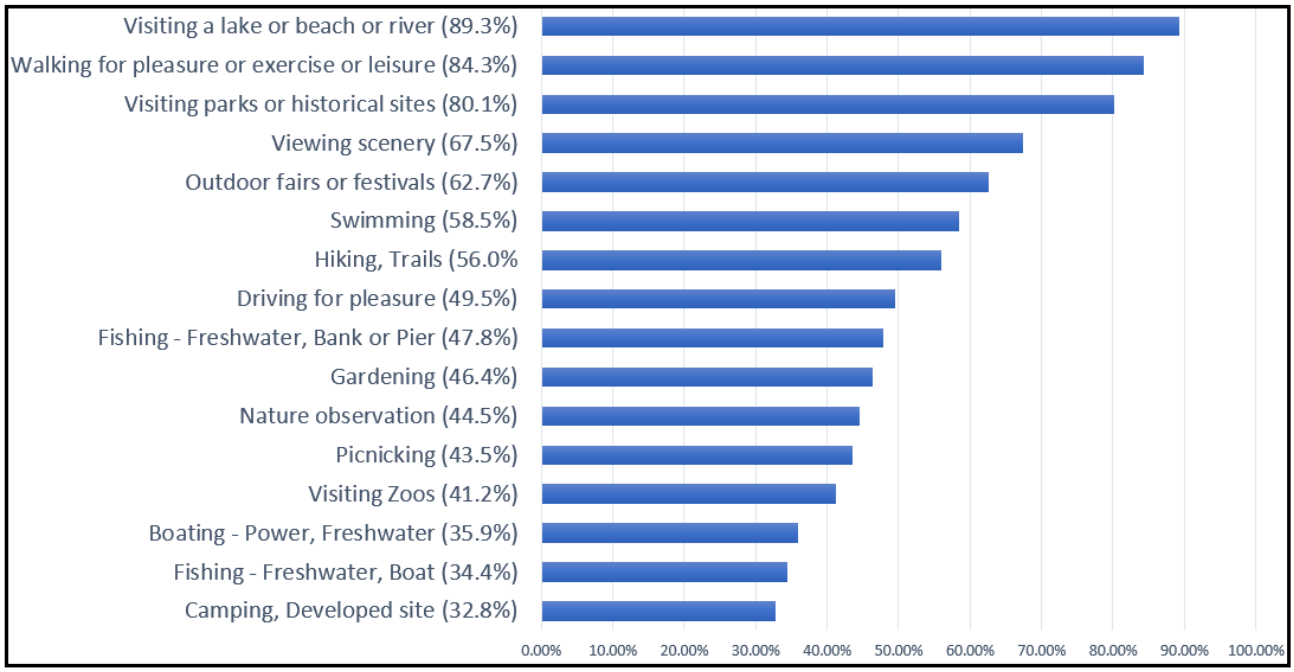

Figure 15- Summary of SCORP listed activities

2.16.5 Recreational Analysis – Needs

Rough River Lake offers an array of recreational opportunities. Public comments received during the master planning process indicate a desire to have campground expansions, maintain and update existing facilities, extensions of the trail network, an archery range, and better educational opportunities once the new Visitor's Center opens.

The Kentucky SCORP supports the need for hiking, biking, and in general more water-based outdoor activities. USACE relies on partnerships for recreational amenities, and as time, partnerships, and budget allows, will integrate more facilities to accommodate the public. These activities are balanced with the primary missions of the lake, namely flood risk management, water supply, and the inherent mission of environmental stewardship.

2.16.6 Recreational Carrying Capacity

There currently is no carrying capacity study for Rough River Lake. A carrying capacity is defined as the number of people, other living organisms, or crops that a region can support without environmental degradation. USACE decisions on significant expansions to marinas or

boat ramps should be informed with the completion of a formal carrying capacity study. Many of the existing recreation facilities often reach capacity, which necessitates the need for a formal land use capacity study. Management decisions have been made to provide additional campsites and day use parking spaces to relieve high occupancy use, though in the 2019 survey, patrons asked for more parking and campsites at most of the campgrounds.

2.17 RELATED RECREATIONAL, HISTORICAL AND CULTURAL AREAS

In addition to Rough River Lake, recreational users have several other water-based recreational facilities available within the Area of Interest (AOI). The primary AOI is defined as counties within 30 minutes' drive time (roughly 30 miles) from the Project and the secondary AOI as counties within 60 minutes' drive time (roughly 60 miles) from the Project. One of these areas, Nolin River Lake, is managed by the USACE.

Other nearby attractions include Mammoth Cave National Park, Pine Knob Theatre, Fordsville L & N Depot Museum, Bill Monroe Museum, Jeffreys Cliffs Conservation, Otter Creek Outdoor Recreation Area and the General George Patton Museum of Leadership.

2.18 REAL ESTATE

2.18.1 Acquisition Policy

Rough River Lake was authorized by the Flood Control Act approved 28 June 1938, Public Law No. 761, 75th Congress, 3rd Session. The guide elevations were determined to be 514.0 feet MSL for fee acquisition and 534.0 feet MSL for flowage easement acquisition with appropriate allowance for backwater effects.

2.18.2 Fee Lands

Current fee acreage totals 9,322.95 consisting of 5,380.74 acres in Breckinridge County, Kentucky, 3,831.57 acres in Grayson County, Kentucky and 110.64 acres in Hardin County, Kentucky.

2.18.3 Easement Lands

Perpetual easements were also acquired to support Project requirements. There are currently 4,494.04 acres of easement at Rough River Lake comprising of 2,443.10 acres located in Breckinridge County, Kentucky, 1,517.25 acres located in Grayson County, Kentucky and 533.68 acres located in Hardin County, Kentucky. These easements were acquired for different purposes including roads, utilities, channel improvement works, and occasional and permanent flooding.

Roadway Easement. Generally, roadway easements allow the government to construct, operate and maintain roads to access USACE-managed lands. There are 1.20 acres of road easements at Rough River Lake in Grayson County, Kentucky.

Flowage Easement. Flowage easements grant the Government the right to occasionally or permanently flood private land in conjunction with operation of the project. The easements also

prohibit the construction of habitable structures. There are 4,486.39 acres of occasional flowage easements at Rough River Lake to include 2,436.66 acres in Breckinridge County, Kentucky, 1,516.05 acres in Grayson County, Kentucky and 533.68 acres in Hardin County, Kentucky. Flowage easements were acquired above elevation 534 feet MSL in some areas but those portions are currently being disposed upon request by the underlying fee landowner in accordance with Section 328 of the Water Resources Development Act of 2020, Division AA of Public Law 116-260.

Utility/Pipeline Easement. Utility/Pipeline easements allow the government to construct, operate and maintain utilities and pipelines to service USACE-owned facilities. There are 0.05 acres of utility easements in Breckinridge County, Kentucky for sewer line purposes.

Channel Improvement Easement. Channel Improvement easements allow the government to construct, operate and maintain channel improvement works as well as the right to clear, cut, fell, remove and dispose any and all timber, trees, underbrush, buildings, improvements and/or other obstructions and to excavate, dredge, cut away, remove from the land for the purpose of placing dredge or spoil material thereon. There is a 6.40 acre channel improvement easement located in Breckinridge County, Kentucky for purposes of maintaining the tailwater area of Rough River.

2.18.4 Licensed Lands

There is currently one license at Rough River Lake located in Breckinridge County, Kentucky consisting of 0.01 acres that allows for the location, construction, operation, maintenance, alteration, repair and patrol of an underground forced sewer main.

2.18.5 Disposals

The following real property interests have been disposed.

48.40 acres, easement, to Burl S. and Elaine St. Clair terminated December 15, 1958 (Tract No. A-104-E). Area was acquired for temporary use as a borrow material and spoil area.

0.14 acres, fee conveyed to Henry Beauchamp by quitclaim deed dated July 22, 1960 (portion of Tract A-102).

65.71 acres, easement conveyed to the Commonwealth of Kentucky by quitclaim deed dated June 6, 1961 (Tract Nos. A-106E, A-105E-2, A-105E-3, A-103E, A-116E-2, D-400E-3, D-401E-2, E-511E-2, E-511E-3, E-512-E, E-513E, D-400E-4, D-403E-2, D-403E-3, D-414E-2, D-414E-3, D-414E-4, D-416E-2, D-417E, E-506E-2, E-506E-3, E-506E-4, E-507E-2, E-508E-1, E-514E-1, F-603E-2, F-607E-3, F-607E-4, F-608E-5, F-609E-4, F-620E-2, F-621E, F-626E, G-715E-2, G-716E-2, G-718E, Q-1706E-2, Q-1715E-2, Q-1728E-2, Q-1729E-2, Q-1731E-2, Q-1737E, Q-1738E, Q-1739E, F-628-E). This disposal was in accordance with Relocation Contract No. DA-15-029-CIVENG-59-6.

1.74 acres, fee conveyed to Benjamin H. and Dorothy W. Gabbard Jr. by quitclaim deed dated July 15, 1968 (portion of Tract No. B-200) in exchange for 2.53 acres fee (Tract No. B-227).

0.82 acres, easement conveyed to the Baxter and Elizabeth B. Napier Jr. by quitclaim deed dated January 2, 1976 (portion of Tract Nos. M-1323E-1) in exchange for 5.72 acres of flowage easement (Tract Nos M-1327E-1, M-1327E-2, M-1327E-3, M-1327E-4, and M-1327E-5).

0.056 acres, fee conveyed to Harold and Janice Clements by quitclaim deed dated October 5, 1990 (Tract No. A-104). The United States also released the human habitation restriction on 0.058 acres (Tract No. A-105-E1) and reserved the right to flood 0.002 acres as may be necessary for the operation of the project (Tract No. 143E).

0.39 acres, fee conveyed to James and Vita C. Spencer by quitclaim deed dated November 12, 1992 (portion of Tract Nos. I-900).
3.45 acres, easement conveyed to Herman D. and Sheila K. Rearden, Brian L. and Tamela M. Ziliak, Kenneth T. Bennett and Robert H. Turner by quitclaim deed dated June 22, 2005 (portion of Tract No. I-910-E).

0.15 acres, fee conveyed to Richard L. and Retta K. Hirst by quitclaim deed dated November 9, 2010 (portion of Tract No. N-1400).

Rough River is surrounded by over 151 residential developments and there are currently an estimated 415 habitable structure encroachments located on flowage easement lands. Upon request by the underlying fee owner, the Government is releasing its flowage easement rights above elevation 534 and/or the human habitation restriction below elevation 534, if certain requirements are met, to resolve these encroachments. Disposals and releases are processed in accordance with the Rough River Lake Flowage Easement Encroachment Resolution Plan, approved by the Assistant Secretary of the Army, Civil Works, ASA(CW), dated January 3, 2017, America's Water Infrastructure Act of 2018 (Public Law 115-270), Title I, Subtitle A, Section 1775, Water Resources Development Act of 2020 (Public Law 116, 260), Title III, Section 328, and ASA(CW) guidance memos dated December 7, 2018, June 20, 2019 and September 23, 2021. As of the date of this report, the Government has disposed of 15.131 acres of flowage easement and released the human habitation restriction on 1.338 acres.

2.18.6 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 that all Federal regulations still apply.

Leases
Lease outgrants typically provide additional recreational opportunities to the general public. USACE manages the following six major leases at Rough River Lake:

3 acres to Grayson County Fiscal Court, under Lease No. DACW27-1-14-046, for public park and recreational purposes at Eveleigh Boat Ramp. The term of the lease is twenty-five (25) years, beginning January 1, 2013, and ending December 31, 2038. The Grayson County Fiscal Court provides the following services: parking lot, boat ramp, and a security light.

1.3 acres to Grayson County Fiscal Court, under Lease No. DACW27-1-17-217, for public park and recreational purposes at Holiday Boat Ramp. The term of the lease is twenty-five

(25) years, beginning August 1, 2017, and ending July 31, 2042. The Grayson County Fiscal Court provides the following services: boat ramp and turnaround.

1.08 acres to Grayson County Fiscal Court, under Lease No. DACW27-1-19-119, for public park and recreational purposes at Indian Valley Boat Ramp. The term of the lease is twenty-five (25) years, beginning August 6, 2018, and ending August 5, 2043. The Grayson County Fiscal Court provides the following services: boat ramp, road/turnaround, and electric line.

23.94 acres to Nick Bronger's Boat Dock, Inc., under Lease No. DACW27-1-22-053, for commercial concession purposes at Axtel Marina. The term of the lease is ten (10) years, beginning January 1, 2022, and ending on December 31, 2031. Nick Bronger's Boat Dock, Inc. provides the following services: watercraft rentals, slip rentals (covered and uncovered as well as lift slips), watercraft pump out, small store containing supplies and limited groceries, a picnic area, and gasoline pumps.

300 acres to Commonwealth of Kentucky, Department of Parks, under Lease No. DACW27-1-78-142, for public park and recreational purposes at Rough River Lake State Park. The term of the lease is fifty (50) years, beginning January 1, 1978, and ending December 31, 2027. The Commonwealth of Kentucky, Department of Parks provides the following services: 40-room lodge with kitchen and restaurant, 17 cottages, a marina and boat ramp, a convention center, a paddle sports concession (via license), a gift shop, and an air camp at the airport. The park offers opportunities for beach and pool swimming, hiking, boating, fishing, miniature golf, orienteering, wildlife viewing, and other outdoor recreational activities.

21.90 acres to Grayson County Fiscal Court, under Lease No. DACW27-1-89-124, for public park and recreational purposes at Peter Cave Access Site. The term of the lease is thirty-eight (38) years, beginning July 1, 1989, and ending June 30, 2027. Grayson County Fiscal Court subleases this area to Peter Cave Marina, LLC and they provide the following services: seasonal camping, a boat ramp, slip rentals (covered and uncovered), small store containing supplies and limited groceries, rental trailers, and a picnic area.

Easements

Numerous easement outgrants are issued to various entities for the construction, operation, and maintenance of water, sewer, electric, telephone, and cable lines. Other easements grant various entities the right to construct, operate and maintain roads and bridges. See Table 16 below for the easements listing.

Table 17- Real Estate Easements Listing.

Outgrant Number	**Grantee**	**Purpose**	**Term**
DACW27-2-00-007	Level 3 Communications, LLC	Fiber Optic Cable	Perpetual

DACW27-2-01-033	Grayson County Water District	Raw Water Intake and Outfall Line	6/1/2001 – 5/31/2026
DACW27-2-03-055	Brandenburg Telephone Company	Aerial Telephone Lines	Perpetual
DACW27-2-06-283	Meade County RECC	Electric Utility Line	3/27/2006 – 3/26/2031
DACW27-2-07-579	Big Rivers Electric Corporation	Electric Transmission Lines	Perpetual
DACW27-2-11-296	City of Leitchfield	Floating Water Intake Structure & Raw Water Transmission Main	4/15/2011 – 4/14/2051
DACW27-2-11-379	Windstream Kentucky East, LLC	Buried Fiber Optic Cable	6/1/2011 – 5/31/2036
DACW27-2-13-292	Grayson County Fiscal Court	Road	Perpetual
DACW27-2-13-404	Big Rivers Electric Corporation	Electric Transmission Lines	Perpetual
DACW27-2-15-116	Grayson County Fiscal Court	Road	Perpetual
DACW27-2-16-173	Bellsouth Telecommunications, LLC, D/B/A AT&T Kentucky	Minor Aerial & Buried Fiber Optic Cable	Perpetual
DACW27-2-17-053	Meade County RECC	Electric Power Transmission Lines	Perpetual
DACW27-2-17-368	Brandenburg Telephone Company	Fiber Optic Cable	9/11/2017 – 9/10/2042
DACW27-2-19-204	City of Leitchfield	6” Gas Pipeline	1/28/2019 – 1/27/2069
DACW27-2-20-413	Grayson County Water District	Two 6” Waterlines	9/30/2020 – 9/29/2045
DA-15-029-CIV-ENG-59-977	Grayson County Fiscal Court	Road	Perpetual
DA-15-029-CIVENG-61-559	Southern Bell Telephone	Telephone Lines	Perpetual
DA-15-029-CIVENG-62-213	Commonwealth of Kentucky (Dept. of Transportation)	Road	Perpetual
DA-15-029-CIVENG-62-597	Breckinridge County Fiscal Court	Road	Perpetual

DA-15-029-CIVENG-62-614	Grayson County Fiscal Court	Road	Perpetual
DA-15-029-CIVENG-64-243	Meade County RECC	Electric Power Transmission Lines	Perpetual
DACW27-2-67-2162	Commonwealth of Kentucky (Dept. of Transportation)	Road	Perpetual
DACW27-2-67-2233	Grayson County Fiscal Court	Road	Perpetual
DACW27-2-69-070	City of Leitchfield	Raw Water Intake Facility	Perpetual
DACW27-2-72-024	South Central Bell Telephone	Underground Telephone Cable	8/26/1971 – 8/25/2021*
DACW27-2-75-023	South Central Bell Telephone	Aboveground Telephone Line	9/23/1974 – 9/22/2024
DACW27-2-78-049	City of Hardinsburg	Water Intake Line	3/21/1978 – 3/20/2028
DACW27-2-78-050	City of Hardinsburg	Road	3/21/1978 – 3/20/2028
DACW27-2-80-027	Falls of Rough Volunteer Fire Department	Buried Waterline and Buried Sewer line	12/19/1979 – 12/18/2029
DACW27-2-81-086	Commonwealth of Kentucky (Dept. of Transportation)	Road	Perpetual
DACW27-2-92-028	Grayson County Water District	Buried Waterline	7/24/1992 – 7/23/2022
DACW27-2-93-005	South Central Bell Telephone	Underground Communication Lines	11/9/1994 – 11/8/2024
DACW27-2-22-224	Meade County RECC	Aboveground Electric	1/1/2022 – 12/31/2046
DACW27-2-95-048	Grayson County Water District	Water Pipeline	3/1/1995 – 2/28/2045

Licenses

License outgrants 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.

USACE licenses 5,100 acres of water to the Commonwealth of Kentucky, Department of Fish and Wildlife Resources, under License No. DACA27-3-20-173 for fisheries management

purposes. The term of the license is twenty-five (25) years, beginning April 1, 2020, and ending March 31, 2045.

USACE issued a license to All Saints Center for the operation and maintenance of a dock for youth camp purposes under License No. DACW27-3-18-318. The term of the license is five (5) years, beginning June 4, 2018, and ending June 3, 2023.

In addition, approximately 360 license outgrants are issued to various entities and individuals for the construction, operation, and maintenance of driveways, pathways, and minor electric lines. These minor shoreline licenses allow joint on-site management by the grantee and Operations Division with only specified use rights granted through instruments which are administered by Real Estate.

Consents to Easement Structures

The servient estate holder may grant additional easements or other lesser interest over land where the United States owns an easement interest or other lesser interest. The United States may consent to the granting of a subsequent easement, subject to any conditions required to protect the Government's interest. Approximately 840 Consents to Easement Structures have been issued to various entities and individuals for a perpetual term, for the construction, operation and maintenance of non-habitable structures and improvements located on flowage easement lands.

2.19 PERTINENT PUBLIC LAWS

Numerous public laws apply directly or indirectly to the management of Federal land at Rough River Lake. Listed below are several key public laws that are most frequently referenced in planning and operational documents. Refer to Appendix A for a more comprehensive listing.

- Endangered Species Act of 1973, Pub. L No. 93-205, 87 Stat. 884 (codified as amended at 16 U.S.C § 1531, et seq.) – This act establishes protections for fish, wildlife, and plants that are listed as threatened or endangered, provides for adding species to and removing them from the list of threatened and endangered species, and for preparing and implementing plans for their recovery; provides for interagency cooperation to avoid take of listed species and for issuing permit for otherwise prohibited activities; provides for cooperation with States, including authorization for financial assistance; and implements the provisions of the Convention an International Trade in Endangered Species of Wild Flora and Fauna.

- 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 Pub. L. No. 85-624, 72 Stat. 563, (1958) (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 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), 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.

- 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; and
    - Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

CHAPTER 3- RESOURCE OBJECTIVES

3.1 INTRODUCTION

This chapter sets forth goals and objectives necessary to achieve the USACE vision for the future of Rough 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 Master Plan strategic implementation plan.

3.2 RESOURCE GOALS

The following statements, paraphrased from EP 1130-2-550, Chapter 3, express the goals for the Rough 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 USACE programs 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 USACE, which may impact human and natural environments.
- Consider the environment in employing a risk management and systems approach throughout the lift cycles of projects and programs.
- Leverage scientific, economic, and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.
- Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.

3.3 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, Rough 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. Regional and State planning documents including the 2020-2025 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 Rough River Lake to the greatest extent possible. They include recreational objectives; natural resource management objectives; visitor information; education and outreach objectives; general management objectives; and cultural resource management objectives. Tables 18 to 22 list the objectives along with the associated goal(s) each address.

Table 18- Recreational Objectives

Recreational Objectives	Goals				
	A	B	C	D	E
Maintain existing facilities, including the infrastructure of the boat ramps. Rough River Lake is regional boating destination with access to swimming, fishing, water skiing and paddle sports.	O		O		O
Evaluate shoreline erosion, sedimentation and develop alternatives to mitigate.	O	O			O
Evaluate the availability 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.). Identify potential development nodes to address the availabilities.	O	O	O	O	O
Maintain the current navigational buoy placement plan on file and maintain to accommodate and protect a variety of uses at public use areas and public mooring at Marinas. Explore enforcement options for no-wake zones and enforce Kentucky boating laws which all contribute to the safety, aesthetics and enjoyment at Rough River Lake and will be a continued emphasis.	O	O	O	O	O
Maintain and balance public use while preserving and protecting the Project's natural resources with aesthetics and scenic views. Also maintaining public opportunities to help support wildlife and natural systems.	O	O	O	O	
Formulate a long term plan for the renovation of aging facilities and infrastructure.	O				
Seek opportunities to accommodate increasing boater usage	O	O	O	O	O
Evaluate the demand and capacity for recreation facilities.	O	O	O	O	O

Monitor public use levels and evaluate impacts from overuse and crowding. Take action to prevent/remediate overuse, conflict, and public safety concerns.	O	O	O		
Keep future development sites as high density recreation to allow for future needs for recreational growth.			O	O	O
Incorporate for ADA accessible ramps, trails, pathways or other accommodations to the residents with a physical impairment.	O	O	O	O	O

Table 19- Natural Resource objectives

Natural Resource Management Objectives	**Goals**				
	A	**B**	**C**	**D**	**E**
Monitor lands and waters for invasive, nuisance species and take action to prevent and/or reduce the spread of these species through early detection and rapid response.	O	O		O	O
Facilitate partnerships with USACE biologists and Kentucky Nature Preserves natural areas inventory biologists (and/or other experts) in identifying at risk natural communities to include maps and conditions of those communities, provide recommendations of best management practices for protecting and enhancing those communities and prioritizing management objectives for Threatened and Endangered species within those communities.	O	O		O	O
Develop annual work plans that achieve and maintain desired natural resource conditions to include special emphasis on environmentally sensitive areas and actions to improve native habitat for migratory birds, pollinators, bats, and native species both terrestrial and aquatic.	O	O	O	O	O
Address unauthorized uses of public lands such as off-road vehicle use, dumping, clearing of vegetation, unauthorized paths, etc. that create negative environmental impacts by additional signage or patrols.	O	O	O		

Table 20- Visitor information, Education and Outreach

Visitor Education, Information and Outreach Objectives	Goals				
	A	B	C	D	E
Continue to seek ways to serve visitors and reach new visitors with public outreach and social media presence.	O		O		O
Maintain and enhance relationship with the Friends of Rough River Lake, Inc., a 501c(3) non-profit independent organization dedicated to increase the visibility and perception of Rough Lake, promote and protect natural resources, encourage safe use of water resources, and promote the local economy through public awareness, community efforts and recreational opportunities. Lake Staff will seek to maintain and enhance this relationship.	O		O		O
Collaborate with local school districts to increase field trips to Rough River Lake, as well as outreach programs hosted at schools. Programs teach children about the USACE mission, wildlife & habitat, restoration efforts, water safety, and fossil discoveries.	O		O		O
Continue to educate surrounding areas about the USACE mission, water safety, history, lake operations, recreation, etc.	O		O		O
Provide opportunities for communication with agencies, special interest groups, and the general public.	O		O		O
Foster community and public involvement to enhance public lands through Recreation and Environmental Stewardship Projects.	O		O		O
Combat damage to resources and impacts to public recreational experiences through active communication with other agencies, public education, and the Visitor Assistance program.	O		O		O
Strategically place safety and wellness equipment (loaner life jackets, fire extinguishers, first aid kits, water stations)	O		O		O

Table 21- Cultural Resources Objectives

Cultural Resources Objectives	Goals				
	A	B	C	D	E
Protect and manage project natural and cultural resources through sustainable environmental stewardship programs.	O	O		O	O
Cultural and historical preservation is fully integrated into all undertakings at Rough River Lake (Section 106 and 110 of the National Historic Preservation Act; the Archeological Resources Protection Act and Native American Graves Protection and Repatriations Act).	O	O		O	O
Actively maintain compliance with Public Law 101-601, Native American Graves Protection and Repatriation Act (16 November 1990) requires Federal Agencies to return Native American human remains and cultural items, including funerary objects and sacred objects, to their respective peoples.	O	O		O	O

Table 22-General Management Objectives

General Management Objectives	Goals				
	A	B	C	D	E
Identify, evaluate, and provide to the extent possible increased opportunities for education and outreach.	O	O		O	O
Foster community and public involvement through partnerships.	O	O	O	O	O
Continue to promote volunteer events and opportunities to preserve the unique scenic beauty and aesthetics of the lake.	O			O	O
Foster community and public involvement to enhance public lands through Recreation and Environmental Stewardship Projects.	O	O	O	O	O
Combat damage to resources and impacts to public recreational experiences through active communication with other agencies, public education, and the Visitor Assistance program.	O	O		O	O
Promote cost- effective renovation of existing facilities (where feasible) as an alternative to the development of new facilities.	O			O	O
Promote usage of environmentally friendly facility upgrades (LED lights, low-flow toilets, etc.).	O	O			O

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

This Master Plan guides the comprehensive management and development of recreation, natural, and cultural resources at the Lake and defines 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

In accordance with EP 1130-2-550, all lands at USACE water resource development projects are allocated by USACE into one of four categories in accordance with the congressionally authorized purpose for which the project lands were acquired: Operations, Recreation, Public Use Area, and Fish and Wildlife. See Figure 16 for the 1961 Land Allocations. Specifically, for Rough River Lake, all lands fall within the Operations land allocation, though there is a description of all four categories in the following sections.

4.1.1 Operations

Operations: These are lands acquired for the congressionally authorized purpose of constructing and operating the project. All lands at the Project are included in this allocation.

4.1.2 Recreation

Recreation: These are lands acquired specifically for the congressionally authorized purpose of recreation. These lands are referred to as separable recreation lands. Lands in this allocation can only be given a land classification of "Recreation."

4.1.3 Fish and Wildlife

Fish and Wildlife: These are 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 in this allocation can only be given a land classification of "Wildlife Management."

4.1.4 Mitigation

Mitigation: These are lands acquired 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 in this allocation can only be given a land classification of "Mitigation."

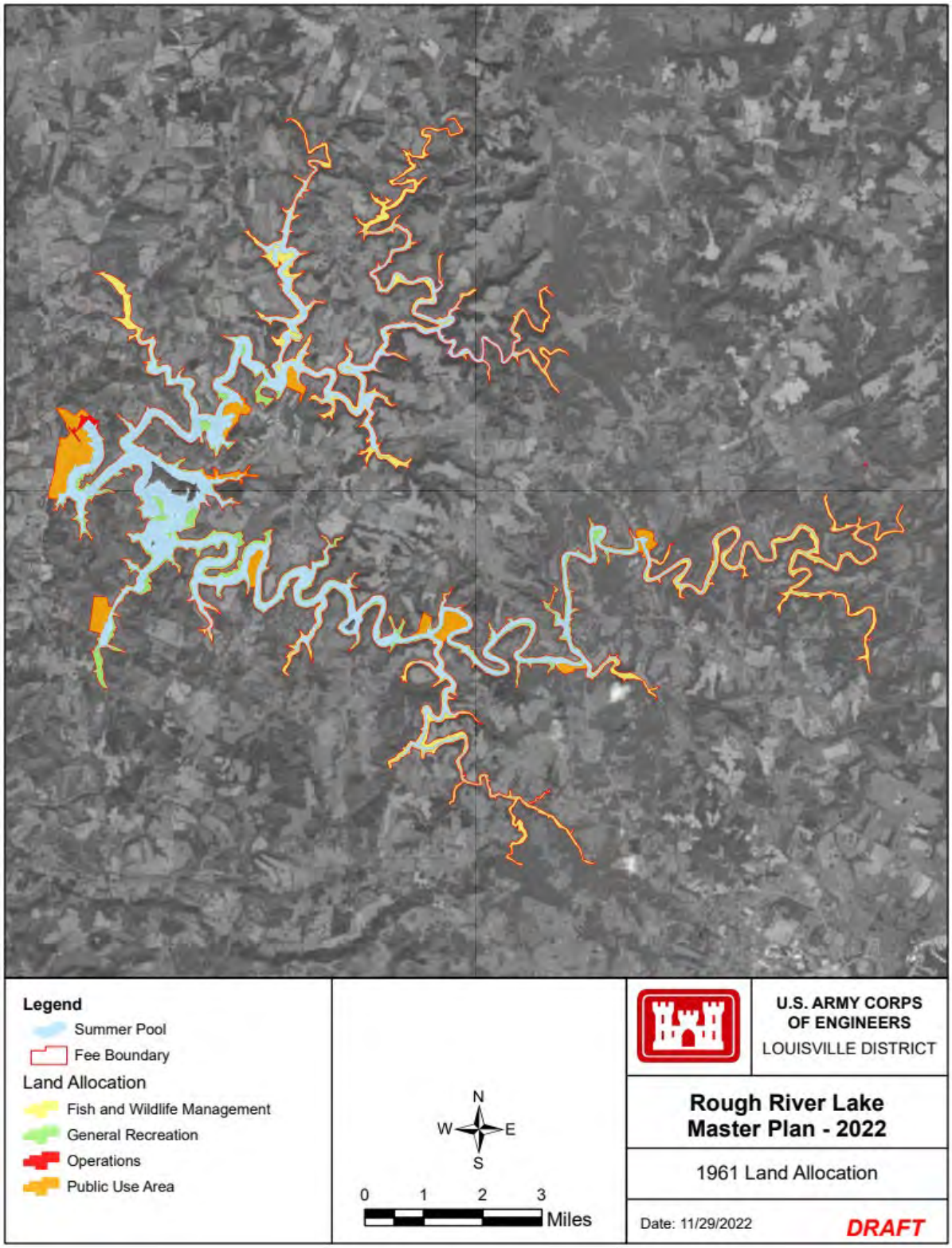

Figure 16- 1961 Land Allocation

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.

Current USACE guidance further defines land classifications to provide for development and resource management consistent with authorized purposes and other Federal laws. The previous Master Plan used an obsolete classification scheme that has been modernized in this document to meet current standards. See Figure 17 for the Land Classification map. 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

Table 28 in Chapter 9 lists acreages in each classification and sub-classification. The classification process refines the original land allocations to fully utilize project lands and considers public desires, legislative authority, regional and project specific resource requirements, and suitability. The system for classification has been realigned to meet current standards. Under prior USACE policy, the term “land allocation” was used in Master Plans to describe how lands were to be managed. Under EP 1130-2-550, Change 05 (2013), the term “land allocation” now refers to the congressionally authorized purpose for which the project lands were acquired, and the “land classification” is now used in USACE Master Plans to indicates the primary use for which project lands are managed.

The Project manages lands according to five of the six above referenced primary classifications. Figure 16 shows the original land allocations from 1961.

4.2.1 Project Operations

The project operations classification is used to classify lands that are required for the dam, spillway, maintenance facilities, administrative facilities and any other land associated with project operation. Where compatible with operational requirements, project operations lands may be used for wildlife habitat management and recreational use. There are 48.7 acres of land included in this classification at Rough River Lake.

4.2.2 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 instances warranted by the public interest and where no viable alternative area or route is available. There are 570.7 acres of land included in this classification at Rough River Lake.

4.2.3 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 Rough River Lake with this classification.

4.2.4 Environmentally Sensitive Areas

This classification category includes areas where scientific, ecological, cultural or aesthetic features have been identified. Designation of these lands is not limited to just lands that are otherwise protected by laws such as the Endangered Species Act, the National Historic Preservation Act, or applicable state statutes. These areas must be considered by management to ensure they are not adversely impacted. Typically, limited or no development or public use is allowed on these lands. No agricultural or grazing uses are permitted on these lands unless necessary for a specific resource management benefit. These areas are typically distinct parcels located within another, and perhaps larger, land classification, area. There are 48.2 acres of land included in this classification at Rough River Lake.

4.2.5 Multiple Resource Management Lands

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

- Low-Density Recreation.
- Wildlife Management.
- Vegetative Management.
- Future or Inactive Recreation Areas; and
- Water Surface.

4.2.5.1 Low Density Recreation

These lands are designated for dispersed and/or low-impact recreation use. Development of facilities on these lands is limited. The 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. There are 46.7 acres of land included in this sub-classification at Rough River Lake.

4.2.5.2 Wildlife Management

This land sub-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. There are 3,465.1 acres of land included in this sub-classification at Rough River Lake.

4.2.5.3 Vegetative Management

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. There are 19.5 acres of land included in this sub-classification at Rough River Lake.

4.2.5.4 Future or Inactive Recreation Areas

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. There are 33.5 acres of land included in this sub-classification at Rough River Lake.

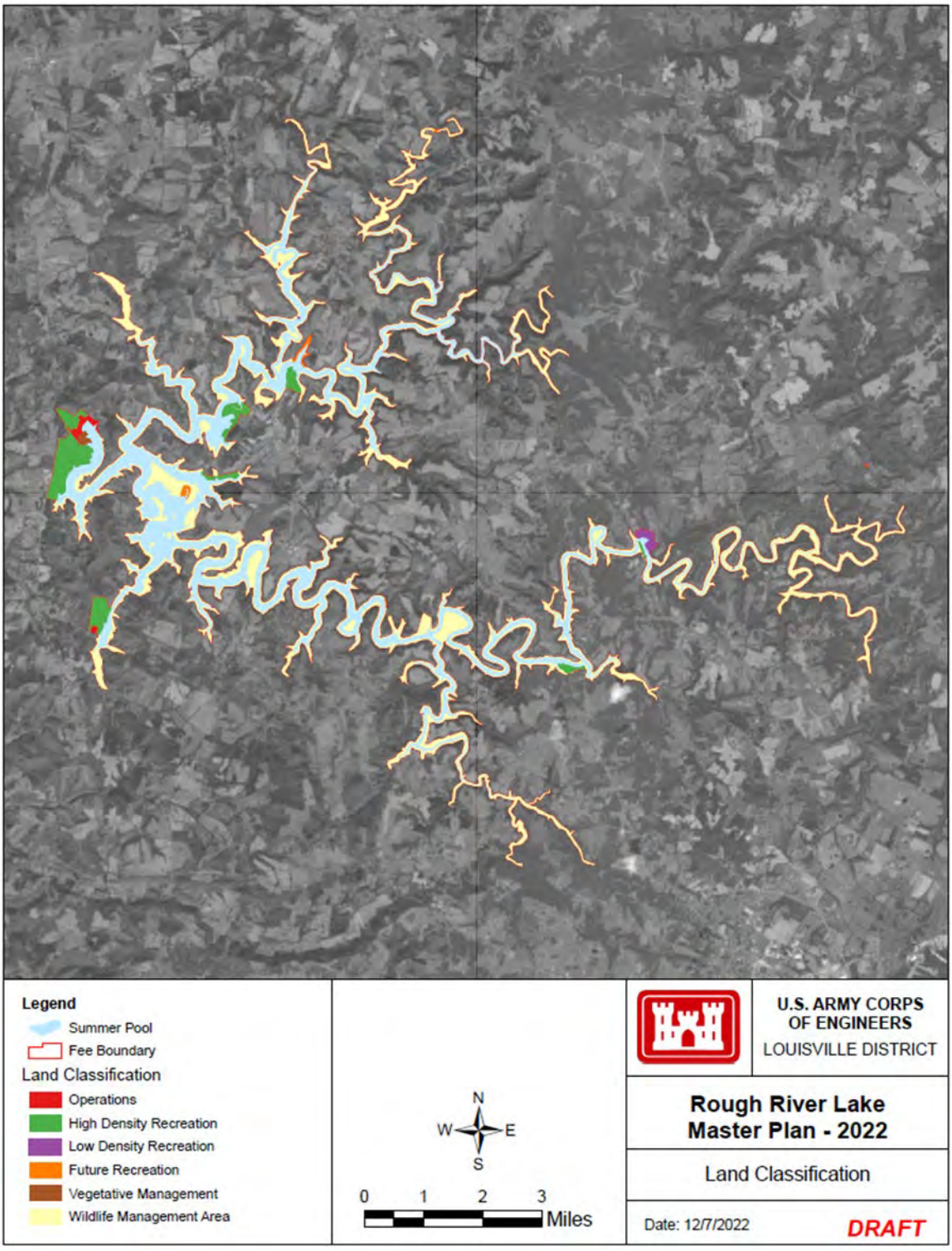

Figure 17- Land Classifications of Rough River

4.2.6 Water Surface

USACE regulations specify four possible sub-categories of the Water Surface classification. These sub-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 Zoning map showing sub-classifications is shown in Figure 18. The four sub-categories of the Water Surface classification are:

- Restricted.
- Designated No-Wake.
- Fish and Wildlife Sanctuary; and
- Open Recreation.

4.2.6.1 Restricted

Restricted water surface includes those areas where recreational boating is prohibited or restricted for project operations, safety, and security purposes. The areas include the water surface upstream and downstream of the Rough River Lake Dam, around the water intake structures, as well as around the swim beaches.

4.2.6.2 Designated No-Wake

Designated No-Wake areas are intended to protect environmentally sensitive shorelines and improve boating safety near key recreational water access areas such as boat ramps. There are 235.6 acres of Designated No-Wake water surface at Rough River Lake.

4.2.6.3 Fish and Wildlife Sanctuary

This water surface sub-classification applies to areas with annual or seasonal restrictions to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning. Rough River Lake has no water surface areas designated as a Fish and Wildlife Sanctuary.

4.2.6.4 Open Recreation

Open Recreation includes all water surface areas available for year-round or seasonal water-based recreational use. This sub-classification encompasses the majority of the lake water surface (2830.9 acres) 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.

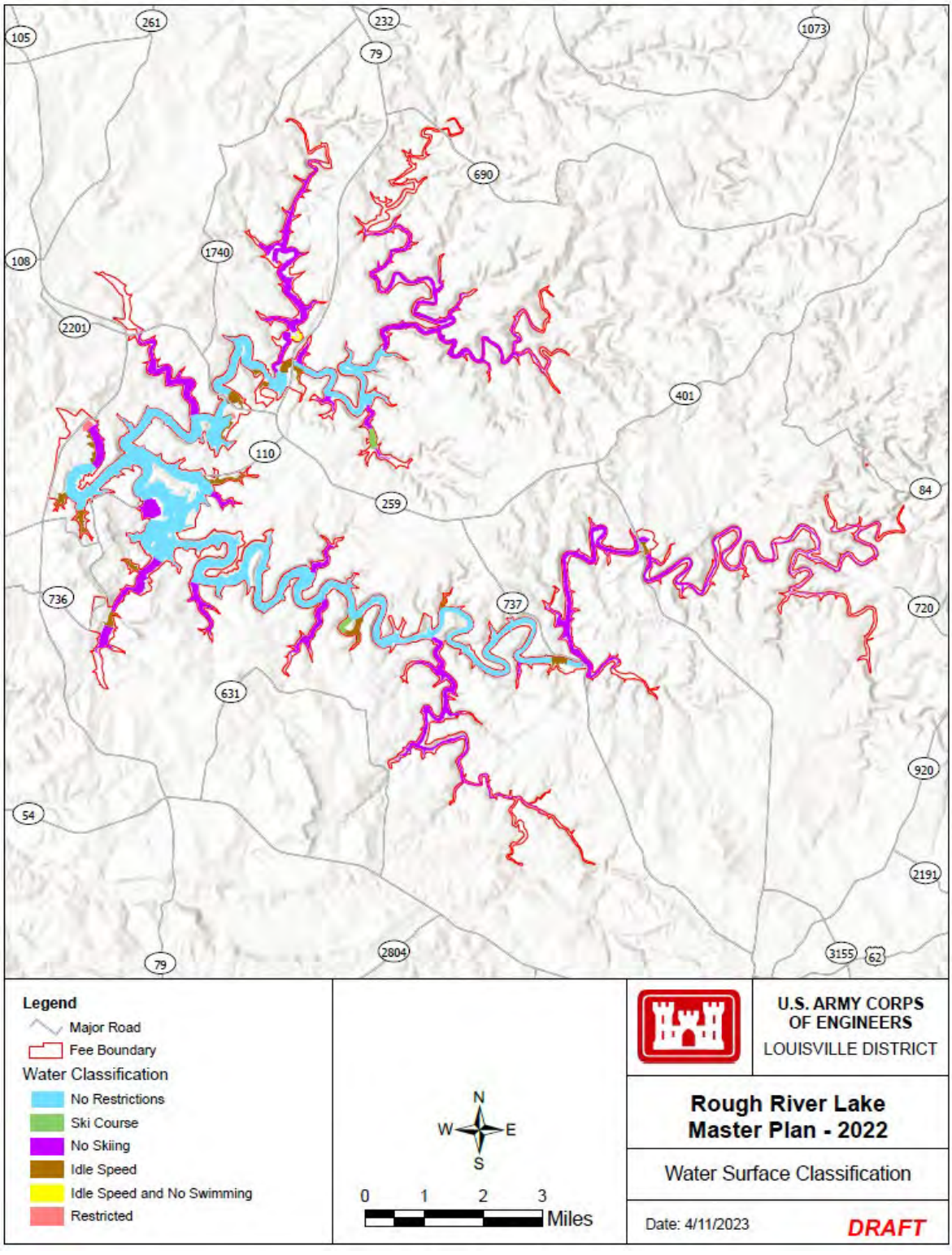

Figure 18- Water Surface Classifications..

CHAPTER 5 - RESOURCE PLAN

5.1 INTRODUCTION

The Master Plan provides guidance for the orderly development, use and management of Project resources. Resource planning takes into consideration:

- Authorized Project Purposes
- Public Input and Interests
- Regional Needs, Opportunities and Constraints

All proposed development is designed to be compatible with the Project's natural and cultural resources. At times, there are conflicts with demands for different uses. For example, subdivisions may request more shoreline use in an area where cyclists would like to see more trails, or another user group has requested primitive camping. Project planning and land classification take into consideration several factors:

- Seasonal Flooding
- Soils
- Ecological Conditions
- Existing and Projected Recreation Demand
- State and Local Interests

5.2 MANAGEMENT BY CLASSIFICATION

This chapter describes the management plans for each land use classification within the Master Plan. The classifications that exist at Rough River Lake are Project Operations, High Density Recreation, Environmentally Sensitive Areas, and Multiple Resource Management Lands, which consist of Low-Density Recreation, Wildlife Management and Future or Inactive Areas. The Water Surface is divided into sub-classifications of Restricted, No-Wake, and Open Recreation. The Resource Plan describes how areas under these various classifications will be managed in broad terms. There are also twenty-one distinct recreation areas identified at Rough River Lake, which extend across multiple land classifications. These recreation areas are listed under the dominant land classification (Table 23) and include management recommendations specific to that area.

Table 23- Land Classification of Recreation and Community areas

Recreation Area	Total Acres per Area	Primary Land Class
Adkins	**0.22**	Low Density Recreation
Axtel	**45**	High Density Recreation
Axtel Marina	**8**	High Density Recreation
Browns Hideaway	**0.4**	Low Density Recreation
Cannon's Point	**0.34**	Low Density Recreation
Cascade Acres	**0.21**	Low Density Recreation
Cave Creek	**100**	High Density Recreation
Eveleigh	**5**	Low Density Recreation
Fernwood	**0.11**	Low Density Recreation
FORRL Visitor	**2**	Low Density Recreation
Fox Cliff	**0.22**	Low Density Recreation
Holiday Rough	**0.26**	Low Density Recreation
Indian Valley	**0.22**	Low Density Recreation
Laurel Branch	**28**	High Density Recreation
Mills	**0.19**	Low Density Recreation
North Fork	**45**	High Density Recreation
Panther Creek	**0.09**	Low Density Recreation
Peter Cave	**25**	High Density Recreation
Pine Ridge	**0.28**	Low Density Recreation
State Park	**240**	High Density Recreation
Tailwater	**12**	Low Density Recreation

Further details for managing these lands will be included in the OMP for the Lake, 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, at all project lands USACE will strive to meet universal project goals 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 trespasses. 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, or other preferred areas used by recreationists into the future. As development occurs in the future, USACE will consider impacts to these areas and may require mitigation for development actions that would negatively impact these sites. This section of the Master Plan provides basic information and data about each Project Site Area (PSA), which is the USACE-owned or leased boundaries for specific functional areas. Management for PSA's are within the OMP and have both project and "site" definitions. The below comprises each land use classification and includes:

- Area name
- Basic information and data about the area
- Listing of existing facilities and a brief discussion
- Listing of proposed actions and a brief discussion

5.3 PROJECT OPERATIONS

This category includes those lands required for operation of the dam, spillway, and outlet works at the Lake. The management plan for these areas is to continue providing physical security necessary to ensure continued operations of the dam and related facilities. Public access to these areas is often restricted. Mooring private vessels and modification of land and vegetation within this area is prohibited without explicit permission from USACE. These areas may at times be used for compatible recreation activities and wildlife management as long as the proposed activities do not negatively impact Project operations. Requests for a permit for a compatible use within an area designated for project operations will be evaluated on a case-by-case basis and a decision will be made as to whether the proposed activity will be permitted based on the potential impacts to operations.

Sufficient facilities have been developed in the Operations area which includes the dam, spillway, USACE Project office, and outlet works area to provide for public use. There are 49.9 acres of land with this classification.

5.4 HIGH DENSITY RECREATION

Rough River Lake has 578.6 acres classified as High Density Recreation. These lands are developed for intensive recreational activities for the visiting public including day use facilities, campgrounds, boat launches, marinas, resorts, and other commercial concessions. National USACE policy set forth in ER 1130-2-550, Chapter 16, states the primary rationale for any future recreation development must be dependent on the project's natural or other resources. This dependency is typically reflected in facilities that accommodate or support water-based activities, overnight use, and day use such as marinas, campgrounds, picnic areas, trails, swimming beaches, boat launching ramps, and comprehensive resort facilities. Examples of activities that are not dependent on a project's natural resources include, theme parks or ride-type attractions, sports or concert stadiums, and stand-alone facilities such as restaurants, bars, motels, hotels, and golf courses.

USACE Managed High Density Recreation Areas

USACE manages four areas designated as High Density Recreation. In recreation areas which are leased to other organizations for operation and management, USACE does not provide any maintenance within any of these locations but there are times when USACE provides support to the managing agency. USACE provides review of requests and ensure accordance with applicable laws and regulations for proposed activities within high density recreation 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. All locations have same day camping reservations available as well as long term camping.

Axtel

Axtel campground is accessed from Highway 79 and contains 158 campsites, many of which have electric and water hookups. All campsites provide views of the lake. Additional amenities

include a swimming area, dump station, showers, fish cleaning station, and a short trail. The day use area includes a boat ramp, and flush toilets. Wi-fi is currently available for free from an outside source. See Figure 19.

There is a wastewater treatment plant (WWTP) at Axtel that serves both Axtel and North Fork. The WWTP is costly to operate, costly to maintain, during peak periods is over capacity, and is not environmentally friendly. The existing WWTP requires four employees to maintain two levels of Kentucky wastewater certification; each employee must be recertified every two years to maintain certification to operate the plant. In 2024, USACE has plans to replace the WWTP with a new aerobic treatment system, subject to available funding and environmental review. An aerobic treatment system does not require any certification to operated. The installation of this new type of waste treatment facility will result in a significant reduction in O&M cost. The new aerobic treatment system will also have two additional advantages: No wastewater will be dumped directly into the reservoir and the wastewater drip field will be a pollinator site.

Figure 19- Aerial View of Axtel Beach

Cave Creek

Cave Creek campground is accessed from Cave Creek Rd (Highway 736) and offers 65 campsites, 36 of which have electric and water hookups. Additional amenities are a dump

station, playground, drinking water, and a shower house. The day use area provides a boat ramp, flush restrooms, multi-use mountain bike trail, group shelter, basketball court, and a fishing pier. See Figure 20.

Figure 20- Playground at the Cave Creek Campground.

Laurel Branch

Laurel Branch campground is accessed from Laurel Brand Rd (Highway 110) and offers 71 campsites, 58 of which have electric and water hookups. Most of the campsites are waterfront, while others are just a short walk away from the lake. Additional amenities include flush toilets, showers, playground, and drinking water. The day use area provides a boat ramp, flush restrooms, nature trail, fish cleaning station, fishing, group shelter, fishing pier, and a public beach. Wi-fi is currently available for free from an outside source. See Figure 21.

Figure 21- Campground area at Laurel Branch.

North Fork

North Fork campground is accessed from Highway 259 and offers 81 campsites, 50 of which have electric and water hookups. Several campsites are on the waterfront, while others are just a short walk away. Additional amenities include a dump station, playground, showers, and a basketball court. The day use area provides a boat ramp, two group shelters, public beach, playground, picnic area, flush restrooms, and a fishing pier. Wi-fi is currently available for free from an outside source. USACE has plans to replace the boat ramp restroom and campground shower house on site, subject to available funding and environmental review. See Figure 22.

Figure 22- North Fork Beach.

Outgranted High Density Areas

Outgranted support facilities are allowed under the policy set forth in ER 1130-2-550, Chapter 16. Development must enhance the recreation experience, be dependent on the resource, and be an incidental secondary need. An example of this is gasoline sales to support boating or cabins to facilitate multi-day recreation. Non-dependent or non-secondary examples would be golf courses, schools, baseball fields, or water parks. See Figure 23 for major outgrant locations, which are also listed in section 2.13.6.

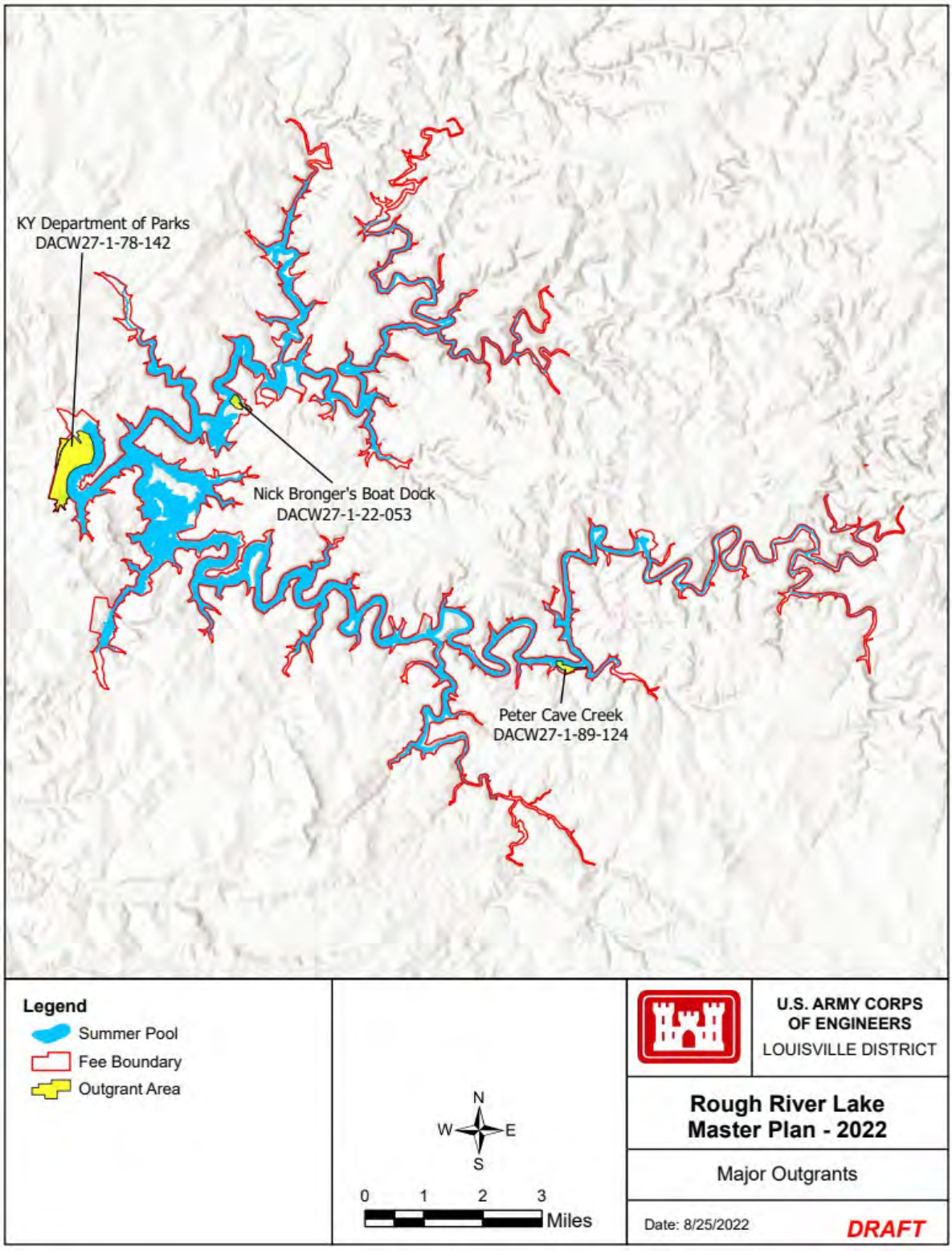

Figure 23- Major Outgrants

Rough River Dam State Resort Park

Rough River Dam State Resort Park is a multipurpose recreation area leased to Kentucky Department of Parks. The Park features 40 lodge rooms with private patios or balconies and 17 two-bedroom cottages, restaurant, and a full-service marina. Some of the activities patrons can enjoy include basketball, birding, boating, disc golf, fishing, hiking, miniature golf, orienteering, picnicking, playgrounds, swimming, tennis, pickle ball, and volleyball. The site also has a gift shop and multiple large and small group meeting rooms. See Figure 24.

Figure 24- Patio at Rough River State Resort Park

Nick Bronger's Boat Dock

This boat dock is located off of Highway 79 in McDaniels Kentucky near Axtel Campground and offers a full-service Pro Shop as well as gas on the water, snacks, and boating supplies. There is also the opportunity to rent pontoons, watercrafts, and boat slips. See Figure 25.

Figure 25- Nick Bronger's Boat Dock

Peter Cave

Peter Cave has a marina, a boat ramps electric and non-electric campground sites and is accessed from Highway 259, north of Leitchfield, with the boat ramp accessed off of Highway 737. See Figure 26 and also Appendix B for a map of this location.

Figure 26- Recreational Vehicles at Peter Cave (photo courtesy of thedyrt.com)

5.5 MITIGATION

This classification is used for lands that were acquired specifically for the purpose of offsetting losses associated with development of the project. There are no lands at Rough River Lake under this classification.

5.6 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. Data includes locations of threatened and endangered species and cultural sites not available to the public. These areas must be managed to ensure they are not adversely impacted. No agricultural or grazing uses are permitted on these lands unless necessary for a specific resource management benefit. Typically, limited or no development or public use is allowed on these lands.

Many species of greatest conservation need are found on USACE lands including federally listed bat species. The degree of sensitivity of an area varies by location and by many contributing factors to its sensitivity. Variables like season, scope, and context of an Action are often important considerations when assessing impacts to sensitive areas. For example, an area may be available to construct a properly designed hiking trail or may be actively managed by forest practices like timber stand improvement without negatively impacting the site's sensitivity. 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 animals are threatened by human activities, especially during active breeding seasons.

Many wildlife species that are identified as having significant conservation need are often associated with large, contiguous blocks of habitat. Fragmentation of these habitats is a primary threat to sensitive species. While no Environmentally Sensitive Areas (ESAs) have been established solely with the goal of limiting fragmentation, large contiguous sections of land are designated as ESAs that currently protect wetlands (or other areas with sensitive, unique, or are otherwise ecologically significant). Because ESAs prohibit the construction of utility corridors, roads, or other fragmenting disturbance, there may be an indirect benefit to those species that are negatively impacted by habitat fragmentation.

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

- Known or discovered cultural sites
- Shoreline erosion
- Reforestations
- Remnant prairies
- Larger planted prairies
- 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 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. There are 48.2 acres of wetland habitat classified as ESA lands at Rough River Lake.

5.7 MULTIPLE RESOURCE MANAGEMENT PLANS

This classification allows for 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.

5.7.1 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.

5.7.2 Wildlife Management

Lands classified as Wildlife Management are designated for the stewardship of fish and wildlife resources and are managed by USACE. There are currently 3,466.2 acres of land under this sub-classification at the lake. However, areas classified as 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 the creation, maintenance, and protection of wildlife habitats and food resources.

The broad objective of fish and wildlife management is to conserve, maintain and improve the fish and wildlife habitat to produce the greatest dividend for the benefit of the general public. 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 sub-classification will be provided to special status species including Federally and state listed species, those identified as species of concern, and species afforded special protections in other Federal regulations such as the Bald and Golden Eagle Act and the Migratory Bird Act.

KDFWR currently manages fisheries at Rough River Lake. The Wildlife Management Areas (WMAs) are managed by USACE and consist of shoreline and the majority of the forested area surrounding the lake. These lands are available to the public for sightseeing, nature study, hiking, hunting, and other activities that enhance environmental awareness and promote environmental stewardship.

Techniques such as prescribed burning, planting native plants and other vegetation beneficial to pollinators, and artificial nest boxes to encourage continued use by raptors, including osprey and bald eagles, are currently utilized and will continue to be practiced.

5.7.3 Future/Inactive Recreation Areas

These areas 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 currently these are inactive areas. There are 38.8 acres of land included in this sub-classification at Rough River Lake.

5.8 WATER SURFACE

There are three Water Surface sub-classifications at Rough River Lake: Open Recreation (unrestricted), Designated No-Wake and Restricted (No Boating). 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 at established stations should continue throughout the Lake's property and watershed, as the data gathered aids in conservation of the project's aquatic resources. A related issue is sedimentation within the reservoir. USACE will evaluate all plans and proposals to ensure that planned or permitted activities are not contributing to the sedimentation problem and ensure that BMPs are adhered in order to prevent excessive erosion. In the future, sustainable reservoir sediment management plans should be developed to address long-term efforts to address sedimentation. See Figure 2 for details regarding water zoning.

5.8.1 Restricted

There are approximately 16.6 acres of restricted boating at Rough River Lake managed by USACE. This area is located at the southern end of the lake in the vicinity of the intake tower and dam. These areas are delineated by a line of "NO BOATS" buoys across the lake.

5.8.2 Fish and Wildlife Sanctuary

There are no Fish and Wildlife Sanctuary designated water surfaces at the Rough River Lake.

5.8.3 Designated No-Wake Zones

Designated No-Wake zones are marked with buoys to protect environmentally sensitive shoreline areas, recreational areas (such as boat ramps, beaches, and courtesy docks). Boats are required to slow down in these areas to prevent waves from impacting these areas. There are 235.6 acres of Designated No-Wake water surface at Rough River Lake.

5.8.4 Open Recreation

The majority of water surface at Rough River Lake is unrestricted year-round. This sub-classification measures approximately 2,830.9 acres in total. Open recreation areas include areas which are designated as no ski zones. 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. See Table 24 below, for Water Zone classification acreages.

Table 24- Water Zone Classifications acreages.

CLASSIFICATION	2023 Master Plan Acres
No Skiing	1928.8
Ski Course	39.5
No Restrictions	2830.9
Idle Speed	248.9
Idle Speed and No Swimming	7.5
Restricted	16.6

5.9 SUSTAINABILITY

Sustainability is a multi-pronged aspect of responsible stewardship of USACE lands. 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 USACE is to manage and conserve natural resources, while providing quality public outdoor recreation opportunities to serve the needs of present and future generations. This mission is the foundation of the Chapter 3 Resource Objectives and all the USACE goals for Rough 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 updated Master Plan for Rough 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 utilizing sustainable practices when managing the Project's aging infrastructure, when creating new educational opportunities, when working with KDFWR to manage the fish population, and when protecting and managing culturally and historically significant sites.

Meeting the public's needs and continuing to provide a full range of outdoor recreation opportunities will require collaboration. In support of that, USACE will maintain and enhance existing relationships while seeking new and innovative types of relationships with federal, state, and local agencies, volunteers, non-government organizations, cooperators, 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 Program (NRM) Strategic Plan establishes a strategic vision with goals and objectives for development of a comprehensive program for USACE. The focus is on the direction for national efforts and activities that are aimed to support the field of natural resources management 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 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

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 TOPICS / ISSUES / CONSIDERATIONS

6.1 FRIENDS OF ROUGH RIVER LAKE

Friends of Rough River Lake, Inc. is a non-profit public service organization that works to promote, preserve, and enhance Rough River Lake and the surrounding areas. The mission is to increase the visibility and perception of Rough River Lake, promote and protect natural resources, encourage safe use of water resources, and promote the local economy through public awareness, community efforts, and recreational opportunities. This organization helps to raise funding, receives grants, and volunteers where needed for the lake, making them an important partner. Friends of Rough River Lake's goals are to:

- Coordinate and facilitate public information and activities on water safety, visitor safety, environmental issues, and other recreation activities on Rough River Lake
- Provide a common meeting ground and forum for interested individuals
- Provide educational opportunities
- Provide assistance in soliciting monetary of tangible donations from area organizations and businesses for projects and/or festivals that the group undertakes.

6.2 NEW WATER WORKS

A USACE 2012 Dam Safety Modification Report (DSMR) on the existing dam called for structural improvements to lower the project risk. This was due to the dam being constructed on a karstic foundation, which is landscape underlain by limestone that can be dissolved by water, leaving voids within it. As there was some concern over installing a cutoff wall around the dam's

existing conduit, the decision was made to install new outlet works as well. The current phase includes the construction of a new outlet works in the left abutment of the dam followed by construction of a concrete cut-off wall (through the existing outlet works) from the crest of the dam through the karstic limestone in the foundation.

6.3 KENTUCKY'S TRANSAMERICA BIKE TRAIL

The Kentucky portion of the national trail is more than 600 miles long. It runs west to east from Crittenden County at the Ohio River to Pike County in the mountainous eastern Kentucky. The fuchsia color on Figure 27 below shows the Midland Kentucky Tour and the rust-colored trail is known as the Mammoth Cave Tour. Both of these trails, running on state routes along Rough River Lake are on the National Bike Trail System.

Figure 27- Kentucky's TransAmerica Bike Trail along Rough River Lake.

6.4 CAVE CREEK TRAIL

The Cave Creek Trail System, opened in May 2021 and has its trailhead at the Cave Creek Campgrounds off Cave Creek Road. The trail came to fruition in cooperation with the Southwest Kentucky Mountain Bike Association (SW KyMBA), Friends of Rough River Lake, Public Trails Association of Grayson County, USACE and local businesses. The trail system is 6.2 miles and consists of three individual loops of increasing skill level. The design and terrain offer a mix of chunk and flow and is full of berms intertwined with intricate rock armor along with some elevation. The trail is bidirectional, and Figure 28 shows an aerial map with the various trail segments.

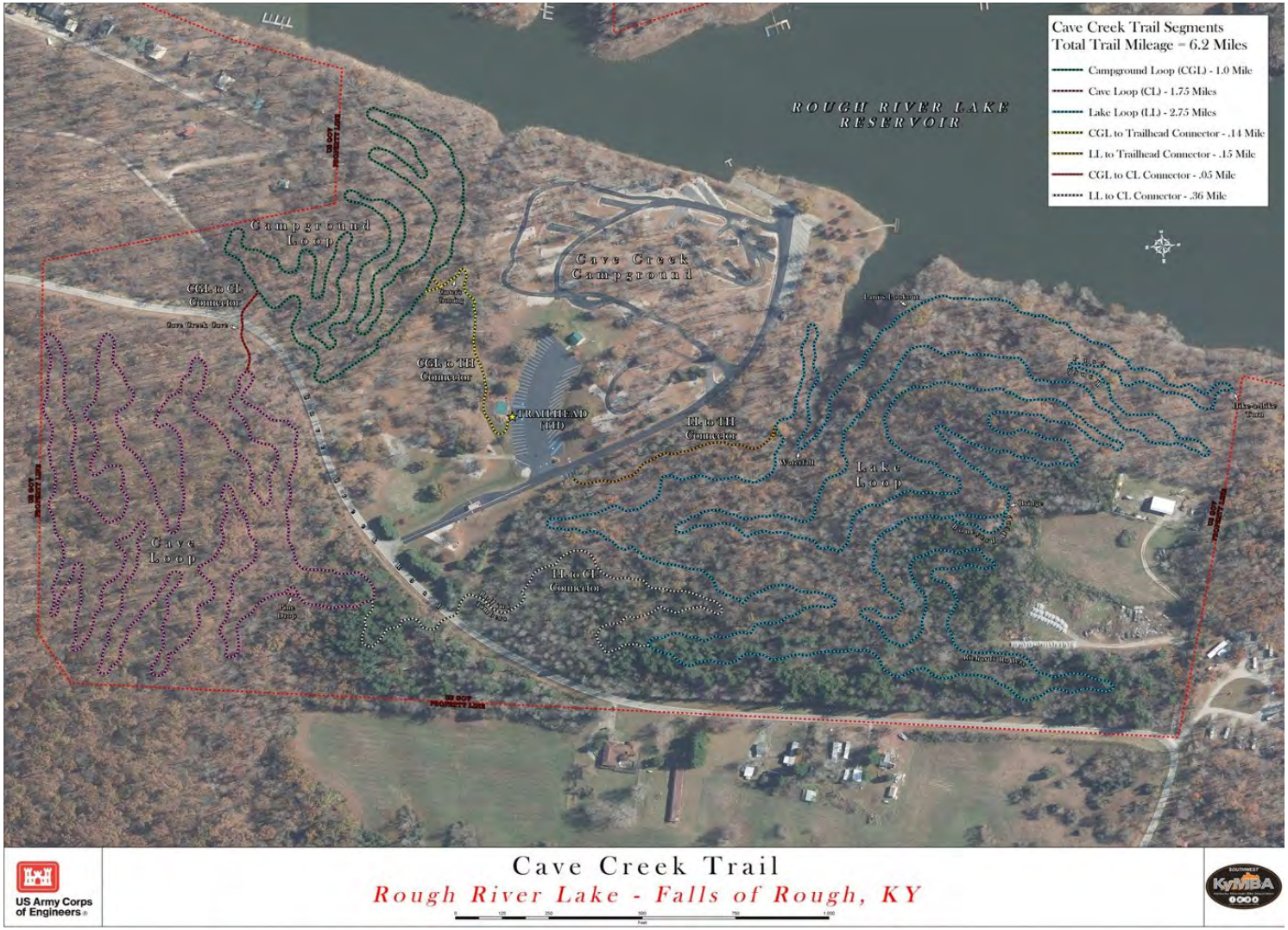

Figure 28- Cave Creek Hike and Bike Trail.

CHAPTER 7 – ENVIRONMENTAL EFFECTS

7.1 NATIONAL ENVIRONMENTAL POLICY ACT OVERVIEW

As an integrated section of the Master Plan document, this EA has been prepared in accordance with NEPA of 1969, Pub. L. No. 91-190, 83 Stat. 852 (codified as amended at 42 U.S.C. §§ 4321, et seq.) and the Council on Environmental Quality's (CEQ) Regulations (codified at 40 C.F.R. Parts 1500-1508), as reflected in USACE 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 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.

7.1.1 Scope of the Environmental Assessment

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 Rough 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. 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 Rough 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 Rough River Lake Master Plan was approved in 1961, 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 1985 in outdoor recreation trends, regional land use, population, legislative requirements, USACE management policy, and wildlife habitat at Barren 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.

7.1.2 Alternatives Considered

When preparing an EA, 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 1961 Master Plan, and the Proposed Action Alternative of implementing and operating the Project consistent with the 2023 Rough 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 3) for these lands that would bring the updated document into compliance with guidance in ER 1130-2-550 and Engineering Pamphlet (EP) 1130-2-550. 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 document.

In addressing the No Action Alternative and Proposed Action Alternatives, it is important to note that the "action" this Integrated document 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. Future operation activities under the adopted plan will be subject to a future, independent NEPA analysis, as appropriate, 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 1961 Master Plan 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 1961 document does not account for the many substantial changes that have occurred since then. The existing Master Plan 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 Rough River Lake Master Plan for the Project, which would replace the 1961 Master Plan. 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.

7.1.3 Affected Environmental/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 withing 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.

Scope of 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 integrated document. 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 document. All future actions taken by USACE, recommended in the 2023 Master Plan or otherwise, would require appropriate environmental review and NEPA compliance.

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. As the guiding document that provides for the development, use, and administration of all Project lands and public use facilities, the focus of a Master Plan document is to present a public use plan for the effective development and efficient utilization of the Project lands, waters, features, and facilities for public benefit. However, the 1961 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 1961 Master Plan and OMP 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 OMP; 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 operation are identified and documented as accurately as possible, additional NEPA analysis will be conducted, on a case-by-case basis, for future projects that are proposed to be carried out in accordance with this Master Plan update (including those identified within the 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 1961 Master Plan and OMP 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.

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 1961 Master Plan, potential effects to air quality of the Project are expected to be negligible. While future development would likely still occur, it 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

This 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. Some localized and temporary emissions associated with construction of new or improved amenities (e.g., utility trenching, road paving, supplying asphalt/concrete, excavation, timber management activities) may be expected. Emissions from increased vehicular traffic and construction actions would typically include byproducts of diesel and gasoline combustion, fugitive dust, and vapors. The emissions associated with equipment operation and construction would be localized, of relatively short duration, and would be expected to result in negligible effects to air quality of the Project.

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 1961 Master Plan, 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 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 1961 Master Plan, 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 1961 Master Plan, 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 and downstream waters.

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 1961 Master Plan, 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. 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 of existing habitats and have the potential to create additional habitat on Project lands. In addition, the revision in classification of some habitats into ESA or Wildlife Management classifications would be beneficial to habitat quality and provide opportunities for the preservation of some 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 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 Rough 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 (Figure 14) 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 Rough 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 USACE.

7.9 THREATENED AND ENDANGERED 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, northern riffleshell, pink mucket, ring pink, clubshell, rough pigtoe, rabbitsfoot. northern long-eared bat, Indiana bat, and the gray bat. 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 1961 Master Plan, no effects to the surrounding demographics, including minority or low-income populations would be anticipated.

7.10.2 Proposed Action

Changes in population and associated stresses on the municipal resources and services over the past 60 years have occurred while 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 1961 Master Plan, the Project would not benefit from strategies and BMPs detailed herein that that may ameliorate the expected pressure on Project resources that the increase in visitation may incur. In

this case, he failure to adopt the updated Master Plan document may have a minor negative impact on recreation and visitation of the Rough River Lake Project.

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 BMPs 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 Proposed Action would have a beneficial effect on cultural resources.

Within the proposed 2023 Master Plan there are potential future actions that are recommended to meet goals outlined for the Project. 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 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 USACE will contact the SHPO.

7.13 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE MATERIALS

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 1961 Master Plan and there are no known HTRWs at the Project, no effects as a result of disturbance of existing or introduction of new HTRW materials to the environment are anticipated.

7.13.2 Proposed Action

Because there are no known HTRWs at the Project and no new actions involving the 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.

7.14 AESTHETICS AND VISUAL QUALITY

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 1961 Master Plan, no effect on aesthetics or visual properties are anticipated.

7.14.2 Proposed Action

Implementing the proposed 2023 Rough 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.

7.15 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 Rough River Lake Project continuing as outlined in the 1961 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. Some short-term effects to the local soundscape may result during normal maintenance activities but these are expected to be temporary and localized in nature. In addition, potential increases in visitation and concomitant increases in vehicular traffic have the potential to effect ambient noise levels of the Project. However, these activities will occur irrespective of the adoption of the Proposed Action and are beyond the scope of this EA.

7.16 CUMULATIVE EFFECTS

The 2023 Master Plan is intended to guide 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. Table 25 provides a summary of anticipated effects from implementation of the updated Master Plan to the resources evaluated in this integrated document.

Table 25- Summary of environmental effects from the Proposed Action.

Resource Evaluated	**Effect**
Reservoir, Pool, and Lake Operation	No effect
Climate	No effect
Air Quality	Negligible
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
HTRW Materials	No effect
Aesthetics and Visual Qualities	No effect
Noise	No effect

7.18 COMPLIANCE WITH ENVIRONMENTAL LAWS

Adoption and implementation of the 2023 Rough 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 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). 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, pink mucket, ring pink, clubshell, rough pigtoe, rabbitsfoot, Indiana bat, northern long-eared bat, and gray bat.

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 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 Appendix C 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. 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), 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.

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 the 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 Rough 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 AGENCY COORDINATION OVERVIEW

USACE is dedicated to serving the public interests in support of the overall development of land uses related to land management for cultural, natural, and recreational resources of Rough River Lake. An integral part of this effort is gathering public comment and engaging stakeholders in the process of planning. 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 Rough River Lake to ensure that future management actions are both environmentally sustainable and responsive to public outdoor recreation needs in a region which is experiencing rapid population growth. The following milestones provide a brief look at the overall process of revising the Rough River Lake Master Plan.

USACE began planning to revise the Rough River Lake Master Plan in March 2022. The objectives for the Master Plan revision were to (1) update land classifications to reflect changes in USACE land management policies since 1961 and (2) update the Master Plan to reflect new agency requirements for Master Plan documents in accordance with ER 1130-2-550, Change 7, January 30, 2013, and EP 1130-2-550, Change 5, January 30, 2013.

Table 26 lists resource agencies, non-governmental organizations and tribes contacted during the Master Plan revision.

Table 26- List of contacts for the Master Plan revision

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
Ohio River Alliance, the Institute for Water Resources
National Resource Conservation Service, Kentucky Office
Kentucky Department of Fish and Wildlife Resources
Office of Kentucky Nature Preserves
Kentucky Heritage Council
Kentucky State Historic Preservation Officer
Kentucky Division of Water
Kentucky Department for Natural Resources
Kentucky Division for Air Quality
Kentucky Division of Waste Management
Kentucky Transportation Cabinet
The Nature Conservancy of Kentucky
The Sierra Club, Kentucky Chapter
Kentucky Environmental Foundation
Kentucky Heartwood
Kentucky Waterways Alliance
Kentucky Resources Council
River Fields
Shawnee Tribe
Cheroke Nation
Eastern Shawnee
Absentee Shawnee Tribe
United Keetoowah Band of Indians
Eastern Band of Cherokee Indians

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 Rough River Lake.

8.3 INITIAL STAKEHOLDER AND PUBLIC MEETINGS

The first action was a scheduled public scoping meeting providing an avenue for public and agency stakeholders to ask questions and provide comments. The public scoping meeting was held in person at the Rough River State Resort Park on August 10, 2022. Two meetings were held, one for the general public and the other for stakeholders which were both were well attended. There was a total of over 50 attendees. The Louisville District placed advertisements on the USACE webpage, social media and in print publications two weeks prior to the public scoping meeting.

USACE employees gave a presentation for the Master Plan Revision Project Delivery Team to convey information about the following topics:

- Public involvement process
- Project overview
- Overview of the NEPA process
- Master Plan and current land classifications; and
- How to submit comments

At the conclusion of the presentation USACE representatives were available to answer questions asked by participants at the end of the presentation or written in the WebEx chat box. Interested persons had the opportunity to comment about the project using a variety of methods, including the following:

- Submitting comments through the interactive lake map website
- Submitting a comment using electronic mail; and
- Submitting a comment and mailing it in on letterhead or choice of paper

Comments and questionnaires were used to develop the Objectives and Actions of this Master Plan (see Section 3.3). There was a 30-day initial public comment period which lasted from August 10, 2022 to September 10, 2022 and a summary of those comments are provided in Table 27. More information can be found in Appendix C.

Table 27- Public Comments received after Master Plan Kick off meetings.

Category	Nature of Comment	Quantity	Response
Recreational	Improve electrical and other utility infrastructure at all campgrounds	1	USACE funds only pay for day to day operations. Acquiring funds from campgrounds require new legislation.
Recreational	Desire for an Archery range	3	Will pursue after Dam remdiation project is complete.
Recreational	Additional scenic Mountain bike/hiking trail and stop over points (suggest Eveleigh)	4	Planned for FY 24. Cultural/Environmental has been completed.
Recreational	Kayak launching sites and improved water access at Hardin Springs	1	Fox Cliff Subdivision is suggested. Area is operated/maintained by a Real Estate License.
Recreational	Additional marinas	2	Currently in discussion
Recreational	Remove existing boat ramps and install a ramp that is usable at winter pool.	1	Management and funding issues.
Recreational	Campsites and a composting restroom on the island.	1	Currently in discussion.
Recreational	A beach and an extended no wake area at Cave Creek	2	Slope concerns. Registered campers would have less space to moor vessels.
Recreational	If the Breckinridge tourism group constructs a venue for the public to attend events, would like a location to boat in a walk up to the venue	1	Tules Cr. Area designation change. The width of this section of Rough River Lake is too narrow.
Recreational	Regulate the number of bass tournaments on the lake	2	State Park leased ramp.
Recreational	Ability to have covered docks	1	Would be addressed in the Shoreline Management Plan.
Recreational	Extend summer pools levels to be from March 1st until November 1st to support boating/kayaking earlier in spring and later in the fall	2	Water management is the project's primary mission.
Recreational	Public access re-established and boat ramp addition added to the end of Hornback Mill extension lane	2	Public access would be an issue.
Recreational	No ski area on the southern fork of the lake to be moved to coincide with the no wake zone at the Peter Cave Marina	1	Will work to address this.
Environmental	Agricultural runoff concerns. Suggest farms should be required to have retention ponds to allow contaminates to settle before entering the basin.	1	Not within USACE authority.
Environmental	Suggest more of a slow release of water to gradually allow the banks to dry out and would result in less shoreline erosion	2	Water management is the project's primary mission.
Environmental	A permit system where by an adjacent Landowner or group of Landowners could purchase a permit and hire an USACE approved contractor to perform shore line mitigation using the approved USACE methods and materials at no cost to the USACE	1	We currently have a process for working with adjacent landowner's to perform this type of work. However, the first step once the area work is agreed upon is to enter into a cooperative agreement that outlines the work to be performed, how it will be performed, and will be responsible.
Safety and Emergency Management	Limit boat speeds and boat wakes. Suggest everything above the mouth of Cave Creek or North Fork to be a no ski zone because it is narrow	18	Falls under enforcement.
Safety and Emergency Management	Allow rails to be installed on bank side of docks and both side of walk ways	1	Would be addressed in the Shoreline Management Plan.
Safety and Emergency Management	Navigation and directional signs at locations of interest as well as on the lake in locations with underwater hazards. More no wake buoys	4	Lake currently has 98 navigational buoys and the placement along with maintenance of additional buoys and signs if there is a definite need. USACE cannot place no wake buoys around every dock.
Safety and Emergency Management	Suggest making the entire cove by the state park ramp an idle no wake zone	1	No future plans to implement.
Safety and Emergency Management	Allow floating extensions to dock access ramps. During high water the existing ramps become inaccessible for the shore	1	Addressed in the Shoreline Management Plan.
Safety and Emergency Management	Basic lake safety rules should be posted at high visited areas at marinas/gas pumps, campgrounds, a boar launch ramps. Could include a bar code for scanning to read the information	3	Agree and will be placing additional rule signage at the USACE managed ramps as soon as signs can be funded and precured.
Cultural Historical Resources	Consideration of having an archive museum/library room at lodge or Corps Office to display historical documents of importance to the lake.	1	Best for Historical Societies.

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

The final draft Master Plan and EA was made available for public and agency review on **[PENDING].** Availability, document access, contact information, and comment instructions were made available through social media, USACE website, and local newspaper announcements. Public and agency comments for the draft final Master Plan were accepted through **[PENDING].** On **[PENDING],** USACE held a virtual meeting to provide stakeholders an additional opportunity to comment on the draft and EA after having some time to review the documents. Copies of all correspondence, initial public comments (prior to the draft public release) as well comments received during the 30-day draft review will be provided in Appendix C. The final version will be posted on the District website.

CHAPTER 9 - SUMMARY OF RECOMMENDATIONS

9.1 SUMMARY OVERVIEW

Rough River Lake's Master Plan preparation followed the USACE Master Planning guidance in ER 1130-2-550 and EP 1130-2-550, both dated 13 January 2013. Three major requirements set forth in the guidance include:

- Preparation of contemporary Resource Objectives
- Classification of Project lands using the approved classification standards; and
- Preparation of a Resource Plan describing in broad terms how the land in each of the land classifications will be managed into the foreseeable future

Additional requirements include public involvement throughout the process, and consideration of regional recreation and natural resource management priorities identified by other federal, state, and municipal authorities. The project delivery team followed the guidance to prepare a Master Plan that will provide for enhanced recreational opportunities for the public, improve environmental quality, and foster a management philosophy conducive to existing and projected staff level at Rough River Lake. Factors considered in the plan were identified through public involvement and review of statewide planning documents including the 2020-2025 Kentucky Statewide Comprehensive Outdoor Recreation Plan. This Master Plan will ensure the long-term sustainability of USACE managed recreation program and natural resources associated with Rough River Lake.

9.2 LAND CLASSIFICATION PROPOSALS

A key component in preparing the Master Plan was examining prior land classification and addressing the needed transition to the new land classification standards. The land classifications presented in the Plan were formulated based on initial public comments and USACE Rough River Lake project staff and Operations Division staff, based on first-hand experience, professional training, and BMPs.

When lands were acquired to construct the project, all of USACE fee owned land was classified as Operations and Recreation. There were 9,231 acres reclassified or updated to the new land classification names. 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 "allocations" to the current classifications is provided in Table 28.

Table 28- Summary of Land Classifications.

CLASSIFICATION	2022 Master Plan Acres	1961 Master Plan Acres
LAND		
Project Operations	48.7	80
Public Use Access*	-	-
High Density Recreation	570.7	-
Environmentally Sensitive Areas	48.2	
Mitigation	0	-
Multiple Resource Management Lands: Low Density Recreation	46.7	-
Multiple Resource Management Lands: Wildlife Management	3465.1	-
Multiple Resource Management Lands: Vegetative Management	19.5	-
Multiple Resource Management Lands: Future/Inactive Recreation	33.5	-
Fish and Wildlife	0	-
Acreage in Easement	-	4765
WATER		
Designated No-Wake**	235.6	-
Restricted**	16.6	-
Open Recreation (does not include Designated No-Ski)	2817.6	-
Designated No-Ski	1928.8	
Normal Recreation Acreage		4860
Fish and Wildlife Sanctuary**	0	-

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

**Water zoning was established in the 1961 Master Plan, but acreages were not calculated.

CHAPTER 10 - BIBLIOGRAPHY

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United States Army Corps of Engineers
Louisville District

Rough River Lake
Master Plan

2023

Appendix A
Environmental

United States Department of Agriculture

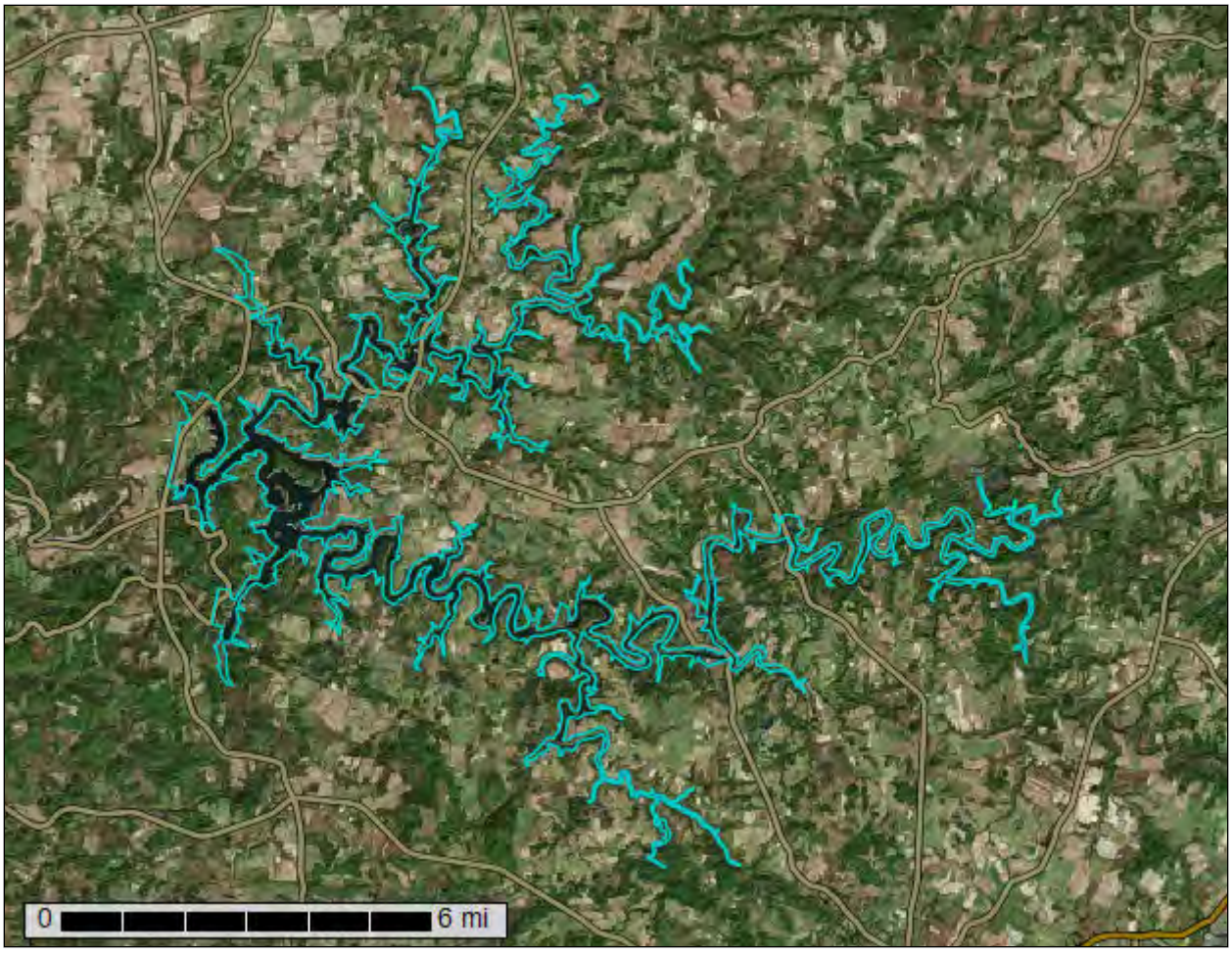
NRCS

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 Breckinridge and Meade Counties, Kentucky, Grayson County, Kentucky, and Hardin and Larue Counties, Kentucky

2023 Rough River Lake Master Plan Update



November 28, 2022

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.

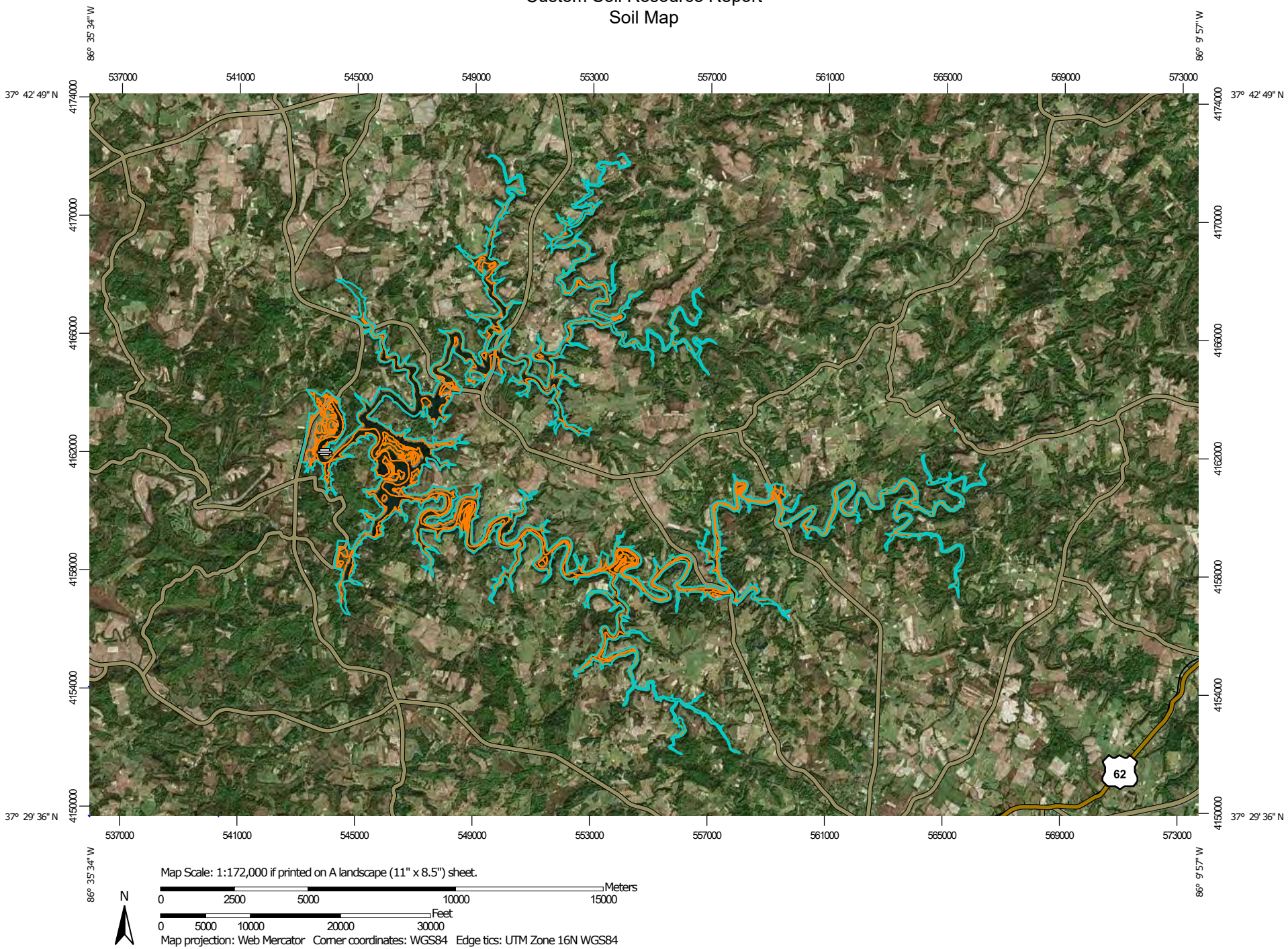
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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 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: Breckinridge and Meade Counties, Kentucky
Survey Area Data: Version 21, Sep 2, 2022

Soil Survey Area: Grayson County, Kentucky
Survey Area Data: Version 19, Sep 2, 2022

Soil Survey Area: Hardin and Larue Counties, Kentucky
Survey Area Data: Version 20, Sep 2, 2022

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

MAP LEGEND

MAP INFORMATION

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background 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
BaC2	Baxter very gravelly silt loam, karst, 6 to 12 percent slopes, eroded	0.4	0.0%
CaC2	Caneyville silt loam, 6 to 12 percent slopes, eroded	10.0	0.1%
CeD3	Caneyville silty clay, 12 to 20 percent slopes, severely eroded	2.3	0.0%
CkD	Caneyville-Rock outcrop complex, 12 to 30 percent slopes	15.2	0.2%
Co	Clifty gravelly silt loam, 0 to 2 percent slopes, occasionally flooded	3.7	0.0%
CrB2	Crider silt loam, 2 to 6 percent slopes, eroded	4.0	0.0%
CrC2	Crider silt loam, 6 to 12 percent slopes, eroded	9.7	0.1%
CrD2	Crider silt loam, 12 to 20 percent slopes, eroded	2.4	0.0%
CtC3	Crider silty clay loam, 6 to 12 percent slopes, severely eroded	0.2	0.0%
Cu	Cuba silt loam, occasionally flooded	30.6	0.3%
DAM	Dam, large	3.7	0.0%
GlC2	Gilpin silt loam, 6 to 12 percent slopes, eroded	0.0	0.0%
GlC3	Gilpin silt loam, 6 to 12 percent slopes, severely eroded	0.3	0.0%
GwF	Gilpin-Dekalb-Rock outcrop complex, 30 to 60 percent slopes	616.1	6.7%
No	Nolin silt loam, 0 to 2 percent slopes, occasionally flooded	125.0	1.4%
RnC2	Rosine silt loam, 6 to 12 percent slopes, eroded	135.1	1.5%
RoC3	Rosine silty clay loam, 6 to 12 percent slopes, severely eroded	14.8	0.2%
RsD2	Rosine-Gilpin-Lenberg complex, 12 to 20 percent slopes, eroded	196.3	2.1%
RsD3	Rosine-Gilpin-Lenberg complex, 12 to 20 percent slopes, severely eroded	182.4	2.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
RsE	Rosine-Gilpin-Lenberg complex, very rocky, 20 to 30 percent slopes	326.8	3.5%
SaA	Sadler silt loam, 0 to 2 percent slopes	0.0	0.0%
SaB2	Sadler silt loam, 2 to 6 percent slopes, eroded	40.2	0.4%
Sf	Steff silt loam, 0 to 2 percent slopes, occasionally flooded	0.2	0.0%
VrF	Varilla-Gilpin-Rock outcrop complex, very bouldery, 20 to 65 percent slopes	547.1	5.9%
W	Water	2,970.8	32.1%
ZaB2	Zanesville silt loam, 2 to 6 percent slopes, eroded	14.1	0.2%
ZaC2	Zanesville silt loam, 6 to 12 percent slopes, eroded	25.6	0.3%
ZnC3	Zanesville silt loam, 6 to 12 percent slopes, severely eroded	32.2	0.3%
Subtotals for Soil Survey Area		**5,309.3**	**57.4%**
Totals for Area of Interest		**9,241.9**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AeC	Allegheny silt loam, 6 to 12 percent slopes	4.0	0.0%
BcC3	Baxter cherty silty clay loam, 6 to 12 percent slopes, severely eroded	0.0	0.0%
Bp	Borrow pits (borrow areas & urban land)	111.0	1.2%
CcC	Caneyville silty clay loam, 6 to 12 percent slopes	1.5	0.0%
CcD	Caneyville silty clay loam, 12 to 20 percent slopes	9.7	0.1%
CeD	Caneyville very rocky silty clay loam, 10 to 20 percent slopes	31.2	0.3%
CeF	Caneyville very rocky silty clay loam, 20 to 40 percent slopes	29.0	0.3%
ClD3	Caneyville silty clay, 6 to 20 percent slopes, severely eroded	0.3	0.0%
CnD3	Caneyville very rocky silty clay, 8 to 25 percent slopes, severely eroded	38.6	0.4%
Co	Caneyville-Rock outcrop complex	8.9	0.1%
CrB	Christian silt loam, 2 to 6 percent slopes	1.2	0.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CrC	Christian silt loam, 6 to 12 percent slopes	2.8	0.0%
CsC3	Christian silty clay loam, 6 to 12 percent slopes, severely eroded	2.6	0.0%
Ct	Clifty gravelly silt loam, 0 to 2 percent slopes, occasionally flooded	15.5	0.2%
CvC3	Crider silty clay loam, 6 to 12 percent slopes, severely eroded	6.0	0.1%
Cw	Cuba silt loam	182.5	2.0%
DAM	Dam, large	10.8	0.1%
GlC	Gilpin silt loam, 6 to 12 percent slopes (frondorf)	2.3	0.0%
GlD	Gilpin silt loam, 12 to 20 percent slopes (frondorf)	53.1	0.6%
GlE	Gilpin silt loam, 20 to 30 percent slopes (frondorf)	6.0	0.1%
GpC3	Gilpin silty clay loam, 6 to 12 percent slopes, severely eroded (frondorf)	37.0	0.4%
GpD3	Gilpin silty clay loam, 12 to 20 percent slopes, severely eroded (frondorf)	108.8	1.2%
GpE3	Gilpin silty clay loam, 20 to 30 percent slopes, severely eroded (frondorf)	12.2	0.1%
Gu	Gullied land	2.4	0.0%
Ld	Lindside silt loam, 0 to 2 percent slopes, occasionally flooded	8.7	0.1%
Ne	Newark silt loam, 0 to 2 percent slopes, occasionally flooded	4.9	0.1%
No	Nolin silt loam, 0 to 2 percent slopes, occasionally flooded	69.2	0.7%
RaE3	Ramsey loam, 10 to 30 percent slopes, severely eroded	7.6	0.1%
SaA	Sadler silt loam, 0 to 2 percent slopes	0.0	0.0%
SaB	Sadler silt loam, 2 to 6 percent slopes	42.5	0.5%
ShC	Shelocta gravelly silt loam, 6 to 12 percent slopes	21.0	0.2%
ShD	Shelocta gravelly silt loam, 12 to 20 percent slopes	38.7	0.4%
ShD3	Shelocta gravelly silt loam, 12 to 20 percent slopes, severely eroded	13.8	0.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ss	Steff silt loam, 0 to 2 percent slopes, occasionally flooded	1.6	0.0%
St	Stendal silt loam, 0 to 2 percent slopes, occasionally flooded	39.5	0.4%
W	Water	1,480.8	16.0%
WcE	Weikert channery silt loam, 12 to 30 percent slopes	54.9	0.6%
WcE3	Weikert channery silt loam, 12 to 30 percent slopes, severely eroded	53.8	0.6%
WgE	Weikert-Ramsey-Gilpin stony complex, 20 to 30 percent slopes	312.2	3.4%
WgE3	Weikert-Ramsey-Gilpin stony complex, 20 to 30 percent slopes, severely eroded	25.5	0.3%
WgF	Weikert-Ramsey-Gilpin stony complex, 30 to 50 percent slopes	607.2	6.6%
WlC	Wellston silt loam, 6 to 12 percent slopes	7.8	0.1%
WlD	Wellston silt loam, 12 to 20 percent slopes	24.9	0.3%
WnC3	Wellston silty clay loam, 6 to 12 percent slopes, severely eroded	29.4	0.3%
WnD3	Wellston silty clay loam, 12 to 20 percent slopes, severely eroded	63.6	0.7%
WsD3	Wellston silty clay loam, clayey subsoil variant, 12 to 20 percent slopes, severely eroded (rosine)	31.0	0.3%
ZaB	Zanesville silt loam, 2 to 6 percent slopes	50.8	0.5%
ZaC	Zanesville silt loam, 6 to 12 percent slopes	83.9	0.9%
ZcC3	Zanesville silt loam, 6 to 12 percent slopes, severely eroded	68.0	0.7%
Subtotals for Soil Survey Area		**3,818.8**	**41.3%**
Totals for Area of Interest		**9,241.9**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AlD	Allegheny-Lenberg-Caneyville complex, 12 to 20 percent slopes	2.9	0.0%
CnD	Caneyville-Rock outcrop complex, 6 to 20 percent slopes	2.5	0.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CnE	Caneyville-Rock outcrop complex, 20 to 30 percent slopes	6.3	0.1%
FrD	Frondorf-Lenberg silt loams, 12 to 20 percent slopes	2.8	0.0%
HnC	Hagerstown silt loam, 6 to 12 percent slopes	2.3	0.0%
Nb	Newark silt loam, 0 to 2 percent slopes, frequently flooded	0.0	0.0%
No	Nolin silt loam, 0 to 2 percent slopes, frequently flooded	56.4	0.6%
RaE	Ramsey-Steinsburg-Allegheny complex, 20 to 40 percent slopes	10.4	0.1%
W	Water	17.4	0.2%
WlB	Wellston silt loam, 2 to 6 percent slopes	0.1	0.0%
WlC	Wellston silt loam, 6 to 12 percent slopes	7.7	0.1%
WlC3	Wellston silt loam, 6 to 12 percent slopes, severely eroded	5.0	0.1%
Subtotals for Soil Survey Area		**113.9**	**1.2%**
Totals for Area of Interest		**9,241.9**	**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.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They

generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *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 the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Breckinridge and Meade Counties, Kentucky

BaC2—Baxter very gravelly silt loam, karst, 6 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: lfvk
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Baxter and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Baxter

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey residuum weathered from cherty limestone

Typical profile

H1 - 0 to 5 inches: very gravelly silt loam
H2 - 5 to 11 inches: gravelly silty clay
H3 - 11 to 37 inches: gravelly clay
H4 - 37 to 97 inches: gravelly clay

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F122XY001KY - Deep Well Drained Cherty Uplands
Other vegetative classification: Deep Well Drained Upland Soils 0-30% (PHG-5)
Hydric soil rating: No

Minor Components

Caneyville
Percent of map unit: 4 percent
Hydric soil rating: No

Crider
Percent of map unit: 4 percent
Hydric soil rating: No

Hammack
Percent of map unit: 4 percent
Hydric soil rating: No

Fredonia
Percent of map unit: 3 percent
Hydric soil rating: No

Vertrees
Percent of map unit: 2 percent
Hydric soil rating: No

Newark
Percent of map unit: 1 percent
Hydric soil rating: No

Nolin
Percent of map unit: 1 percent
Hydric soil rating: No

Lindside
Percent of map unit: 1 percent
Hydric soil rating: No

CaC2—Caneyville silt loam, 6 to 12 percent slopes, eroded

Map Unit Setting
National map unit symbol: lfvs
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Caneyville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caneyville

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 10 inches: silty clay loam
H3 - 10 to 24 inches: clay
R - 24 to 34 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F122XY005KY - Moderately Deep Well Drained Uplands
Other vegetative classification: Moderately Deep Upland Soils (PHG-7)
Hydric soil rating: No

Minor Components

Lenberg

Percent of map unit: 6 percent
Hydric soil rating: No

Rosine

Percent of map unit: 5 percent
Hydric soil rating: No

Hagerstown

Percent of map unit: 2 percent
Hydric soil rating: No

Gilpin

Percent of map unit: 2 percent
Hydric soil rating: No

CeD3—Caneyville silty clay, 12 to 20 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lfvw
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition

Caneyville, severely eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caneyville, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 5 inches: silty clay
H2 - 5 to 23 inches: clay
R - 23 to 33 inches: unweathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F122XY005KY - Moderately Deep Well Drained Uplands
Other vegetative classification: Severely Eroded Soils (PHG-10)
Hydric soil rating: No

Minor Components

Gilpin
Percent of map unit: 5 percent
Hydric soil rating: No

Lenberg
Percent of map unit: 4 percent
Hydric soil rating: No

Rosine
Percent of map unit: 4 percent
Hydric soil rating: No

Hagerstown
Percent of map unit: 2 percent
Hydric soil rating: No

CkD—Caneyville-Rock outcrop complex, 12 to 30 percent slopes

Map Unit Setting
National map unit symbol: lfvx
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition
Caneyville and similar soils: 40 percent
Rock outcrop: 30 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caneyville

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone

Typical profile
H1 - 0 to 6 inches: silt loam
H2 - 6 to 10 inches: silty clay loam
H3 - 10 to 24 inches: clay
R - 24 to 34 inches: unweathered bedrock

Properties and qualities

Slope: 12 to 30 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F122XY005KY - Moderately Deep Well Drained Uplands
Other vegetative classification: Moderately Deep Upland Soils (PHG-7)
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Landform position (three-dimensional): Free face
Parent material: Limestone

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Other vegetative classification: Not Rated (NR)
Hydric soil rating: No

Minor Components

Fredonia

Percent of map unit: 6 percent
Hydric soil rating: No

Gilpin

Percent of map unit: 6 percent
Hydric soil rating: No

Wellston

Percent of map unit: 6 percent
Hydric soil rating: No

Lenberg

Percent of map unit: 5 percent
Hydric soil rating: No

Rosine

Percent of map unit: 5 percent
Hydric soil rating: No

Crider

Percent of map unit: 2 percent
Hydric soil rating: No

Co—Clifty gravelly silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2r14j
Elevation: 380 to 760 feet
Mean annual precipitation: 38 to 58 inches
Mean annual air temperature: 44 to 69 degrees F
Frost-free period: 154 to 212 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Clifty, occasionally flooded, and similar soils: 86 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clifty, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Acid fine-loamy alluvium

Typical profile

Ap - 0 to 8 inches: gravelly silt loam
Bw - 8 to 30 inches: gravelly silt loam
C - 30 to 80 inches: gravelly loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 60 to 80 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F120AY015KY - Loamy Alluvial Headwaters
Hydric soil rating: No

Minor Components

Skidmore, occasionally flooded
Percent of map unit: 6 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Blackford, occasionally flooded
Percent of map unit: 4 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sharon, occasionally flooded
Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Cuba, occasionally flooded
Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

CrB2—Crider silt loam, 2 to 6 percent slopes, eroded

Map Unit Setting
National map unit symbol: lfw0
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Crider and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Crider

Setting
Landform: Ridges

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over clayey residuum weathered from cherty limestone

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 31 inches: silt loam
H3 - 31 to 80 inches: clay

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F122XY004KY - Loess Veneered Uplands
Other vegetative classification: Deep Well Drained Upland Soils 0-30% (PHG-5)
Hydric soil rating: No

Minor Components

Baxter

Percent of map unit: 3 percent
Hydric soil rating: No

Nicholson

Percent of map unit: 3 percent
Hydric soil rating: No

Hammack

Percent of map unit: 3 percent
Hydric soil rating: No

Nolin

Percent of map unit: 2 percent
Hydric soil rating: No

Caneyville

Percent of map unit: 2 percent
Hydric soil rating: No

Fredonia

Percent of map unit: 2 percent
Hydric soil rating: No

CrC2—Crider silt loam, 6 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2wv4v
Elevation: 400 to 1,050 feet
Mean annual precipitation: 38 to 66 inches
Mean annual air temperature: 42 to 68 degrees F
Frost-free period: 139 to 212 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Crider, eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Crider, Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty noncalcareous loess over clayey residuum weathered from limestone

Typical profile

Ap - 0 to 6 inches: silt loam
Bt1 - 6 to 26 inches: silty clay loam
2Bt2 - 26 to 80 inches: clay

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F122XY004KY - Loess Veneered Uplands
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Minor Components

Caneyville, eroded
Percent of map unit: 10 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Bedford, eroded
Percent of map unit: 7 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Nolin, ponded
Percent of map unit: 3 percent
Landform: Sinkholes
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

CrD2—Crider silt loam, 12 to 20 percent slopes, eroded

Map Unit Setting
National map unit symbol: lfw2
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition
Crider and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Crider

Setting
Landform: Hills

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over clayey residuum weathered from cherty limestone

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 31 inches: silt loam
H3 - 31 to 80 inches: clay

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Deep Well Drained Upland Soils >12% (PHG-6)
Hydric soil rating: No

Minor Components

Rosine

Percent of map unit: 5 percent
Hydric soil rating: No

Baxter

Percent of map unit: 5 percent
Hydric soil rating: No

Nolin

Percent of map unit: 4 percent
Hydric soil rating: No

Fredonia

Percent of map unit: 3 percent
Hydric soil rating: No

Caneyville

Percent of map unit: 3 percent
Hydric soil rating: No

CtC3—Crider silty clay loam, 6 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lfw3
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition

Crider, severely eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Crider, Severely Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over clayey residuum weathered from cherty limestone

Typical profile

H1 - 0 to 6 inches: silty clay loam
H2 - 6 to 26 inches: silt loam
H3 - 26 to 75 inches: clay

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Severely Eroded Soils (PHG-10)
Hydric soil rating: No

Minor Components

Hammack
Percent of map unit: 3 percent
Hydric soil rating: No

Baxter
Percent of map unit: 3 percent
Hydric soil rating: No

Nicholson
Percent of map unit: 3 percent
Hydric soil rating: No

Nolin
Percent of map unit: 2 percent
Hydric soil rating: No

Caneyville
Percent of map unit: 2 percent
Hydric soil rating: No

Fredonia
Percent of map unit: 2 percent
Hydric soil rating: No

Cu—Cuba silt loam, occasionally flooded

Map Unit Setting
National map unit symbol: lfw5
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Cuba, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cuba, Occasionally Flooded

Setting
Landform: Drainageways, flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile
H1 - 0 to 30 inches: silt loam
H2 - 30 to 66 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F120AY017KY - Well Drained Silty Alluvium
Other vegetative classification: Well Drained Bottomland Soils (PHG-1)
Hydric soil rating: No

Minor Components

Steff

Percent of map unit: 4 percent
Hydric soil rating: No

Clifty

Percent of map unit: 4 percent
Hydric soil rating: No

Stendal

Percent of map unit: 4 percent
Hydric soil rating: No

Nolin

Percent of map unit: 2 percent
Hydric soil rating: No

Lindside

Percent of map unit: 1 percent
Hydric soil rating: No

DAM—Dam, large

Map Unit Setting

National map unit symbol: 1j1j3
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition

Dam, large: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dam, Large

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Other vegetative classification: Not Rated (NR)
Hydric soil rating: No

GIC2—Gilpin silt loam, 6 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: lfwj
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition

Gilpin and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilpin

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 24 inches: loam
H3 - 24 to 29 inches: very channery loam
R - 29 to 39 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Other vegetative classification: Moderately Deep Upland Soils (PHG-7)
Hydric soil rating: No

Minor Components

Zanesville

Percent of map unit: 3 percent
Hydric soil rating: No

Lenberg

Percent of map unit: 3 percent
Hydric soil rating: No

Rosine

Percent of map unit: 3 percent
Hydric soil rating: No

Wellston

Percent of map unit: 1 percent
Hydric soil rating: No

GIC3—Gilpin silt loam, 6 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lfwk
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition

Gilpin, severely eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilpin, Severely Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 3 inches: silt loam
H2 - 3 to 19 inches: loam
H3 - 19 to 24 inches: very channery loam
R - 24 to 34 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Other vegetative classification: Severely Eroded Soils (PHG-10)
Hydric soil rating: No

Minor Components

Zanesville

Percent of map unit: 4 percent
Hydric soil rating: No

Lenberg

Percent of map unit: 4 percent
Hydric soil rating: No

Wellston

Percent of map unit: 4 percent
Hydric soil rating: No

Rosine

Percent of map unit: 3 percent
Hydric soil rating: No

GwF—Gilpin-Dekalb-Rock outcrop complex, 30 to 60 percent slopes

Map Unit Setting

National map unit symbol: lfwl
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition

Gilpin and similar soils: 35 percent
Dekalb and similar soils: 25 percent
Rock outcrop: 15 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilpin

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 24 inches: channery loam
H3 - 24 to 29 inches: very channery loam
R - 29 to 39 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 60 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C

Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Other vegetative classification: Not Rated (NR)
Hydric soil rating: No

Description of Dekalb

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 5 inches: loam
H2 - 5 to 28 inches: very channery sandy loam
H3 - 28 to 38 inches: extremely channery sandy loam
R - 38 to 48 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 60 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F120AY008KY - Loamy Skeletal Uplands
Other vegetative classification: Not Rated (NR)
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Landform position (three-dimensional): Free face
Parent material: Sandstone

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Other vegetative classification: Not Rated (NR)
Hydric soil rating: No

Minor Components

Caneyville

Percent of map unit: 5 percent
Hydric soil rating: No

Rosine
Percent of map unit: 5 percent
Hydric soil rating: No

Varilla
Percent of map unit: 5 percent
Hydric soil rating: No

Lenberg
Percent of map unit: 5 percent
Hydric soil rating: No

Wellston
Percent of map unit: 3 percent
Hydric soil rating: No

Nolin
Percent of map unit: 2 percent
Hydric soil rating: No

No—Nolin silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting
National map unit symbol: 2qykn
Elevation: 300 to 810 feet
Mean annual precipitation: 35 to 56 inches
Mean annual air temperature: 42 to 69 degrees F
Frost-free period: 154 to 221 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Nolin, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nolin, Occasionally Flooded

Setting
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile
Ap - 0 to 9 inches: silt loam
Bw - 9 to 48 inches: silt loam
C - 48 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F120AY018KY - Riverbank Loamy Alluvium
Other vegetative classification: Well Drained Bottomland Soils (PHG-1)
Hydric soil rating: No

Minor Components

Lindside, occasionally flooded

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Newark, occasionally flooded

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Nolin, frequent(hydric)

Percent of map unit: 1 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Huntington, occasionally flooded

Percent of map unit: 1 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

RnC2—Rosine silt loam, 6 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2rmw0
Elevation: 380 to 1,010 feet
Mean annual precipitation: 40 to 56 inches
Mean annual air temperature: 42 to 69 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Rosine, eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rosine, Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over clayey residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 7 inches: silt loam
Bt1 - 7 to 21 inches: silty clay loam
2Bt2 - 21 to 54 inches: silty clay
2C - 54 to 64 inches: parachannery silty clay loam
2Cr - 64 to 74 inches: bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 60 to 74 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F120AY004KY - Loess Veneered Sandstone-Shale Uplands

Hydric soil rating: No

Minor Components

Zanesville, eroded

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moderately Well Drained Soils With a Fragipan (PHG-11)
Hydric soil rating: No

Lenberg, eroded

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Deep Well Drained Upland Soils >12% (PHG-6)
Hydric soil rating: No

Gilpin, eroded

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moderately Deep Upland Soils (PHG-7)
Hydric soil rating: No

RoC3—Rosine silty clay loam, 6 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lfxn
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition

Rosine, severely eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rosine, Severely Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Thin fine-silty noncalcareous loess over clayey residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 6 inches: silty clay loam
H2 - 6 to 16 inches: silt loam
H3 - 16 to 49 inches: channery silty clay loam
H4 - 49 to 61 inches: silty clay loam
Cr - 61 to 71 inches: weathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 60 to 80 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F120AY004KY - Loess Veneered Sandstone-Shale Uplands
Other vegetative classification: Severely Eroded Soils (PHG-10)
Hydric soil rating: No

Minor Components

Gilpin

Percent of map unit: 5 percent
Hydric soil rating: No

Zanesville

Percent of map unit: 5 percent
Hydric soil rating: No

Lenberg

Percent of map unit: 4 percent
Hydric soil rating: No

Caneyville

Percent of map unit: 3 percent
Hydric soil rating: No

Other soils

Percent of map unit: 3 percent

Hydric soil rating: No

RsD2—Rosine-Gilpin-Lenberg complex, 12 to 20 percent slopes, eroded

Map Unit Setting

National map unit symbol: lfxp
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition

Rosine and similar soils: 35 percent
Gilpin and similar soils: 25 percent
Lenberg and similar soils: 20 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rosine

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over clayey residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 21 inches: silt loam
H3 - 21 to 54 inches: channery silty clay loam
H4 - 54 to 64 inches: silty clay loam
Cr - 64 to 74 inches: weathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 60 to 80 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F120AY004KY - Loess Veneered Sandstone-Shale Uplands
Other vegetative classification: Deep Well Drained Upland Soils >12% (PHG-6)
Hydric soil rating: No

Description of Gilpin

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 24 inches: channery loam
H3 - 24 to 29 inches: very channery loam
R - 29 to 39 inches: unweathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Other vegetative classification: Deep Well Drained Upland Soils >12% (PHG-6)
Hydric soil rating: No

Description of Lenberg

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from acid shale

Typical profile

H1 - 0 to 3 inches: silt loam
H2 - 3 to 15 inches: silty clay
H3 - 15 to 31 inches: silty clay

Cr - 31 to 41 inches: weathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Other vegetative classification: Deep Well Drained Upland Soils >12% (PHG-6)
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 5 percent
Hydric soil rating: No

Dekalb

Percent of map unit: 5 percent
Hydric soil rating: No

Caneyville

Percent of map unit: 5 percent
Hydric soil rating: No

Clifty

Percent of map unit: 3 percent
Hydric soil rating: No

Cuba

Percent of map unit: 2 percent
Hydric soil rating: No

RsD3—Rosine-Gilpin-Lenberg complex, 12 to 20 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lfxq
Elevation: 360 to 1,020 feet

Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition

Rosine, severely eroded, and similar soils: 35 percent
Gilpin, severely eroded, and similar soils: 25 percent
Lenberg, severely eroded, and similar soils: 20 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rosine, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over clayey residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 16 inches: silt loam
H3 - 16 to 49 inches: channery silty clay loam
H4 - 49 to 61 inches: silty clay loam
Cr - 61 to 71 inches: weathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 60 to 80 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F120AY004KY - Loess Veneered Sandstone-Shale Uplands
Other vegetative classification: Severely Eroded Soils (PHG-10)
Hydric soil rating: No

Description of Gilpin, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 4 inches: loam
H2 - 4 to 18 inches: channery loam
H3 - 18 to 23 inches: very channery loam
R - 23 to 33 inches: unweathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Other vegetative classification: Severely Eroded Soils (PHG-10)
Hydric soil rating: No

Description of Lenberg, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from acid shale

Typical profile

H1 - 0 to 4 inches: silty clay loam
H2 - 4 to 12 inches: silty clay
H3 - 12 to 28 inches: silty clay
Cr - 28 to 38 inches: weathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Other vegetative classification: Severely Eroded Soils (PHG-10)
Hydric soil rating: No

Minor Components

Dekalb

Percent of map unit: 5 percent
Hydric soil rating: No

Caneyville

Percent of map unit: 5 percent
Hydric soil rating: No

Other soils

Percent of map unit: 4 percent
Hydric soil rating: No

Clifty

Percent of map unit: 3 percent
Hydric soil rating: No

Cuba

Percent of map unit: 3 percent
Hydric soil rating: No

RsE—Rosine-Gilpin-Lenberg complex, very rocky, 20 to 30 percent slopes

Map Unit Setting

National map unit symbol: lfxr
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition

Rosine and similar soils: 31 percent
Gilpin and similar soils: 29 percent
Lenberg and similar soils: 15 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rosine

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over clayey residuum weathered from shale and siltstone

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 21 inches: silt loam
H3 - 21 to 54 inches: channery silty clay loam
H4 - 54 to 64 inches: silty clay loam
Cr - 64 to 74 inches: weathered bedrock

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: 60 to 80 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F120AY004KY - Loess Veneered Sandstone-Shale Uplands
Other vegetative classification: Deep Well Drained Upland Soils >12% (PHG-6)
Hydric soil rating: No

Description of Gilpin

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 24 inches: channery loam
H3 - 24 to 29 inches: very channery loam
R - 29 to 39 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 30 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Other vegetative classification: Deep Well Drained Upland Soils >12% (PHG-6)
Hydric soil rating: No

Description of Lenberg

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from acid shale

Typical profile

H1 - 0 to 3 inches: silt loam
H2 - 3 to 15 inches: silty clay
H3 - 15 to 31 inches: silty clay
Cr - 31 to 41 inches: weathered bedrock

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Other vegetative classification: Deep Well Drained Upland Soils >12% (PHG-6)
Hydric soil rating: No

Minor Components

Caneyville
Percent of map unit: 6 percent
Hydric soil rating: No

Dekalb
Percent of map unit: 6 percent
Hydric soil rating: No

Other soils
Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop
Percent of map unit: 4 percent
Hydric soil rating: No

Clifty
Percent of map unit: 2 percent
Hydric soil rating: No

Cuba
Percent of map unit: 2 percent
Hydric soil rating: No

SaA—Sadler silt loam, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: 2vtzn
Elevation: 380 to 890 feet
Mean annual precipitation: 38 to 58 inches
Mean annual air temperature: 42 to 69 degrees F
Frost-free period: 154 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Sadler and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sadler

Setting
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt - 7 to 20 inches: silt loam
E/B - 20 to 24 inches: silt loam
2Btx - 24 to 62 inches: silt loam
2C - 62 to 76 inches: very gravelly fine sandy loam
2R - 76 to 86 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 22 to 31 inches to fragipan; 72 to 80 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
Depth to water table: About 19 to 28 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F120AY002KY - Fragipan Uplands
Hydric soil rating: No

Minor Components

Zanesville

Percent of map unit: 7 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Robbs

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Wellston

Percent of map unit: 4 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear

Across-slope shape: Linear
Hydric soil rating: No

SaB2—Sadler silt loam, 2 to 6 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2vtzm
Elevation: 360 to 910 feet
Mean annual precipitation: 40 to 58 inches
Mean annual air temperature: 46 to 69 degrees F
Frost-free period: 148 to 215 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sadler, eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sadler, Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 6 inches: silt loam
Bt - 6 to 20 inches: silt loam
E/B - 20 to 24 inches: silt loam
2Btx - 24 to 62 inches: silt loam
2C - 62 to 76 inches: very gravelly fine sandy loam
2R - 76 to 86 inches: bedrock

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 22 to 28 inches to fragipan; 72 to 80 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
Depth to water table: About 19 to 25 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F120AY002KY - Fragipan Uplands
Hydric soil rating: No

Minor Components

Zanesville, eroded

Percent of map unit: 7 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Robbs

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Wellston, eroded

Percent of map unit: 4 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sf—Steff silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2wlvp
Elevation: 350 to 820 feet
Mean annual precipitation: 40 to 58 inches
Mean annual air temperature: 42 to 69 degrees F
Frost-free period: 154 to 212 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Steff, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Steff, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Acid fine-silty alluvium

Typical profile

Ap - 0 to 7 inches: silt loam
Bw - 7 to 23 inches: silt loam
Bg - 23 to 48 inches: silt loam
Cg - 48 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 20 to 39 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 13.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F120AY019KY - Moist Silty Alluvium
Hydric soil rating: No

Minor Components

Stendal, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lindside, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Cuba, occasionally flooded

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Rise

Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Bonnie, occasionally flooded
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: Yes

VrF—Varilla-Gilpin-Rock outcrop complex, very bouldery, 20 to 65 percent slopes

Map Unit Setting
National map unit symbol: lfxz
Elevation: 360 to 1,020 feet
Mean annual precipitation: 41 to 56 inches
Mean annual air temperature: 42 to 67 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition
Varilla and similar soils: 35 percent
Gilpin and similar soils: 20 percent
Rock outcrop: 15 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Varilla

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Rocky loamy colluvium derived from sandstone

Typical profile
H1 - 0 to 6 inches: flaggy fine sandy loam
H2 - 6 to 24 inches: very channery sandy loam
H3 - 24 to 62 inches: extremely channery sandy loam
R - 62 to 80 inches: bedrock

Properties and qualities
Slope: 20 to 65 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 61 to 80 inches to lithic bedrock

Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F120AY008KY - Loamy Skeletal Uplands
Other vegetative classification: Not Rated (NR)
Hydric soil rating: No

Description of Gilpin

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 24 inches: channery loam
H3 - 24 to 29 inches: very channery loam
R - 29 to 39 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Other vegetative classification: Not Rated (NR)
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Free face
Parent material: Sandstone

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Other vegetative classification: Not Rated (NR)
Hydric soil rating: No

Minor Components

Dekalb

Percent of map unit: 8 percent
Hydric soil rating: No

Rosine

Percent of map unit: 7 percent
Hydric soil rating: No

Lenberg

Percent of map unit: 7 percent
Hydric soil rating: No

Alluvial soils

Percent of map unit: 3 percent
Hydric soil rating: No

Other upland soils

Percent of map unit: 3 percent
Hydric soil rating: No

Markland

Percent of map unit: 2 percent
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

ZaB2—Zanesville silt loam, 2 to 6 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2s2cq
Elevation: 360 to 1,010 feet
Mean annual precipitation: 40 to 58 inches
Mean annual air temperature: 42 to 69 degrees F
Frost-free period: 154 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Zanesville, eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zanesville, Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 6 inches: silt loam
Bt - 6 to 28 inches: silt loam
Btx - 28 to 39 inches: silty clay loam
2BC - 39 to 60 inches: sandy clay loam
2R - 60 to 70 inches: bedrock

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 20 to 30 inches to fragipan; 40 to 80 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
Depth to water table: About 17 to 28 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F120AY002KY - Fragipan Uplands
Hydric soil rating: No

Minor Components

Hosmer, eroded

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Wellston, eroded

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sadler, eroded

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Moderately Well Drained Soils With a Fragipan (PHG-11)
Hydric soil rating: No

ZaC2—Zanesville silt loam, 6 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2s2cs
Elevation: 350 to 1,010 feet
Mean annual precipitation: 35 to 58 inches
Mean annual air temperature: 42 to 69 degrees F
Frost-free period: 154 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Zanesville, eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zanesville, Eroded

Setting

Landform: Ridges

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and siltstone

Typical profile

Ap - 0 to 6 inches: silt loam
Bt - 6 to 24 inches: silt loam
Btx - 24 to 40 inches: silty clay loam
2C - 40 to 60 inches: clay loam
2R - 60 to 70 inches: bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 22 to 30 inches to fragipan; 40 to 79 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
Depth to water table: About 19 to 28 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: F120AY002KY - Fragipan Uplands
Hydric soil rating: No

Minor Components

Hosmer, eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moderately Well Drained Soils With a Fragipan (PHG-11)
Hydric soil rating: No

Sadler, eroded

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Wellston, eroded

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

ZnC3—Zanesville silt loam, 6 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2s2ct
Elevation: 320 to 970 feet
Mean annual precipitation: 30 to 61 inches
Mean annual air temperature: 42 to 70 degrees F
Frost-free period: 154 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Zanesville, severely eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zanesville, Severely Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and siltstone

Typical profile

Ap - 0 to 4 inches: silt loam
Bt - 4 to 23 inches: silt loam
Btx - 23 to 34 inches: silty clay loam
2C - 34 to 56 inches: clay loam
R - 56 to 66 inches: bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 20 to 28 inches to fragipan; 38 to 75 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)

Depth to water table: About 17 to 26 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C/D
Ecological site: F120AY002KY - Fragipan Uplands
Hydric soil rating: No

Minor Components

Sadler, eroded

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Wellston, severely eroded

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hosmer, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Severely Eroded Soils (PHG-10)
Hydric soil rating: No

Grayson County, Kentucky

AeC—Allegheny silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: lfyb
Elevation: 430 to 770 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Allegheny, rarely flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Allegheny, Rarely Flooded

Setting

Landform: Stream terraces
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Mixed fine-loamy alluvium

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 39 inches: clay loam
H3 - 39 to 70 inches: sandy clay loam

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F120AY010KY - Well-Drained High Terraces
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 3 percent
Hydric soil rating: No

Shelocta
Percent of map unit: 3 percent
Hydric soil rating: No

Frondorf
Percent of map unit: 3 percent
Hydric soil rating: No

Zanesville
Percent of map unit: 3 percent
Hydric soil rating: No

Wellston
Percent of map unit: 3 percent
Hydric soil rating: No

BcC3—Baxter cherty silty clay loam, 6 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lfyd
Elevation: 530 to 720 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Baxter, severely eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Baxter, Severely Eroded

Setting

Landform: Ridges
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from cherty limestone

Typical profile

H1 - 0 to 6 inches: gravelly silty clay loam
H2 - 6 to 10 inches: gravelly silty clay loam
H3 - 10 to 39 inches: gravelly clay
H4 - 39 to 75 inches: clay

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 5 percent
Hydric soil rating: No

Christian

Percent of map unit: 5 percent
Hydric soil rating: No

Caneyville

Percent of map unit: 5 percent
Hydric soil rating: No

Crider

Percent of map unit: 5 percent
Hydric soil rating: No

Bp—Borrow pits (borrow areas & urban land)

Map Unit Setting

National map unit symbol: lfyc
Elevation: 510 to 840 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, (borrow pits & urban land): 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, (borrow Pits & Urban Land)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

CcC—Caneyville silty clay loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: lfyk
Elevation: 450 to 880 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Caneyville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caneyville

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 5 inches: silty clay loam
H2 - 5 to 18 inches: silty clay
H3 - 18 to 24 inches: clay
R - 24 to 34 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F122XY005KY - Moderately Deep Well Drained Uplands
Hydric soil rating: No

Minor Components

Other soils
Percent of map unit: 5 percent
Hydric soil rating: No

Christian
Percent of map unit: 5 percent
Hydric soil rating: No

Nicholson
Percent of map unit: 5 percent
Hydric soil rating: No

CcD—Caneyville silty clay loam, 12 to 20 percent slopes

Map Unit Setting
National map unit symbol: lfyl
Elevation: 460 to 840 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition
Caneyville and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caneyville

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone

Typical profile
H1 - 0 to 5 inches: silty clay loam
H2 - 5 to 18 inches: silty clay
H3 - 18 to 24 inches: clay
R - 24 to 34 inches: unweathered bedrock

Properties and qualities
Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F122XY005KY - Moderately Deep Well Drained Uplands
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 8 percent
Hydric soil rating: No

Christian

Percent of map unit: 5 percent
Hydric soil rating: No

Baxter

Percent of map unit: 5 percent
Hydric soil rating: No

Frondorf

Percent of map unit: 2 percent
Hydric soil rating: No

CeD—Caneyville very rocky silty clay loam, 10 to 20 percent slopes

Map Unit Setting

National map unit symbol: lfym
Elevation: 420 to 820 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Caneyville and similar soils: 80 percent
Rock outcrop: 10 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caneyville

Setting

Landform: Hills

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 5 inches: silty clay loam
H2 - 5 to 18 inches: silty clay
H3 - 18 to 24 inches: clay
R - 24 to 34 inches: unweathered bedrock

Properties and qualities

Slope: 10 to 20 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F122XY005KY - Moderately Deep Well Drained Uplands
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Landform position (three-dimensional): Free face
Parent material: Limestone

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Baxter

Percent of map unit: 4 percent
Hydric soil rating: No

Christian

Percent of map unit: 3 percent
Hydric soil rating: No

Frondorf

Percent of map unit: 3 percent
Hydric soil rating: No

CeF—Caneyville very rocky silty clay loam, 20 to 40 percent slopes

Map Unit Setting

National map unit symbol: lfyn
Elevation: 420 to 870 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Caneyville and similar soils: 75 percent
Rock outcrop: 10 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caneyville

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 5 inches: silty clay loam
H2 - 5 to 18 inches: silty clay
H3 - 18 to 24 inches: clay
R - 24 to 34 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 40 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F122XY005KY - Moderately Deep Well Drained Uplands

Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Landform position (three-dimensional): Free face
Parent material: Limestone

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Frondorf

Percent of map unit: 8 percent
Hydric soil rating: No

Weikert

Percent of map unit: 7 percent
Hydric soil rating: No

CID3—Caneyville silty clay, 6 to 20 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lfyp
Elevation: 430 to 890 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Caneyville, severely eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caneyville, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 4 inches: silty clay

H2 - 4 to 15 inches: silty clay
H3 - 15 to 21 inches: clay
R - 21 to 31 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 20 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F122XY005KY - Moderately Deep Well Drained Uplands
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 10 percent
Hydric soil rating: No

Christian

Percent of map unit: 5 percent
Hydric soil rating: No

Nicholson

Percent of map unit: 5 percent
Hydric soil rating: No

CnD3—Caneyville very rocky silty clay, 8 to 25 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lfyq
Elevation: 420 to 860 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Caneyville, severely eroded, and similar soils: 80 percent
Rock outcrop: 10 percent

Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caneyville, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 4 inches: silty clay
H2 - 4 to 15 inches: silty clay
H3 - 15 to 21 inches: clay
R - 21 to 31 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F122XY005KY - Moderately Deep Well Drained Uplands
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Landform position (three-dimensional): Free face
Parent material: Limestone

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Frondorf

Percent of map unit: 5 percent
Hydric soil rating: No

Weikert

Percent of map unit: 5 percent

Hydric soil rating: No

Co—Caneyville-Rock outcrop complex

Map Unit Setting

National map unit symbol: lfyr
Elevation: 430 to 820 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Caneyville and similar soils: 55 percent
Rock outcrop: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caneyville

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 5 inches: silty clay loam
H2 - 5 to 18 inches: silty clay
H3 - 18 to 24 inches: clay
R - 24 to 34 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 90 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C

Ecological site: F122XY005KY - Moderately Deep Well Drained Uplands
Hydric soil rating: No

Description of Rock Outcrop

Setting
Landform: Hills
Landform position (three-dimensional): Free face
Parent material: Limestone

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Other soils
Percent of map unit: 4 percent
Hydric soil rating: No

Christian
Percent of map unit: 2 percent
Hydric soil rating: No

Rarden
Percent of map unit: 2 percent
Hydric soil rating: No

Frondorf
Percent of map unit: 2 percent
Hydric soil rating: No

CrB—Christian silt loam, 2 to 6 percent slopes

Map Unit Setting
National map unit symbol: lfyv
Elevation: 440 to 800 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Christian and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Christian

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone, sandstone, and shale

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 12 inches: silty clay loam
H3 - 12 to 40 inches: silty clay
H4 - 40 to 60 inches: clay

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Baxter

Percent of map unit: 4 percent
Hydric soil rating: No

Wellston

Percent of map unit: 4 percent
Hydric soil rating: No

Allegheny

Percent of map unit: 4 percent
Hydric soil rating: No

Other soils

Percent of map unit: 3 percent
Hydric soil rating: No

CrC—Christian silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: lfyw
Elevation: 490 to 800 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Christian and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Christian

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone, sandstone, and shale

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 12 inches: silty clay loam
H3 - 12 to 40 inches: silty clay
H4 - 40 to 60 inches: clay

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Rarden
Percent of map unit: 4 percent
Hydric soil rating: No

Caneyville
Percent of map unit: 4 percent
Hydric soil rating: No

Wellston
Percent of map unit: 4 percent
Hydric soil rating: No

Other soils
Percent of map unit: 3 percent
Hydric soil rating: No

CsC3—Christian silty clay loam, 6 to 12 percent slopes, severely eroded

Map Unit Setting
National map unit symbol: lfyx
Elevation: 450 to 810 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition
Christian, severely eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Christian, Severely Eroded

Setting
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone, sandstone, and shale

Typical profile
H1 - 0 to 6 inches: silty clay loam
H2 - 6 to 36 inches: silty clay
H3 - 36 to 56 inches: clay

Properties and qualities
Slope: 6 to 12 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Wellston

Percent of map unit: 4 percent
Hydric soil rating: No

Caneyville

Percent of map unit: 4 percent
Hydric soil rating: No

Rarden

Percent of map unit: 4 percent
Hydric soil rating: No

Other soils

Percent of map unit: 3 percent
Hydric soil rating: No

Ct—Clifty gravelly silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2r14j
Elevation: 380 to 760 feet
Mean annual precipitation: 38 to 58 inches
Mean annual air temperature: 44 to 69 degrees F
Frost-free period: 154 to 212 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Clifty, occasionally flooded, and similar soils: 86 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clifty, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Acid fine-loamy alluvium

Typical profile

Ap - 0 to 8 inches: gravelly silt loam
Bw - 8 to 30 inches: gravelly silt loam
C - 30 to 80 inches: gravelly loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 60 to 80 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F120AY015KY - Loamy Alluvial Headwaters
Hydric soil rating: No

Minor Components

Skidmore, occasionally flooded

Percent of map unit: 6 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Blackford, occasionally flooded

Percent of map unit: 4 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Cuba, occasionally flooded

Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Sharon, occasionally flooded

Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

CvC3—Crider silty clay loam, 6 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lfz1
Elevation: 470 to 780 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Crider, severely eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Crider, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over clayey residuum weathered from cherty limestone

Typical profile

H1 - 0 to 5 inches: silty clay loam
H2 - 5 to 40 inches: silty clay loam
H3 - 40 to 75 inches: silty clay

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F122XY004KY - Loess Veneered Uplands
Hydric soil rating: No

Minor Components

Baxter

Percent of map unit: 5 percent
Hydric soil rating: No

Other soils

Percent of map unit: 5 percent
Hydric soil rating: No

Caneyville

Percent of map unit: 5 percent
Hydric soil rating: No

Christian

Percent of map unit: 5 percent
Hydric soil rating: No

Cw—Cuba silt loam

Map Unit Setting

National map unit symbol: lfz2
Elevation: 390 to 780 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Cuba, occasionally flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cuba, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile

H1 - 0 to 28 inches: silt loam
H2 - 28 to 64 inches: stratified fine sand to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 12.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F120AY017KY - Well Drained Silty Alluvium
Hydric soil rating: No

Minor Components

Clifty

Percent of map unit: 4 percent
Hydric soil rating: No

Steff

Percent of map unit: 4 percent
Hydric soil rating: No

Other soils

Percent of map unit: 2 percent
Hydric soil rating: No

DAM—Dam, large

Map Unit Setting

National map unit symbol: 1jxpv
Elevation: 450 to 560 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Dam, large: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dam, Large

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8
Hydric soil rating: No

GIC—Gilpin silt loam, 6 to 12 percent slopes (frondorf)

Map Unit Setting

National map unit symbol: lfz3
Elevation: 430 to 920 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Frondorf and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frondorf

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Thin fine-silty noncalcareous loess over residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 19 inches: silt loam
H2 - 19 to 27 inches: channery loam
R - 27 to 37 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Weikert
Percent of map unit: 4 percent
Hydric soil rating: No

Wellston
Percent of map unit: 4 percent
Hydric soil rating: No

Zanesville
Percent of map unit: 4 percent
Hydric soil rating: No

Other soils
Percent of map unit: 3 percent
Hydric soil rating: No

GID—Gilpin silt loam, 12 to 20 percent slopes (frondorf)

Map Unit Setting
National map unit symbol: lfz4
Elevation: 410 to 900 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition
Frondorf and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frondorf

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over residuum weathered from sandstone and siltstone and/or shale

Typical profile
H1 - 0 to 19 inches: silt loam
H2 - 19 to 27 inches: channery loam
R - 27 to 37 inches: unweathered bedrock

Properties and qualities
Slope: 12 to 20 percent

Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Zanesville

Percent of map unit: 5 percent
Hydric soil rating: No

Wellston

Percent of map unit: 5 percent
Hydric soil rating: No

Other soils

Percent of map unit: 5 percent
Hydric soil rating: No

Weikert

Percent of map unit: 5 percent
Hydric soil rating: No

GIE—Gilpin silt loam, 20 to 30 percent slopes (frondorf)

Map Unit Setting

National map unit symbol: lfz5
Elevation: 420 to 850 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Frondorf and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frondorf

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 19 inches: silt loam
H2 - 19 to 27 inches: channery loam
R - 27 to 37 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Wellston

Percent of map unit: 5 percent
Hydric soil rating: No

Shelocta

Percent of map unit: 5 percent
Hydric soil rating: No

Other soils

Percent of map unit: 5 percent
Hydric soil rating: No

Weikert

Percent of map unit: 5 percent
Hydric soil rating: No

GpC3—Gilpin silty clay loam, 6 to 12 percent slopes, severely eroded (frondorf)

Map Unit Setting

National map unit symbol: lfz6
Elevation: 440 to 870 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Frondorf, severely eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frondorf, Severely Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Thin fine-silty noncalcareous loess over residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 15 inches: silty clay loam
H2 - 15 to 23 inches: channery loam
R - 23 to 33 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Zanesville
Percent of map unit: 4 percent
Hydric soil rating: No

Weikert
Percent of map unit: 4 percent
Hydric soil rating: No

Wellston
Percent of map unit: 4 percent
Hydric soil rating: No

Other soils
Percent of map unit: 3 percent
Hydric soil rating: No

GpD3—Gilpin silty clay loam, 12 to 20 percent slopes, severely eroded (frondorf)

Map Unit Setting
National map unit symbol: lfz7
Elevation: 420 to 930 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition
Frondorf, severely eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frondorf, Severely Eroded

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over residuum weathered from sandstone and siltstone and/or shale

Typical profile
H1 - 0 to 15 inches: silty clay loam
H2 - 15 to 23 inches: channery loam
R - 23 to 33 inches: unweathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 5 percent
Hydric soil rating: No

Weikert

Percent of map unit: 5 percent
Hydric soil rating: No

Wellston

Percent of map unit: 5 percent
Hydric soil rating: No

Zanesville

Percent of map unit: 5 percent
Hydric soil rating: No

GpE3—Gilpin silty clay loam, 20 to 30 percent slopes, severely eroded (frondorf)

Map Unit Setting

National map unit symbol: lfz8
Elevation: 430 to 890 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Frondorf, severely eroded, and similar soils: 80 percent
Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frondorf, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 15 inches: silty clay loam
H2 - 15 to 23 inches: channery loam
R - 23 to 33 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Weikert

Percent of map unit: 7 percent
Hydric soil rating: No

Wellston

Percent of map unit: 7 percent
Hydric soil rating: No

Other soils

Percent of map unit: 6 percent
Hydric soil rating: No

Gu—Gullied land

Map Unit Setting

National map unit symbol: lfz9
Elevation: 440 to 960 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Gullied land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gullied Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Ld—Lindside silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2wh4g
Elevation: 310 to 880 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 42 to 69 degrees F
Frost-free period: 154 to 221 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Lindside, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lindside, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Non-acid fine-silty alluvium

Typical profile

Ap - 0 to 7 inches: silt loam
Bw - 7 to 27 inches: silt loam
C - 27 to 80 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.02 to 1.98 in/hr)
Depth to water table: About 20 to 36 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: F120AY019KY - Moist Silty Alluvium
Hydric soil rating: No

Minor Components

Huntington, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Newark, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Steff, occasionally flooded

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Nolin, occasionally flooded

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lindside, frequently flooded

Percent of map unit: 1 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Ne—Newark silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2s2cl
Elevation: 310 to 770 feet
Mean annual precipitation: 30 to 56 inches
Mean annual air temperature: 42 to 69 degrees F
Frost-free period: 154 to 221 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Newark, occasionally flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newark, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile

Ap - 0 to 7 inches: silt loam
Bg - 7 to 66 inches: silty clay loam
Cg - 66 to 80 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 to 20 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F120AY019KY - Moist Silty Alluvium
Hydric soil rating: No

Minor Components

Nolin, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Lindside, occasionally flooded

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Melvin, ocassionally flooded

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: Yes

Newark, frequent(hydric)

Percent of map unit: 1 percent
Landform: Sloughs on flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: Yes

No—Nolin silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2qykn
Elevation: 300 to 810 feet

Mean annual precipitation: 35 to 56 inches
Mean annual air temperature: 42 to 69 degrees F
Frost-free period: 154 to 221 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Nolin, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nolin, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile

Ap - 0 to 9 inches: silt loam
Bw - 9 to 48 inches: silt loam
C - 48 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F120AY018KY - Riverbank Loamy Alluvium
Other vegetative classification: Well Drained Bottomland Soils (PHG-1)
Hydric soil rating: No

Minor Components

Lindside, occasionally flooded

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Newark, occasionally flooded

Percent of map unit: 3 percent
Landform: Flood plains

Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Nolin, frequent(hydric)
Percent of map unit: 1 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Huntington, occasionally flooded
Percent of map unit: 1 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

RaE3—Ramsey loam, 10 to 30 percent slopes, severely eroded

Map Unit Setting
National map unit symbol: lfzj
Elevation: 460 to 820 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition
Ramsey, severely eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramsey, Severely Eroded

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy residuum weathered from sandstone and siltstone

Typical profile
H1 - 0 to 5 inches: loam
H2 - 5 to 15 inches: gravelly fine sandy loam
R - 15 to 25 inches: unweathered bedrock

Properties and qualities

Slope: 10 to 30 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F120AY006KY - Shallow Sandstone Uplands
Hydric soil rating: No

Minor Components

Frondorf

Percent of map unit: 8 percent
Hydric soil rating: No

Weikert

Percent of map unit: 8 percent
Hydric soil rating: No

Other soils

Percent of map unit: 4 percent
Hydric soil rating: No

SaA—Sadler silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2vtzn
Elevation: 380 to 890 feet
Mean annual precipitation: 38 to 58 inches
Mean annual air temperature: 42 to 69 degrees F
Frost-free period: 154 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sadler and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sadler

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt - 7 to 20 inches: silt loam
E/B - 20 to 24 inches: silt loam
2Btx - 24 to 62 inches: silt loam
2C - 62 to 76 inches: very gravelly fine sandy loam
2R - 76 to 86 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 22 to 31 inches to fragipan; 72 to 80 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
Depth to water table: About 19 to 28 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F120AY002KY - Fragipan Uplands
Hydric soil rating: No

Minor Components

Zanesville

Percent of map unit: 7 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Robbs

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave

Across-slope shape: Linear
Hydric soil rating: No

Wellston

Percent of map unit: 4 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

SaB—Sadler silt loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2vtzl
Elevation: 360 to 990 feet
Mean annual precipitation: 30 to 58 inches
Mean annual air temperature: 44 to 69 degrees F
Frost-free period: 157 to 213 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sadler and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sadler

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt - 7 to 20 inches: silt loam
E/B - 20 to 24 inches: silt loam
2Btx - 24 to 62 inches: silt loam
2C - 62 to 76 inches: very gravelly fine sandy loam
2R - 76 to 86 inches: bedrock

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 22 to 31 inches to fragipan; 72 to 80 inches to lithic bedrock
Drainage class: Moderately well drained

Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
Depth to water table: About 19 to 28 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F120AY002KY - Fragipan Uplands
Hydric soil rating: No

Minor Components

Zanesville

Percent of map unit: 7 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Robbs

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Wellston

Percent of map unit: 4 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

ShC—Shelocta gravelly silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: lfzs
Elevation: 420 to 830 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F

Frost-free period: 157 to 198 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Shelocta and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shelocta

Setting

Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Mixed fine-loamy colluvium derived from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 7 inches: gravelly silt loam
H2 - 7 to 52 inches: gravelly silty clay loam
H3 - 52 to 60 inches: channery silt loam

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Wellston

Percent of map unit: 6 percent
Hydric soil rating: No

Zanesville

Percent of map unit: 6 percent
Hydric soil rating: No

Other soils

Percent of map unit: 3 percent
Hydric soil rating: No

ShD—Shelocta gravelly silt loam, 12 to 20 percent slopes

Map Unit Setting

National map unit symbol: lfzt
Elevation: 450 to 900 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Shelocta and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shelocta

Setting

Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy colluvium derived from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 7 inches: gravelly silt loam
H2 - 7 to 52 inches: gravelly silty clay loam
H3 - 52 to 60 inches: channery silt loam

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Wellston
Percent of map unit: 7 percent
Hydric soil rating: No

Frondorf
Percent of map unit: 7 percent
Hydric soil rating: No

Other soils
Percent of map unit: 6 percent
Hydric soil rating: No

ShD3—Shelocta gravelly silt loam, 12 to 20 percent slopes, severely eroded

Map Unit Setting
National map unit symbol: lfzv
Elevation: 450 to 770 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition
Shelocta, severely eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shelocta, Severely Eroded

Setting
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy colluvium derived from sandstone and siltstone and/or shale

Typical profile
H1 - 0 to 6 inches: gravelly silt loam
H2 - 6 to 45 inches: gravelly silty clay loam
H3 - 45 to 53 inches: channery silt loam

Properties and qualities
Slope: 12 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Wellston

Percent of map unit: 7 percent
Hydric soil rating: No

Frondorf

Percent of map unit: 7 percent
Hydric soil rating: No

Other soils

Percent of map unit: 6 percent
Hydric soil rating: No

Ss—Steff silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2wlvp
Elevation: 350 to 820 feet
Mean annual precipitation: 40 to 58 inches
Mean annual air temperature: 42 to 69 degrees F
Frost-free period: 154 to 212 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Steff, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Steff, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Acid fine-silty alluvium

Typical profile

Ap - 0 to 7 inches: silt loam
Bw - 7 to 23 inches: silt loam
Bg - 23 to 48 inches: silt loam
Cg - 48 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 20 to 39 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 13.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F120AY019KY - Moist Silty Alluvium
Hydric soil rating: No

Minor Components

Lindside, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Stendal, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Cuba, occasionally flooded

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Bonnie, occasionally flooded

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Dip

Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: Yes

St—Stendal silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2wh44
Elevation: 370 to 830 feet
Mean annual precipitation: 40 to 58 inches
Mean annual air temperature: 42 to 69 degrees F
Frost-free period: 154 to 212 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Stendal, occasionally flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stendal, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Acid fine-silty alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
Bw - 8 to 18 inches: silt loam
Bg - 18 to 40 inches: silt loam
Cg - 40 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 12 to 20 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 13.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F120AY019KY - Moist Silty Alluvium

Hydric soil rating: No

Minor Components

Steff, occasionally flooded
Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Cuba, occasionally flooded
Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Bonnie, occasionally flooded
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: Yes

Newark, occasionally flooded
Percent of map unit: 1 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

W—Water

Map Unit Setting
National map unit symbol: lfzy
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

WcE—Weikert channery silt loam, 12 to 30 percent slopes

Map Unit Setting

National map unit symbol: lfzz
Elevation: 440 to 900 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Weikert and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 6 inches: channery silt loam
H2 - 6 to 17 inches: very channery silt loam
Cr - 17 to 27 inches: weathered bedrock

Properties and qualities

Slope: 12 to 30 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F120AY006KY - Shallow Sandstone Uplands
Hydric soil rating: No

Minor Components

Ramsey
Percent of map unit: 4 percent
Hydric soil rating: No

Caneyville
Percent of map unit: 4 percent
Hydric soil rating: No

Frondorf
Percent of map unit: 4 percent
Hydric soil rating: No

Other soils
Percent of map unit: 4 percent
Hydric soil rating: No

Shelocta
Percent of map unit: 4 percent
Hydric soil rating: No

WcE3—Weikert channery silt loam, 12 to 30 percent slopes, severely eroded

Map Unit Setting
National map unit symbol: lg00
Elevation: 440 to 950 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition
Weikert, severely eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert, Severely Eroded

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile
H1 - 0 to 5 inches: channery silt loam

H2 - 5 to 13 inches: very channery silt loam
Cr - 13 to 23 inches: weathered bedrock

Properties and qualities

Slope: 12 to 30 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F120AY006KY - Shallow Sandstone Uplands
Hydric soil rating: No

Minor Components

Ramsey

Percent of map unit: 4 percent
Hydric soil rating: No

Shelocta

Percent of map unit: 4 percent
Hydric soil rating: No

Other soils

Percent of map unit: 4 percent
Hydric soil rating: No

Frondorf

Percent of map unit: 4 percent
Hydric soil rating: No

Caneyville

Percent of map unit: 4 percent
Hydric soil rating: No

WgE—Weikert-Ramsey-Gilpin stony complex, 20 to 30 percent slopes

Map Unit Setting

National map unit symbol: lg01
Elevation: 420 to 930 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days

Farmland classification: Not prime farmland

Map Unit Composition

Weikert, stony, and similar soils: 50 percent
Ramsey, stony, and similar soils: 20 percent
Gilpin, stony, and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert, Stony

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 6 inches: stony silt loam
H2 - 6 to 17 inches: very channery silt loam
Cr - 17 to 27 inches: weathered bedrock

Properties and qualities

Slope: 20 to 30 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F120AY006KY - Shallow Sandstone Uplands
Hydric soil rating: No

Description of Ramsey, Stony

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy residuum weathered from sandstone

Typical profile

H1 - 0 to 6 inches: loam

H2 - 6 to 18 inches: stony fine sandy loam
R - 18 to 28 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F120AY006KY - Shallow Sandstone Uplands
Hydric soil rating: No

Description of Gilpin, Stony

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 6 inches: stony silt loam
H2 - 6 to 19 inches: channery silt loam
H3 - 19 to 27 inches: channery loam
R - 27 to 37 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Rarden
Percent of map unit: 4 percent
Hydric soil rating: No

Caneyville
Percent of map unit: 4 percent
Hydric soil rating: No

Shelocta
Percent of map unit: 4 percent
Hydric soil rating: No

Other soils
Percent of map unit: 3 percent
Hydric soil rating: No

WgE3—Weikert-Ramsey-Gilpin stony complex, 20 to 30 percent slopes, severely eroded

Map Unit Setting
National map unit symbol: lg02
Elevation: 420 to 890 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition
Weikert, stony, severely eroded, and similar soils: 50 percent
Ramsey, stony, severely eroded, and similar soils: 20 percent
Gilpin, stony, severely eroded, and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert, Stony, Severely Eroded

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 5 inches: stony silt loam
H2 - 5 to 13 inches: very channery silt loam
Cr - 13 to 23 inches: weathered bedrock

Properties and qualities

Slope: 20 to 30 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F120AY006KY - Shallow Sandstone Uplands
Hydric soil rating: No

Description of Ramsey, Stony, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy residuum weathered from sandstone

Typical profile

H1 - 0 to 5 inches: loam
H2 - 5 to 15 inches: stony fine sandy loam
R - 15 to 25 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F120AY006KY - Shallow Sandstone Uplands

Hydric soil rating: No

Description of Gilpin, Stony, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 2 inches: stony silt loam
H2 - 2 to 15 inches: channery silt loam
H3 - 15 to 23 inches: channery loam
R - 23 to 33 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Shelocta

Percent of map unit: 4 percent
Hydric soil rating: No

Rarden

Percent of map unit: 4 percent
Hydric soil rating: No

Caneyville

Percent of map unit: 4 percent
Hydric soil rating: No

Other soils

Percent of map unit: 3 percent
Hydric soil rating: No

WgF—Weikert-Ramsey-Gilpin stony complex, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: lg03
Elevation: 420 to 970 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Weikert, stony, and similar soils: 50 percent
Ramsey, stony, and similar soils: 20 percent
Gilpin, stony, and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert, Stony

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 6 inches: stony silt loam
H2 - 6 to 17 inches: very channery silt loam
Cr - 17 to 27 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F120AY006KY - Shallow Sandstone Uplands
Hydric soil rating: No

Description of Ramsey, Stony

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy residuum weathered from sandstone

Typical profile

H1 - 0 to 6 inches: loam
H2 - 6 to 18 inches: stony fine sandy loam
R - 18 to 28 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F120AY006KY - Shallow Sandstone Uplands
Hydric soil rating: No

Description of Gilpin, Stony

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 6 inches: stony silt loam
H2 - 6 to 19 inches: channery silt loam
H3 - 19 to 27 inches: channery loam
R - 27 to 37 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Caneyville

Percent of map unit: 4 percent
Hydric soil rating: No

Rarden

Percent of map unit: 4 percent
Hydric soil rating: No

Shelocta

Percent of map unit: 4 percent
Hydric soil rating: No

Other soils

Percent of map unit: 3 percent
Hydric soil rating: No

WIC—Wellston silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2vtzy
Elevation: 330 to 1,160 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 44 to 68 degrees F
Frost-free period: 157 to 215 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Wellston and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellston

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt - 7 to 35 inches: silt loam
2C - 35 to 60 inches: fine sandy loam
2R - 60 to 70 inches: bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F120AY004KY - Loess Veneered Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Zanesville

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Frondorf

Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Lenberg

Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Deep Well Drained Upland Soils >12% (PHG-6)
Hydric soil rating: No

WID—Wellston silt loam, 12 to 20 percent slopes

Map Unit Setting

National map unit symbol: 2wh3r
Elevation: 350 to 830 feet
Mean annual precipitation: 30 to 55 inches
Mean annual air temperature: 44 to 69 degrees F
Frost-free period: 157 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Wellston and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellston

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt - 7 to 35 inches: silt loam
2C - 35 to 60 inches: fine sandy loam
2R - 60 to 70 inches: bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained

Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F120AY004KY - Loess Veneered Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Lenberg
Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Deep Well Drained Upland Soils >12% (PHG-6)
Hydric soil rating: No

Zanesville
Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Frondorf
Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

WnC3—Wellston silty clay loam, 6 to 12 percent slopes, severely eroded

Map Unit Setting
National map unit symbol: 2wh59
Elevation: 360 to 970 feet
Mean annual precipitation: 37 to 57 inches

Mean annual air temperature: 44 to 69 degrees F
Frost-free period: 157 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Wellston, severely eroded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellston, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 3 inches: silty clay loam
Bt - 3 to 42 inches: silty clay loam
2C - 42 to 64 inches: clay loam
2R - 64 to 74 inches: bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 39 to 78 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F120AY004KY - Loess Veneered Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Frondorf, severely eroded

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Zanesville, severely eroded

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

WnD3—Wellston silty clay loam, 12 to 20 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: lg08
Elevation: 420 to 920 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition

Wellston, severely eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellston, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 5 inches: silty clay loam
H2 - 5 to 25 inches: silty clay loam
H3 - 25 to 41 inches: channery clay loam
R - 41 to 51 inches: unweathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F120AY004KY - Loess Veneered Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Other soils
Percent of map unit: 5 percent
Hydric soil rating: No

Shelocta
Percent of map unit: 3 percent
Hydric soil rating: No

Frondorf
Percent of map unit: 3 percent
Hydric soil rating: No

Ramsey
Percent of map unit: 3 percent
Hydric soil rating: No

Weikert
Percent of map unit: 3 percent
Hydric soil rating: No

Zanesville
Percent of map unit: 3 percent
Hydric soil rating: No

WsD3—Wellston silty clay loam, clayey subsoil variant, 12 to 20 percent slopes, severely eroded (rosine)

Map Unit Setting
National map unit symbol: lg0d
Elevation: 420 to 800 feet
Mean annual precipitation: 42 to 54 inches
Mean annual air temperature: 44 to 67 degrees F
Frost-free period: 157 to 198 days
Farmland classification: Not prime farmland

Map Unit Composition
Rosine, severely eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rosine, Severely Eroded

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over clayey residuum weathered from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 4 inches: silty clay loam
H2 - 4 to 18 inches: silty clay loam
H3 - 18 to 47 inches: silty clay
H4 - 47 to 66 inches: channery silty clay loam
Cr - 66 to 76 inches: weathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 40 to 80 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F120AY004KY - Loess Veneered Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Frondorf

Percent of map unit: 5 percent
Hydric soil rating: No

Other soils

Percent of map unit: 5 percent
Hydric soil rating: No

Rarden

Percent of map unit: 5 percent
Hydric soil rating: No

Shelocta

Percent of map unit: 5 percent
Hydric soil rating: No

ZaB—Zanesville silt loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2s2cp
Elevation: 350 to 670 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 44 to 69 degrees F
Frost-free period: 157 to 213 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Zanesville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zanesville

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt - 7 to 31 inches: silt loam
Btx - 31 to 39 inches: silty clay loam
2C - 39 to 68 inches: silty clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 24 to 32 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 21 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F120AY002KY - Fragipan Uplands
Hydric soil rating: No

Minor Components

Hosmer

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Sadler

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Wellston

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

ZaC—Zanesville silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2s2cr
Elevation: 330 to 910 feet
Mean annual precipitation: 30 to 61 inches
Mean annual air temperature: 44 to 70 degrees F
Frost-free period: 168 to 212 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Zanesville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zanesville

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and siltstone

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 30 inches: silt loam
Btx - 30 to 50 inches: silt loam
2C - 50 to 70 inches: clay loam
R - 70 to 80 inches: bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 24 to 32 inches to fragipan; 40 to 79 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
Depth to water table: About 21 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F120AY002KY - Fragipan Uplands
Hydric soil rating: No

Minor Components

Hosmer

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Moderately Well Drained Soils With a Fragipan (PHG-11)
Hydric soil rating: No

Wellston

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sadler

Percent of map unit: 5 percent
Landform: Ridges

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

ZcC3—Zanesville silt loam, 6 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2s2ct
Elevation: 320 to 970 feet
Mean annual precipitation: 30 to 61 inches
Mean annual air temperature: 42 to 70 degrees F
Frost-free period: 154 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Zanesville, severely eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zanesville, Severely Eroded

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and siltstone

Typical profile

Ap - 0 to 4 inches: silt loam
Bt - 4 to 23 inches: silt loam
Btx - 23 to 34 inches: silty clay loam
2C - 34 to 56 inches: clay loam
R - 56 to 66 inches: bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 20 to 28 inches to fragipan; 38 to 75 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
Depth to water table: About 17 to 26 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C/D
Ecological site: F120AY002KY - Fragipan Uplands
Hydric soil rating: No

Minor Components

Wellston, severely eroded

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hosmer, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Severely Eroded Soils (PHG-10)
Hydric soil rating: No

Sadler, eroded

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Hardin and Larue Counties, Kentucky

AlD—Allegheny-Lenberg-Caneyville complex, 12 to 20 percent slopes

Map Unit Setting

National map unit symbol: lhcy
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Allegheny and similar soils: 40 percent
Lenberg and similar soils: 22 percent
Caneyville and similar soils: 20 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Allegheny

Setting

Landform: Stream terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy colluvium derived from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 6 inches: loam
H2 - 6 to 33 inches: clay loam
H3 - 33 to 50 inches: sandy loam
R - 50 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F120AY010KY - Well-Drained High Terraces
Hydric soil rating: No

Description of Lenberg

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey residuum weathered from acid shale

Typical profile

H1 - 0 to 11 inches: silt loam
H2 - 11 to 25 inches: clay
H3 - 25 to 34 inches: channery clay
Cr - 34 to 44 inches: weathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Description of Caneyville

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 31 inches: clay
R - 31 to 41 inches: unweathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F122XY005KY - Moderately Deep Well Drained Uplands
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 15 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 3 percent
Hydric soil rating: No

CnD—Caneyville-Rock outcrop complex, 6 to 20 percent slopes

Map Unit Setting

National map unit symbol: lhd0
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Caneyville and similar soils: 65 percent
Rock outcrop: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caneyville

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 34 inches: clay
R - 34 to 44 inches: unweathered bedrock

Properties and qualities

Slope: 6 to 20 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F122XY005KY - Moderately Deep Well Drained Uplands
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Free face
Parent material: Limestone

Typical profile

R - 0 to 60 inches: unweathered bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 15 percent
Hydric soil rating: No

CnE—Caneyville-Rock outcrop complex, 20 to 30 percent slopes

Map Unit Setting

National map unit symbol: lhd1

Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Caneyville and similar soils: 65 percent
Rock outcrop: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caneyville

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 34 inches: clay
R - 34 to 44 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F122XY005KY - Moderately Deep Well Drained Uplands
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Free face
Parent material: Limestone

Typical profile

R - 0 to 60 inches: unweathered bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 15 percent
Hydric soil rating: No

FrD—Frondorf-Lenberg silt loams, 12 to 20 percent slopes

Map Unit Setting

National map unit symbol: lhdg
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Frondorf and similar soils: 60 percent
Lenberg and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Frondorf

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Thin fine-loamy noncalcareous loess over loamy residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 20 inches: silt loam
H2 - 20 to 33 inches: gravelly silt loam
R - 33 to 43 inches: unweathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F120AY004KY - Loess Veneered Sandstone-Shale Uplands
Hydric soil rating: No

Description of Lenberg

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey residuum weathered from acid shale

Typical profile

H1 - 0 to 11 inches: silt loam
H2 - 11 to 25 inches: clay
H3 - 25 to 37 inches: channery clay
Cr - 37 to 47 inches: weathered bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Wellston

Percent of map unit: 4 percent
Hydric soil rating: No

Steinsburg

Percent of map unit: 4 percent
Hydric soil rating: No

Other soils

Percent of map unit: 2 percent
Hydric soil rating: No

HnC—Hagerstown silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2z8yt
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hagerstown and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hagerstown

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone

Typical profile

Ap - 0 to 6 inches: silt loam
Bt1 - 6 to 13 inches: silty clay loam
Bt2 - 13 to 48 inches: clay
R - 48 to 58 inches: bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 40 to 62 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F122XY002KY - Deep Well Drained Limestone Uplands
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Minor Components

Caneyville

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F122XY002KY - Deep Well Drained Limestone Uplands
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Crider

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F122XY004KY - Loess Veneered Uplands
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Wilbur, frequently ponded, depression

Percent of map unit: 5 percent
Landform: Sinkholes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F122XY017KY - Moist Alluvium
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Nb—Newark silt loam, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2s2cf
Elevation: 390 to 960 feet
Mean annual precipitation: 40 to 66 inches
Mean annual air temperature: 42 to 68 degrees F

Frost-free period: 139 to 205 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Newark, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newark, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
Bg - 8 to 55 inches: silty clay loam
Cg - 55 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 to 20 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: F122XY017KY - Moist Alluvium
Hydric soil rating: No

Minor Components

Nolin, frequently flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lindside, frequently flooded

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear

Across-slope shape: Linear
Hydric soil rating: No

Melvin, frequently flooded
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: Yes

No—Nolin silt loam, 0 to 2 percent slopes, frequently flooded

Map Unit Setting
National map unit symbol: 2s2cx
Elevation: 380 to 970 feet
Mean annual precipitation: 43 to 62 inches
Mean annual air temperature: 42 to 68 degrees F
Frost-free period: 145 to 205 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition
Nolin, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nolin, Frequently Flooded

Setting
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fine-silty alluvium

Typical profile
Ap - 0 to 8 inches: silt loam
Bw - 8 to 72 inches: silt loam
C - 72 to 85 inches: loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None

Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F122XY016KY - Riverbank Loamy Alluvium
Hydric soil rating: No

Minor Components

Newark, frequently flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Sensabaugh, frequently flooded

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Melvin, frequently flooded

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: Yes

RaE—Ramsey-Steinsburg-Allegheny complex, 20 to 40 percent slopes

Map Unit Setting

National map unit symbol: lhf6
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Ramsey and similar soils: 40 percent
Steinsburg and similar soils: 20 percent
Allegheny and similar soils: 15 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramsey

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy residuum weathered from sandstone

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 16 inches: gravelly loam
R - 16 to 26 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 40 percent
Depth to restrictive feature: 12 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F120AY006KY - Shallow Sandstone Uplands
Hydric soil rating: No

Description of Steinsburg

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy residuum weathered from sandstone

Typical profile

H1 - 0 to 7 inches: fine sandy loam
H2 - 7 to 18 inches: sandy loam
H3 - 18 to 35 inches: channery sandy loam
R - 35 to 45 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 40 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F120AY005KY - Moderately Deep Sandstone-Shale Uplands
Hydric soil rating: No

Description of Allegheny

Setting

Landform: Stream terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy colluvium derived from sandstone and siltstone and/or shale

Typical profile

H1 - 0 to 6 inches: loam
H2 - 6 to 33 inches: clay loam
H3 - 33 to 50 inches: sandy loam
R - 50 to 54 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F120AY010KY - Well-Drained High Terraces
Hydric soil rating: No

Minor Components

Wellston

Percent of map unit: 7 percent
Hydric soil rating: No

Caneyville

Percent of map unit: 7 percent
Hydric soil rating: No

Lenberg
Percent of map unit: 7 percent
Hydric soil rating: No

Other soils
Percent of map unit: 4 percent
Hydric soil rating: No

W—Water

Map Unit Setting
National map unit symbol: lhfs
Elevation: 380 to 1,060 feet
Mean annual precipitation: 44 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 165 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

WlB—Wellston silt loam, 2 to 6 percent slopes

Map Unit Setting
National map unit symbol: 2wlvj
Elevation: 380 to 960 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 44 to 69 degrees F
Frost-free period: 157 to 215 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Wellston and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellston

Setting
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex

Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 40 inches: silt loam
2C - 40 to 52 inches: loam
2R - 52 to 62 inches: bedrock

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F120AY004KY - Loess Veneered Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Zanesville

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Frondorf

Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Lenberg

Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Deep Well Drained Upland Soils >12% (PHG-6)

Hydric soil rating: No

WIC—Wellston silt loam, 6 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2vtzy
Elevation: 330 to 1,160 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 44 to 68 degrees F
Frost-free period: 157 to 215 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Wellston and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellston

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt - 7 to 35 inches: silt loam
2C - 35 to 60 inches: fine sandy loam
2R - 60 to 70 inches: bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 40 to 72 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.13 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F120AY004KY - Loess Veneered Sandstone-Shale Uplands

Hydric soil rating: No

Minor Components

Zanesville

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Frondorf

Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Lenberg

Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Deep Well Drained Upland Soils >12% (PHG-6)
Hydric soil rating: No

WIC3—Wellston silt loam, 6 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2wv4t
Elevation: 360 to 940 feet
Mean annual precipitation: 30 to 58 inches
Mean annual air temperature: 41 to 69 degrees F
Frost-free period: 141 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition

Wellston, severely eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wellston, Severely Eroded

Setting

Landform: Ridges

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Thin fine-silty noncalcareous loess over loamy residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 2 inches: silt loam
Bt - 2 to 40 inches: silt loam
2C - 40 to 52 inches: loam
2R - 52 to 62 inches: bedrock

Properties and qualities

Slope: 6 to 12 percent
Depth to restrictive feature: 40 to 69 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F120BY007IN - Deep Well Drained Sandstone-Shale Uplands
Hydric soil rating: No

Minor Components

Rosine, severely eroded

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Zanesville, severely eroded

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Gilpin, severely eroded

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

Lenberg, severely eroded

Percent of map unit: 2 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Deep Well Drained Upland Soils >12% (PHG-6)
Hydric soil rating: No

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State listed species documented or potentially occurring at the Rough River Lake Project

Common Name	Scientific Name	County	KY Status[1]
Northern Cavefish	*Amblyopsis spelaea*	Breckinridge, Hart	S
Western Sand Darter	*Ammocrypta clara*	Hart	E
Lake Chubsucker	*Erimyzon sucetta*	Grayson	T
Pallid Shiner	*Hybopsis amnis*	Hart	E
Black Buffalo	*Ictiobus niger*	Breckinridge, Grayson	S
Spotted Darter	*Nothonotus maculatus*	Hart	T
Slender Madtom	*Noturus exilis*	Grayson	E
Longhead Darter	*Percina macrocephala*	Hart	E
Stargazing Minnow	*Phenacobius uranops*	Hart	S
Southern Cavefish	*Typhlichthys subterraneus*	Hart	S
Eastern Hellbender	*Cryptobranchus alleganiensis alleganiensis*	Breckinridge, Grayson, Hart	S
Gray Treefrog	*Hyla versicolor*	Breckinridge	S
A Cave Obligate Pseudoscorpion	*Kleptochthonius attenuatus*	Hart	H
Sharp-shinned Hawk	*Accipiter striatus*	Breckinridge, Grayson, Hart	S
Spotted Sandpiper	*Actitis macularius*	Breckinridge, Grayson, Hart	E
Great Egret	*Ardea alba*	Breckinridge, Hart	T
Short-eared Owl	*Asio flammeus*	Grayson	E
American Bittern	*Botaurus lentiginosus*	Breckinridge, Hart	H
Cattle Egret	*Bubulcus ibis*	Breckinridge, Hart	S
Canada Warbler	*Cardellina canadensis*	Hart	S
Henslow's Sparrow	*Centronyx henslowii*	Breckinridge, Grayson, Hart	S
Brown Creeper	*Certhia americana*	Breckinridge, Hart	T
Lark Sparrow	*Chondestes grammacus*	Breckinridge, Hart	S
Northern Harrier	*Circus hudsonius*	Breckinridge, Grayson, Hart	T
Sedge Wren	*Cistothorus stellaris*	Breckinridge	S
Bobolink	*Dolichonyx oryzivorus*	Hart	S
Little Blue Heron	*Egretta caerulea*	Hart	E
Least Flycatcher	*Empidonax minimus*	Hart	E
Peregrine Falcon	*Falco peregrinus*	Grayson, Hart	E
American Coot	*Fulica americana*	Breckinridge, Grayson, Hart	E
Common Gallinule	*Gallinula galeata*	Hart	T
Bald Eagle	*Haliaeetus leucocephalus*	Breckinridge, Grayson, Hart	S
Dark-eyed Junco	*Junco hyemalis*	Breckinridge, Grayson, Hart	S
Loggerhead Shrike	*Lanius ludovicianus*	Breckinridge, Grayson, Hart	S
Hooded Merganser	*Lophodytes cucullatus*	Hart	T
Yellow-crowned Night-heron	*Nyctanassa violacea*	Grayson	T
Black-crowned Night-heron	*Nycticorax nycticorax*	Hart	T
Osprey	*Pandion haliaetus*	Breckinridge, Grayson, Hart	S
Savannah Sparrow	*Passerculus sandwichensis*	Grayson, Hart	S
Double-crested Cormorant	*Phalacrocorax auritus*	Hart	S
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	Grayson, Hart	S
Pied-billed Grebe	*Podilymbus podiceps*	Breckinridge, Grayson, Hart	E
Vesper Sparrow	*Pooecetes gramineus*	Grayson, Hart	E
Bank Swallow	*Riparia riparia*	Breckinridge, Hart	S
Blackburnian Warbler	*Setophaga fusca*	Breckinridge, Hart	T
Red-breasted Nuthatch	*Sitta canadensis*	Hart	E
Blue-winged Teal	*Spatula discors*	Hart	T
Bewick's Wren	*Thryomanes bewickii*	Breckinridge, Grayson, Hart	H
Barn Owl	*Tyto alba*	Breckinridge, Grayson, Hart	S
Golden-winged Warbler	*Vermivora chrysoptera*	Hart	E
Bell's Vireo	*Vireo bellii*	Breckinridge, Hart	S

Elktoe	*Alasmidonta marginata*	Hart	T
Slippershell Mussel	*Alasmidonta viridis*	Grayson, Hart	S
Cylindrical Papershell	*Anodontoides ferussacianus*	Breckinridge	S
Fanshell	*Cyprogenia stegaria*	Hart	E
Elephantear	*Elliptio crassidens*	Breckinridge, Grayson, Hart	S
Catspaw	*Epioblasma obliquata*	Hart	E
Northern Riffleshell	*Epioblasma rangiana*	Grayson, Hart	E
Snuffbox	*Epioblasma triquetra*	Grayson, Hart	E
Longsolid	*Fusconaia subrotunda*	Grayson	S
Longsolid	*Fusconaia subrotunda*	Hart	S
Pink Mucket	*Lampsilis abrupta*	Hart	E
Pocketbook	*Lampsilis ovata*	Hart	E
Little Spectaclecase	*Leaunio lienosus*	Grayson, Hart	T
Kentucky Creekshell	*Leaunio ortmanni*	Grayson, Hart	E
Black Sandshell	*Ligumia recta*	Breckinridge, Hart	S
Spectaclecase	*Margaritifera monodonta*	Hart	E
Ring Pink	*Obovaria retusa*	Hart	E
Round Hickorynut	*Obovaria subrotunda*	Hart	T
Orangefoot Pimpleback	*Plethobasus cooperianus*	Grayson	E
Sheepnose	*Plethobasus cyphyus*	Hart	E
Clubshell	*Pleurobema clava*	Grayson, Hart	E
Rough Pigtoe	*Pleurobema plenum*	Hart	E
Pyramid Pigtoe	*Pleurobema rubrum*	Hart	E
Salamander Mussel	*Simpsonaias ambigua*	Breckinridge, Hart	T
Rabbitsfoot	*Theliderma cylindrica*	Grayson, Hart	E
Shaggy Cavesnail	*Antroselates spiralis*	Breckinridge, Hart	S
Onyx Rocksnail	*Leptoxis praerosa*	Hart	S
Domed Ancylid	*Rhodacme elatior*	Hart	S
Double-ringed Pennant	*Celithemis verna*	Hart	E
Bold Cave Beetle	*Pseudanophthalmus audax*	Hart	H
Round-headed Cave Beetle	*Pseudanophthalmus globiceps*	Hart	E
Cub Run Cave Beetle	*Pseudanophthalmus simulans*	Hart	H
Northern Hairstreak	*Satyrium favonius ontario*	Hart	S
A Stonefly	*Soyedina calcarea*	Hart	E
Elusive Clubtail	*Stylurus notatus*	Breckinridge, Hart	E
A Cave Obligate Beetle	*Tychobythinus hubrichti*	Hart	H
Bottlebrush Crayfish	*Barbicambarus cornutus*	Grayson, Hart	S
Saddle Crayfish	*Faxonius durelli*	Hart	S
Rough River Crayfish	*Faxonius rafinesquei*	Breckinridge, Grayson	S
Devil Crayfish	*Lacunicambarus chimera*	Breckinridge, Grayson	S
Ghost Crayfish	*Orconectes inermis inermis*	Breckinridge, Hart	S
Mammoth Cave Crayfish	*Orconectes pellucidus*	Breckinridge, Hart	S
Mammoth Cave Shrimp	*Palaemonias ganteri*	Hart	E
A Stygobromus Amphipod	*Stygobromus vitreus*	Hart	S
Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	Breckinridge, Hart	S
Southeastern Myotis	*Myotis austroriparius*	Breckinridge, Hart	S
Gray Myotis	*Myotis grisescens*	Breckinridge, Grayson, Hart	T
Eastern Small-footed Myotis	*Myotis leibii*	Breckinridge	T
Little Brown Bat	*Myotis lucifugus*	Breckinridge, Hart	T
Northern Myotis	*Myotis septentrionalis*	Breckinridge, Hart	E
Indiana Bat	*Myotis sodalis*	Breckinridge, Grayson, Hart	E
Eastern Pipistrelle	*Perimyotis subflavus*	Breckinridge, Grayson, Hart	T
A Copepod	*Bryocamptus morrisoni elegans*	Hart	T

Chestnut Lamprey	*Ichthyomyzon castaneus*	Breckinridge	S
American Brook Lamprey	*Lethenteron appendix*	Hart	T
Six-lined Racerunner	*Aspidoscelis sexlineata*	Breckinridge, Hart	S
Eastern Slender Glass Lizard	*Ophisaurus attenuatus longicaudus*	Hart	T
Red Cornsnake	*Pantherophis guttatus*	Grayson, Hart	S
Northern Pinesnake	*Pituophis melanoleucus melanoleucus*	Hart	E
Southeastern Five-lined Skink	*Plestiodon inexpectatus*	Hart	S
Southeastern Crowned Snake	*Tantilla coronata*	Hart	T

Total = 112 Species

Source: (KDFWR 2022). Available at http://app.fw.ky.gov/speciesinfo/speciesinfo.asp

1 - E = endangered, T = threatened, S = special concern, H = historic, X = extirpated

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kentucky Ecological Services Field Office
J C Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601-8670
Phone: (502) 695-0468 Fax: (502) 695-1024
Email Address: kentuckyes@fws.gov

In Reply Refer To:
Project Code: 2023-0019285
Project Name: 2023 Rough River Lake Master Plan Update

November 28, 2022

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: 2023-0019285
Project Name: 2023 Rough River Lake Master Plan Update
Project Type: Water Supply Facility - Maintenance / Modification
Project Description: The 2023 Master Plan Update project is designed to update the original Master Plans created in 1984. Master Plans are required for civil works projects (such as the Rough River Lake Project) for which the USACE has administrative responsibility for management of natural and manmade resources. Master Plans provide guidelines and direction for future project development and provide a District-level policy consistent with national objectives and other state and regional goals and programs. The existing Rough River Master Plan was completed in 1984, and there has been no comprehensive revision to the Master Plan in more than 30 years. As such, the current Master Plan provides an inadequate basis on which to evaluate contemporary proposals, update land classifications, and resource uses. The data generated as a result of this iPaC query will be used as part of NEPA analysis conducted as part of the Master Plan Update.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@37.603505600000005,-86.47296497145311,14z

Counties: Breckinridge , Grayson , and Hardin counties, Kentucky

Endangered Species Act Species

There is a total of 12 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 10 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/TNFTPXV4WJHXNH5JQLPADMMDSM/documents/generated/6422.pdf

Indiana Bat *Myotis sodalis* — Endangered

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
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.
- The project area includes known 'swarming 1' habitat.

Species profile: https://ecos.fws.gov/ecp/species/5949
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/TNFTPXV4WJHXNH5JQLPADMMDSM/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.
- Contact the KFO to discuss possible impacts to the species. The specified area includes or is in the vicinity of a known hibernaculum and/or maternity roost tree.

Species profile: https://ecos.fws.gov/ecp/species/9045
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/TNFTPXV4WJHXNH5JQLPADMMDSM/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.
This species only needs to be considered under the following conditions:
- The species may potentially occur in suitable habitat within the following rivers: Little, Pond, Rough, and Tradewater; and their larger tributaries.

Species profile: https://ecos.fws.gov/ecp/species/3789
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/TNFTPXV4WJHXNH5JQLPADMMDSM/documents/generated/5639.pdf

Fanshell *Cyprogenia stegaria* — Endangered

No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:
- The species may potentially occur in suitable habitat within the following rivers: Little, Pond, Rough, and Tradewater; and their larger tributaries.

Species profile: https://ecos.fws.gov/ecp/species/4822
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/TNFTPXV4WJHXNH5JQLPADMMDSM/documents/generated/5639.pdf

Northern Riffleshell *Epioblasma rangiana* — Endangered

No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:
- The species may potentially occur in suitable habitat within the following rivers: Little, Pond, Rough, and Tradewater; and their larger tributaries.

Species profile: https://ecos.fws.gov/ecp/species/527
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/TNFTPXV4WJHXNH5JQLPADMMDSM/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/TNFTPXV4WJHXNH5JQLPADMMDSM/documents/generated/5639.pdf

Rabbitsfoot *Quadrula cylindrica cylindrica* — Threatened

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
This species only needs to be considered under the following conditions:
- The species may potentially occur in suitable habitat within the following rivers: Little, Pond, Rough, and Tradewater; and their larger tributaries.

Species profile: https://ecos.fws.gov/ecp/species/5165
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/TNFTPXV4WJHXNH5JQLPADMMDSM/documents/generated/5639.pdf

Ring Pink (mussel) *Obovaria retusa* — Endangered

No critical habitat has been designated for this species.

NAME STATUS

This species only needs to be considered under the following conditions:

- The species may potentially occur in suitable habitat within the following rivers: Little, Pond, Rough, and Tradewater; and their larger tributaries.

Species profile: https://ecos.fws.gov/ecp/species/4128

General project design guidelines:
https://ipac.ecosphere.fws.gov/project/TNFTPXV4WJHXNH5JQLPADMMDSM/documents/generated/5639.pdf

Rough Pigtoe *Pleurobema plenum* Endangered

No critical habitat has been designated for this species.

This species only needs to be considered under the following conditions:

- The species may potentially occur in suitable habitat within the following rivers: Little, Pond, Rough, and Tradewater; and their larger tributaries.

Species profile: https://ecos.fws.gov/ecp/species/6894

General project design guidelines:
https://ipac.ecosphere.fws.gov/project/TNFTPXV4WJHXNH5JQLPADMMDSM/documents/generated/5639.pdf

Spectaclecase (mussel) *Cumberlandia monodonta* Endangered

No critical habitat has been designated for this species.

This species only needs to be considered under the following conditions:

- The species may potentially occur in suitable habitat within the following rivers: Little, Pond, Rough, and Tradewater; and their larger tributaries.

Species profile: https://ecos.fws.gov/ecp/species/7867

General project design guidelines:
https://ipac.ecosphere.fws.gov/project/TNFTPXV4WJHXNH5JQLPADMMDSM/documents/generated/5639.pdf

Insects

NAME STATUS

Monarch Butterfly *Danaus plexippus* Candidate

No critical habitat has been designated for this species.

Species profile: https://ecos.fws.gov/ecp/species/9743

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: Army Corps of Engineers
Name: Jeffrey Hawkins
Address: 600 Dr. Martin Luther King Jr. Place
City: Louisville
State: KY
Zip: 40202
Email jeffrey.a.hawkins@usace.army.mil
Phone: 8593399414

Federally Listed Species: Life History and General Distribution Information

Pink Mucket (*Lampsilis abrupta*)

The pink mucket (*Lampsilis abrupta*) was listed as endangered in 1974. This species has historically been considered as an Ohioan and Interior Basin species in origin. It was formerly scattered throughout the Mississippi, Tennessee, Ohio, and Cumberland River systems (USFWS 1985). The species has been characterized as a large river species (Dennis 1984) associated with fast-flowing waters, although it has been able to survive and reproduce in impoundments with river-lake conditions but never in standing pools of water (USFWS 1985). Despite extensive declines historically, the species appears to have adapted somewhat to existence in impounded sections of big rivers. Rarer occurrence of this species in smaller streams such as the Clinch River and Paint Rock River may result from sub-optimal habitat for this otherwise large river species (USFWS 1985). This species probably is rather sessile with only limited movement in the substrate. Passive downstream movement may occur when mussels are displaced from the substrate during floods. Major dispersal occurs while glochidia are encysted on their hosts (NatureServe 2021). Maintenance of flowing water conditions and suitable water quality seem to be the most important factors influencing the survival of this species. Small, isolated populations survive in free-flowing sections of the Barren and Green rivers below antiquated navigations dams and in the longer, un-impounded section of the upper Green River in Hart County (Haag and Cicerello 2016).

Clubshell (*Pleurobema clava*)

Listed as endangered in 1993, clubshell (*Pleurobema clava*) prefers clean, loose sand and gravel in medium to small rivers and streams and will bury itself in the bottom substrate to depths of up to four inches. Reproduction requires a stable, undisturbed habitat and a sufficient population of fish hosts to complete the mussel's larval development. Once found all over the eastern United States, it is now only known to occur in 13 streams. Reasons for its decline in the upper Ohio and Wabash watersheds are mainly due to pollution from agricultural run-off and industrial wastes, as well as extensive impoundments for navigation (USFWS 1997a). No clubshell have been found in mussel surveys conducted in and near the Action Area. Therefore, this species is not anticipated to be present in the Action Area. The only surviving natural population in Kentucky is in the upper Green River (Green County) where it rare (Haag and Cicerello 2016).

Fanshell (*Cyprogenia stegaria*)

The fanshell (*Cyprogenia stegaria*), listed as endangered in 1990, is found in medium to large rivers. It buries itself in sand or gravel in deep water of moderate current, with only the edge of its shell and its feeding siphons exposed. Reproduction requires a stable, undisturbed habitat and a sufficient population of fish hosts to complete the mussel's larval development. The species is known to be reproducing in the Clinch River in Tennessee and Virginia, as well as the Green and Licking Rivers in Kentucky. Increase regulation of rivers has degraded most of this mussel's habitat, reducing its gravel and sand habitat and affecting the distribution of its fish hosts. Impoundment of larger river habitat, dredging for channel maintenance, erosion caused by strip mining, as well as logging and farming have been known to destroy or degrade fanshell habitat. Other threats include pollution from agricultural and industrial runoff (USFWS 1997b). The largest populations of the fanshell occur in the Green and Licking rivers. Small, isolated populations of this species are known from the Barren River (Haag and Cicerello 2016).

Northern Riffleshell (*Epioblasma torulosa rangiana*)

The northern riffleshell (*Epioblasma torulosa rangiana*) was listed as endangered in 1993. The northern riffleshell was historically found in Illinois, Indiana, Kentucky, Michigan, Ohio, Pennsylvania, West Virginia, and western Ontario. Restricted to main-channel shoal habitats of medium sized to large streams in gravel and sand substrates, the species is a host specialist on darters (Percidae) and sculpins (Cottidae). The northern riffleshell has declined drastically throughout its range. While all natural populations in Kentucky appear to be extirpated, it is possible that the species survives in very low numbers in the Green River (Haag and Cicerello, 2016). The last documented sighting of the species in Kentucky was the collection of 1-2 fresh dead shells in the Green River (Edmonson and Hart counties) in 1987 and 1989. Reintroduction efforts were conducted in the Licking River in 2013 and 2014.

Rough Pigtoe (*Pleurobema plenum*)

The rough pigtoe was listed as endangered in 1987. In the 1980s, this species was confined to under 20 sites in the Tennessee, Clinch, Cumberland, Barren, and Green rivers (USFWS 1984b); fewer than half are still likely extant. The species is found in medium to large rivers (20 m wide or greater) in sand, gravel, and cobble substrates in shoals. It is occasionally found on flats and muddy sand (Gordon and Layzer 1989). It is present in the Green River, Kentucky between locks 4 and 5 and in the Barren River below Lock and Dam 1 (USFWS 1984b). Clarke (1983) found a single living specimen in the Green River near Glenmore, Kentucky. The impoundment, siltation, and pollution of rivers are driving factors of the species decline. The rough pigtoe has not been documented in field surveys conducted in or near the Action Area.

Spectaclecase (*Cumberlandia monodonta*)

The spectaclecase was listed as endangered in 2012. Historically, this species is known from 45 streams in 15 states including the upper Mississippi River system (Mississippi River); lower Missouri River system (Missouri River); Ohio River system (Ohio River); Cumberland River system (Cumberland River); Tennessee River system (Tennessee River); and in the Mulberry and Ouachita rivers of the lower Mississippi River system (Butler 2003b; USFWS 2003). Spectaclecase mussels are found in large rivers where they live in areas adjacent to, but sheltered from, the main force of the river current. This species often lives in firm mud and shelters beneath rock slabs and boulders. Extant populations of the spectaclecase are known from 20 streams in 10 states.

The decline of the spectaclecase across its range is primarily the result of habitat loss and degradation. Chief among the causes of decline are impoundments, channelization, chemical contaminants, mining, and sedimentation (Watters 2000). Less serious are disease or predation (Butler 2003b) and invasive species (Asiatic clam, zebra mussel, black carp). Of the 20 extant populations, seven are represented by only a single specimen each and are likely not viable. Several live individuals were reported in the Green River in 2006 (Haag and Cicerello 2016).

Ring Pink (*Obovaria retusa*)

The ring pink was listed as endangered in 1989. Restricted to main-channel habitats of medium-sized to large streams in gravel and sand substrates, this species is extirpated from nearly all of its former range through loss of habitat. The ring pink has been reduced to five known populations, most of which are represented by few collected specimens and are not viable. The only extant populations near the Barren River Lake project are in the upper Green River (Warren, Edmonson, and Hart counties), Kentucky, where it is very sporadic (Cicerello and Schuster 2003; Haag and Cicerello 2016). Because the species is found in such low numbers and appears to be no longer reproducing at most occurrences, artificial propagation will probably be the only way the species can survive.

Rabbitsfoot (*Quadrula cylindrica cylindrica*)

The rabbitsfoot (*Quadrula cylindrica cylindrica*) was listed as threatened in 2013. Historically, the rabbitsfoot occurred 137 streams in 15 states including: the lower Great Lakes sub-basin, Ohio River system, Cumberland River system, Tennessee River system, lower Mississippi River sub-basin, White River system, Arkansas River system, and Red River system. It is found throughout the Ohio River drainage from headwaters in Pennsylvania to the mouth of the Ohio River (Cummings and Mayer 1992). Based on historical and current data, the rabbitsfoot is declining range-wide and is now extant only in 46 of 137 streams of historical occurrence, representing a 66% decline. Further, in the streams where it is extant, populations with few exceptions are highly fragmented and restricted to short reaches (Butler 2005). The chief causes of this species' decline are impoundments, channelization, chemical contaminants, mining, and sedimentation. The closest known occurrence of the species in the upper Green River from Edmonson to Adair County (Haag and Cicerello 2016).

Gray Bat (*Myotis grisescens*)

The gray bat was listed as Federally endangered in 1976. Gray bats (*Myotis grisescens*) are distinguished from their congeners by the bat's wing membrane which connects to its ankle instead of at the toe; the gray bat also has notched claws. Gray bats weigh 7-16 grams. The bats eat a variety of flying aquatic and terrestrial insects present along rivers or lakes. Gray bats live in caves year-round. During the winter gray bats hibernate in deep, vertical caves. In the summer, they roost in caves which are scattered along rivers.

The gray bat occupies a limited geographic range in limestone karst areas of the southeastern United States. They are mainly found in Alabama, northern Arkansas, Kentucky, Missouri, and Tennessee. Florida, Georgia, Kansas, Indiana, Illinois, Oklahoma, Mississippi, Virginia, and North Carolina are considered the edge of their range (USFWS 2019b).

Gray bats are endangered largely because of their habit of living in very large numbers in only a few caves. As a result, they are extremely vulnerable to disturbance. Arousing bats while they are hibernating forces bats to use finite energy reserves. In June and July, when flightless young are present, human disturbance can lead to mortality as frightened females drop their young while fleeing from the intruder.

The gray bat has a very large range that includes the Project Area and the species is considered potentially present in areas in which they have not been previously documented. However, there are no known hibernacula or maternity caves used by gray bats occurring on fee lands of the Rough River Lake Project.

Indiana Bat (*Myotis sodalis*)

The Indiana bats was listed as Federally endangered in 1967. Indiana bats hibernate during winter in caves. For hibernation, they require cool, humid caves with stable temperatures, under 50° F but above freezing (USFWS 2006). Very few caves within the range of the species have these conditions. If bats are disturbed or cave temperatures increase during hibernation, more energy is needed, and hibernating bats may starve.

In the spring, Indiana bats emerge from hibernation and migrate to summer roost sites where they usually roost under loose tree bark of dead or dying trees. During summer, males roost alone or in small groups, while females roost in larger groups of up to 100 bats or more. Indiana bats also forage in or along the edges of forested areas. Indiana bats are found over most of the eastern half of the United States. Almost half of all Indiana bats (207,000 in 2005) hibernate in caves in southern Indiana. The 2005 population estimate was about 457,000 Indiana bats, half as many as when the species was listed as endangered in 1967 (USFWS 2006). Loss and fragmentation of forest habitat are among the major threats to Indiana bat populations. Other threats include white-nose syndrome, winter disturbance, and environmental contaminants (USFWS 2006).

The Indiana bat has a very large range that includes the entire state of Kentucky, and the species is considered potentially present in areas of the state, including those areas in which they have not been previously documented. No known caves are located on fee lands of the Project.

Northern Long-eared Bat (*Myotis septentrionalis*)

The northern long-eared bat was listed as a threatened in 2015 due to declines mostly associated with white-nose syndrome. The bats spend winter hibernating in caves and mines. During the summer, the species roosts singly or in colonies underneath bark, in cavities, or in crevices of both live trees and snags. Males and non-reproductive females may also roost in cooler places, like caves and mines. While there are no known records of roosts occurring in the Project area, the species has a very large range that includes the entire state of Kentucky, and the species is considered potentially present by USFWS in areas in which they have not been previously documented.

United States Army Corps of Engineers
Louisville District

Rough River Lake
Master Plan

2023

Appendix B
Project Maps

Legend

- USACE Office
- Fee Boundary

N
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S

0 250 500 750
Feet

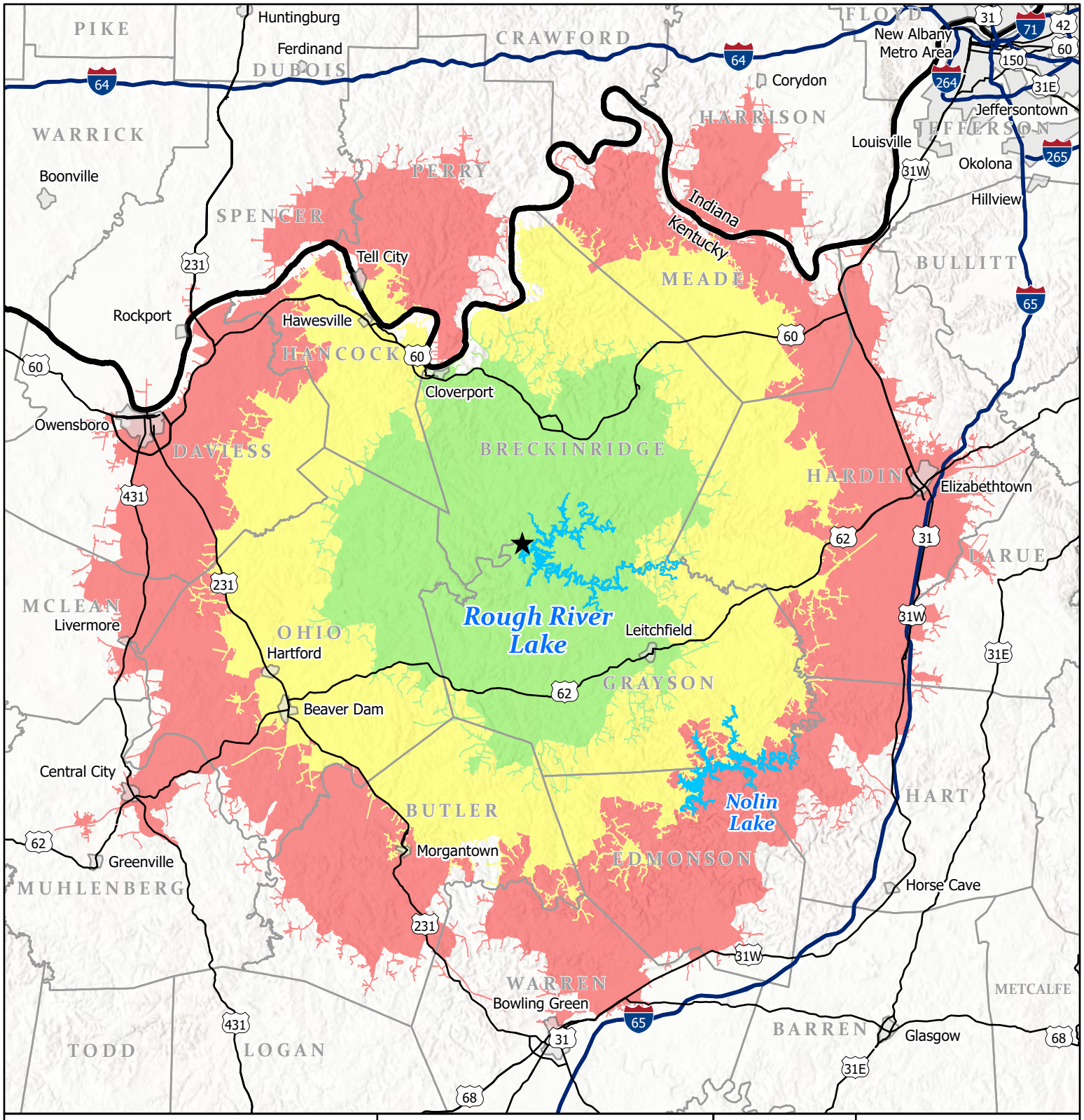
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Dam Area

Date: 5/31/2022

DRAFT



Legend

- Corps Office
- Interstate
- US Highway
- Corps Reservoir
- Urban Area
- County
- State

Rough River Lake Drive Time

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

N
W E
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0 5 10 15 20 Miles

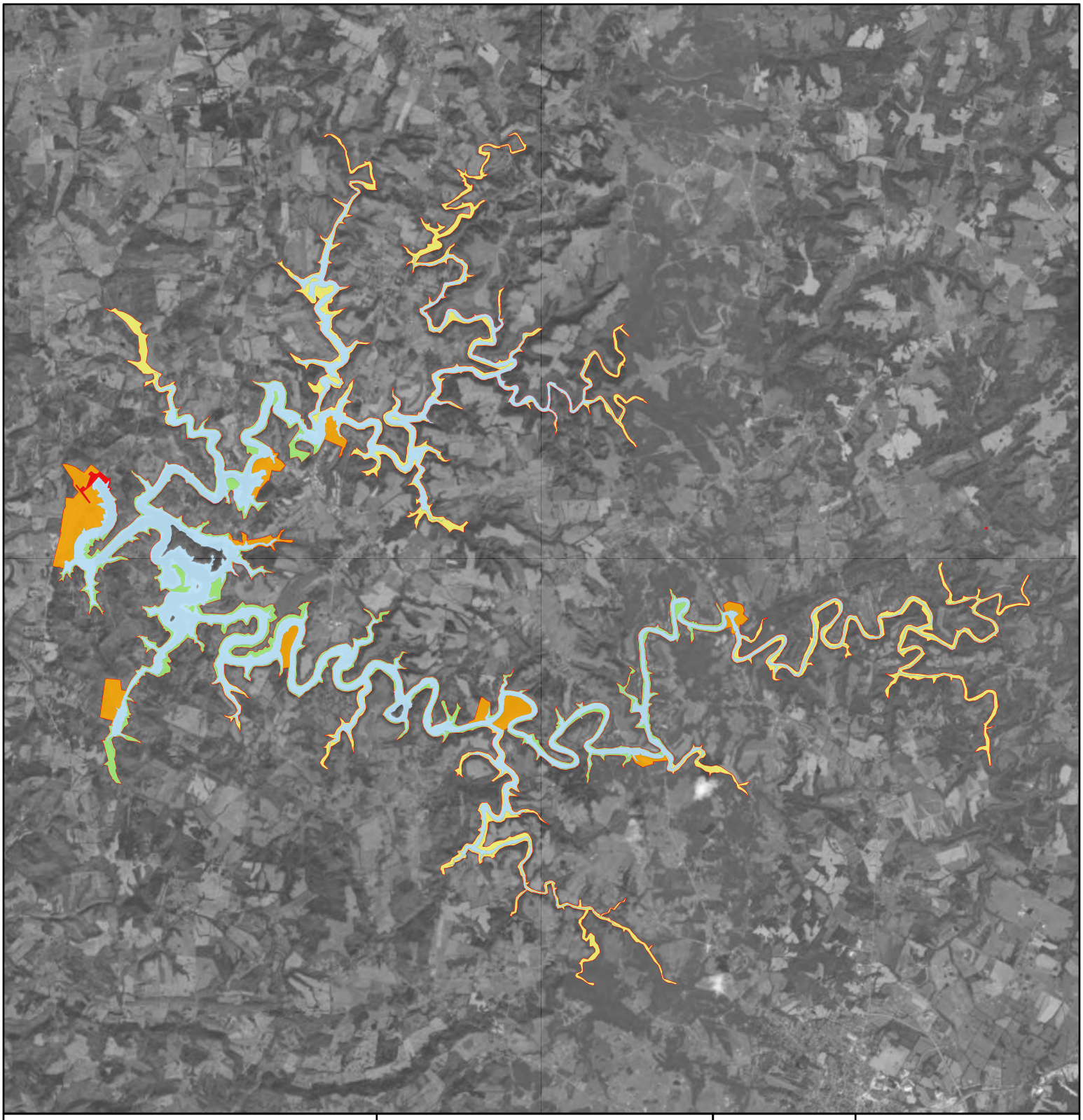
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Drive Time

Date: 5/18/2022

DRAFT



Legend

- Summer Pool
- Fee Boundary

Land Allocation

- Fish and Wildlife Management
- General Recreation
- Operations
- Public Use Area

N
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0 1 2 3
Miles

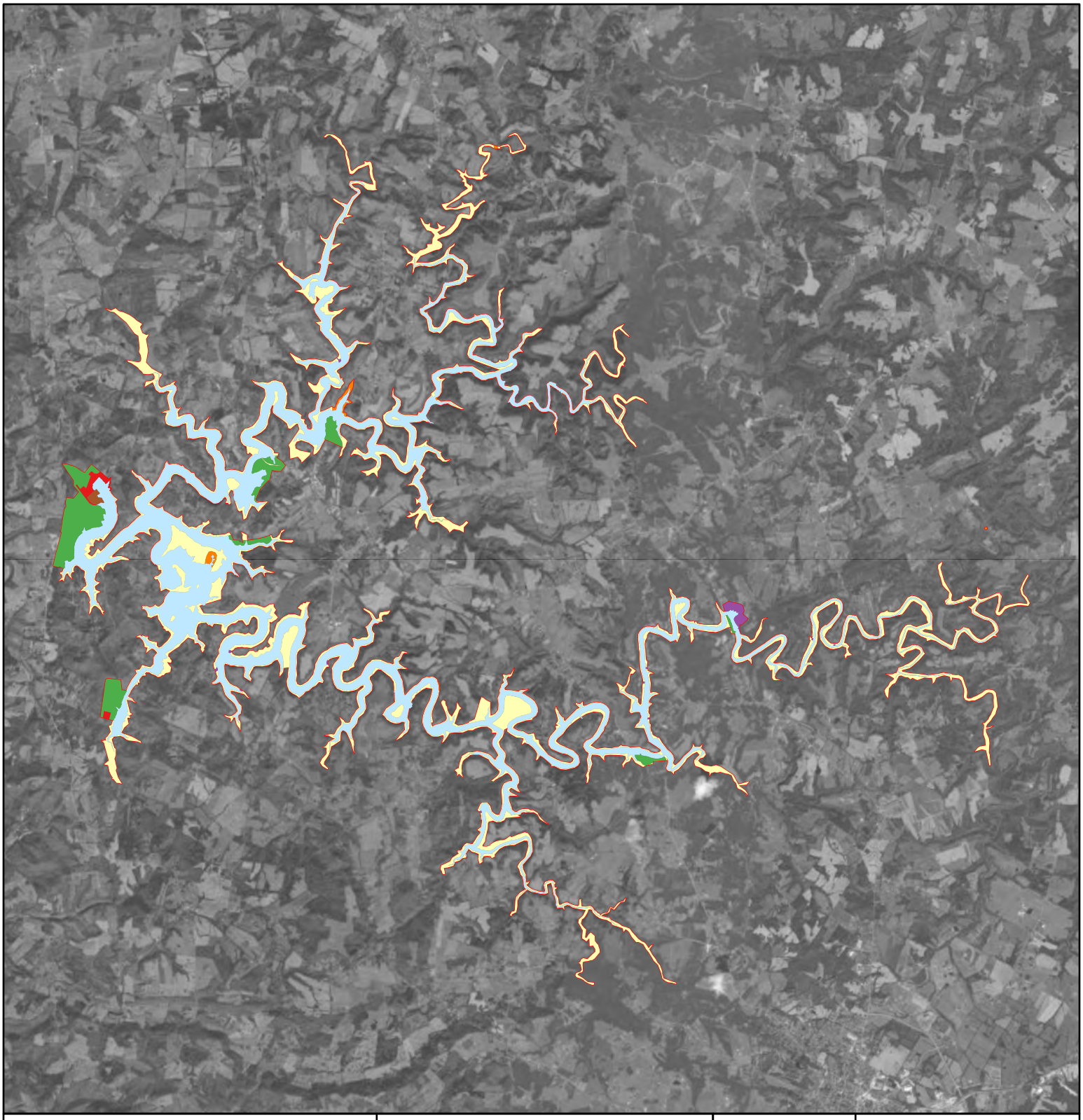
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

1961 Land Allocation

Date: 11/29/2022

DRAFT



Legend

- Summer Pool
- Fee Boundary

Land Classification

- Operations
- High Density Recreation
- Low Density Recreation
- Future Recreation
- Vegetative Management
- Wildlife Management Area

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0 1 2 3 Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Land Classification

Date: 12/7/2022

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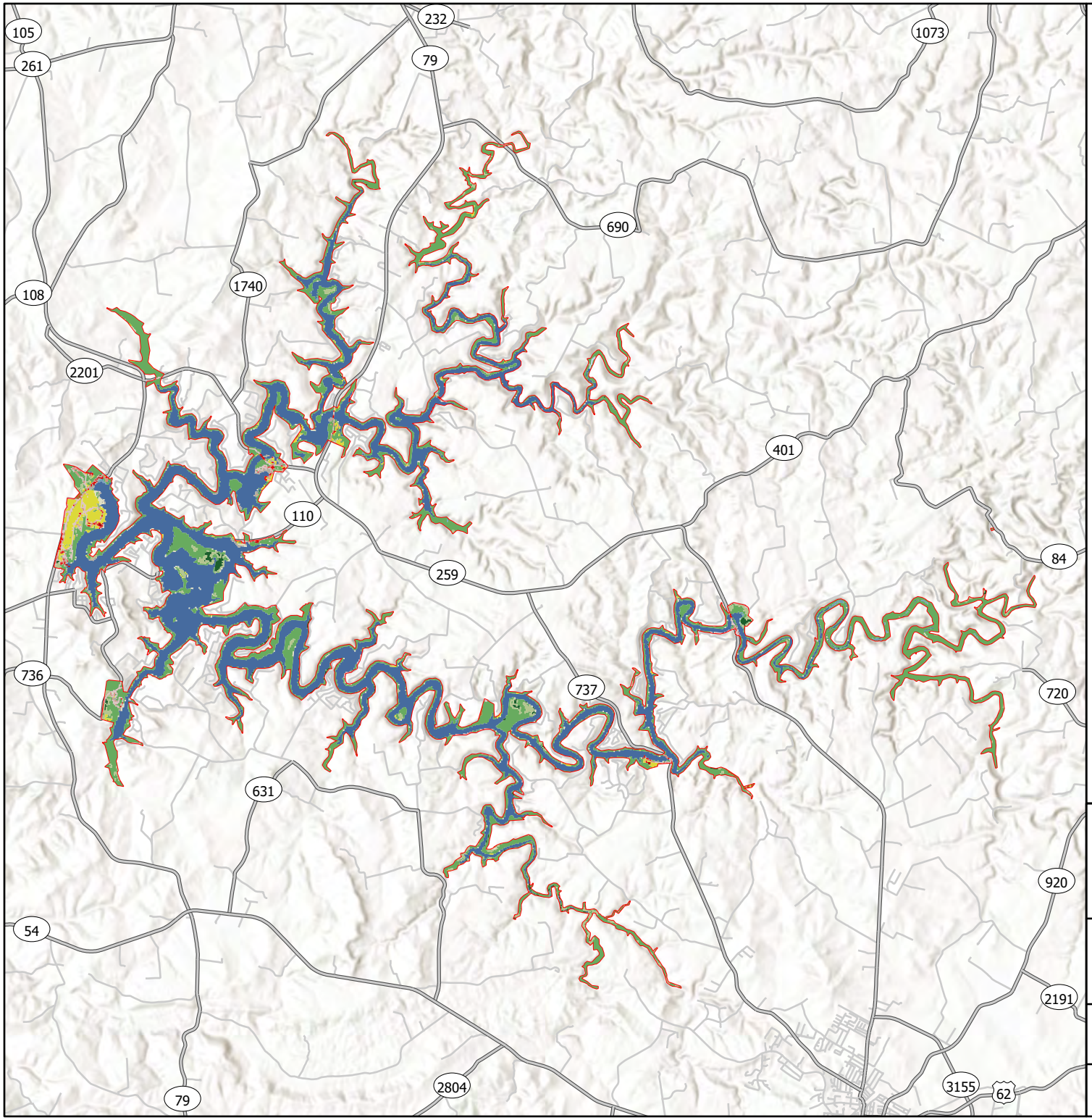

Legend

- Minor Road
- Major Road
- Fee Boundary

Landcover

- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Grassland/Herbaceuous
- Hay/Pasture
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceuous Wetlands

N
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0 1 2 3 4
Miles

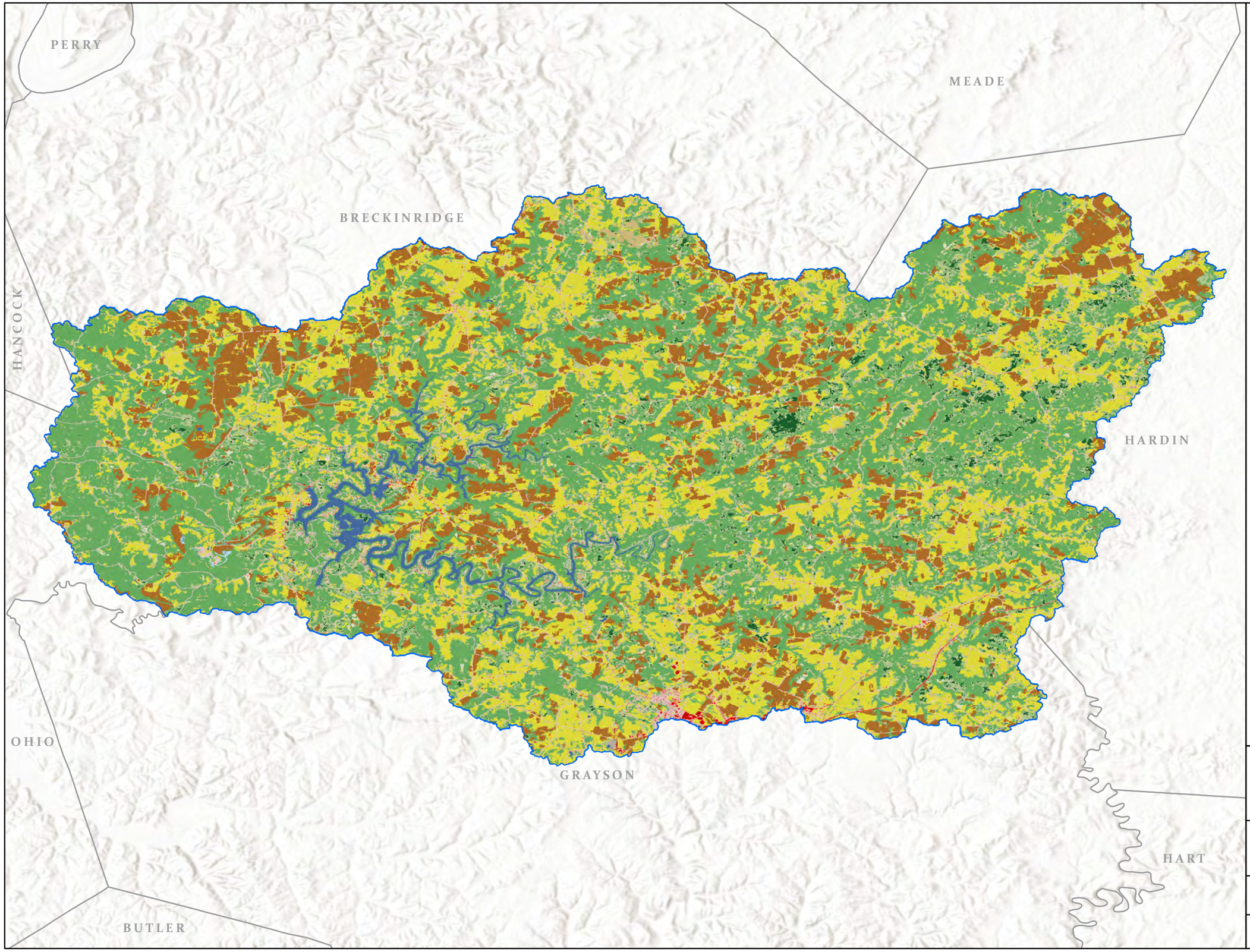
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Landcover (NLCD 2019)

Date: 11/30/2022

DRAFT



Legend

Watershed

County

Landcover

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

N
W E
S

0 2 4 6 Miles

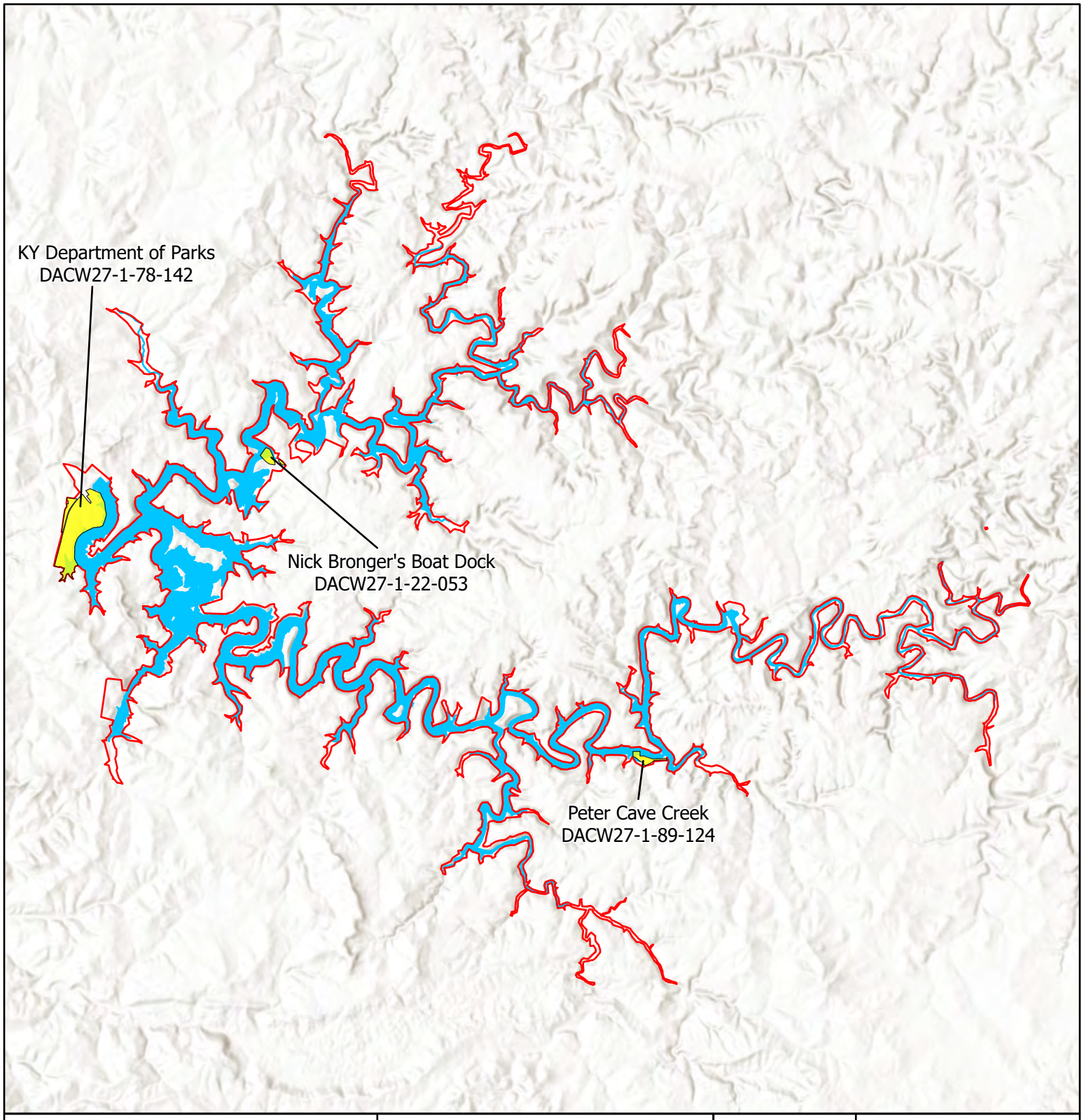
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Landcover (NLCD 2019)
Rough River Lake Watershed

Date: 5/27/2022

DRAFT



Legend

- Summer Pool
- Fee Boundary
- Outgrant Area

N
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0 1 2 3
Miles

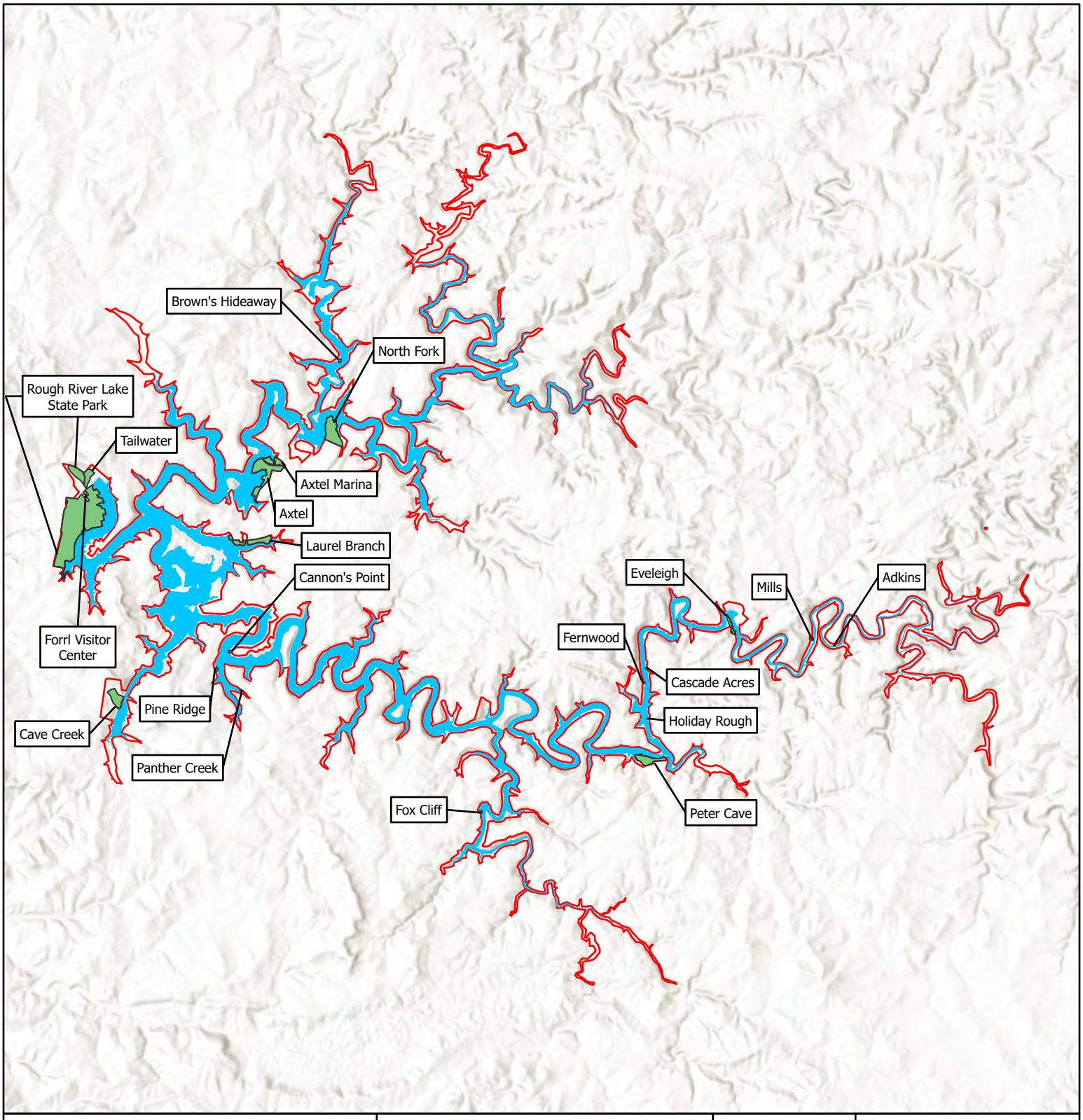
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Major Outgrants

Date: 8/25/2022

DRAFT



Legend

- Summer Pool
- Fee Boundary
- Project Site Area

N
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0 1 2 3 Miles

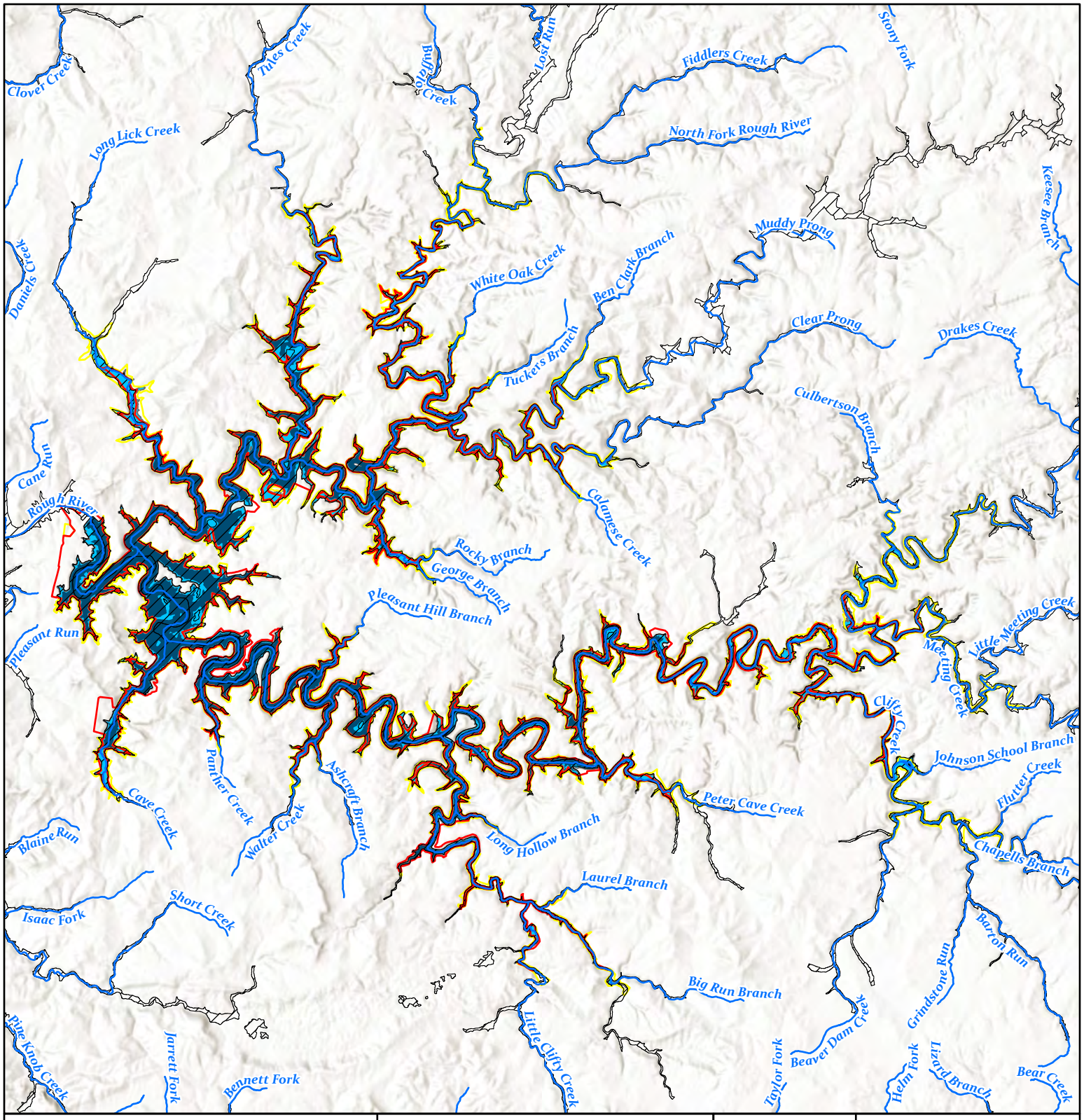
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Recreational Project Site Areas

Date: 11/30/2022

DRAFT



Legend

- Stream
- Summer Pool
- Flood Pool
- 100 Year Floodplain
- Fee Boundary
- Flowage Easement

N
W E
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0 1 2 3 4 Miles

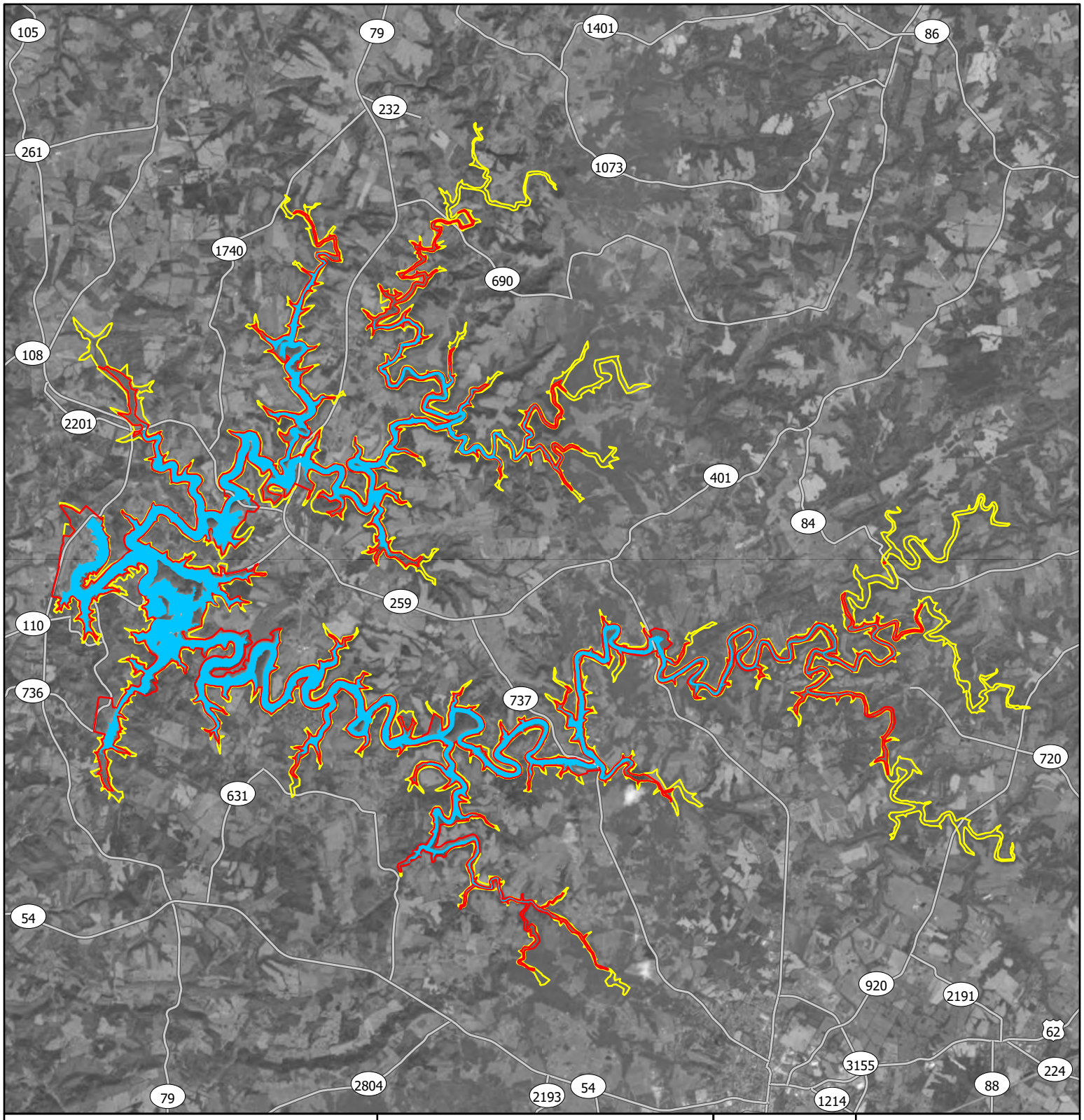
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Hydrology

Date: 11/29/2022

DRAFT



Legend

- Major Road
- Summer Pool
- Fee Boundary
- Flowage Easement

N
W E
S

0 1 2 3 4 Miles

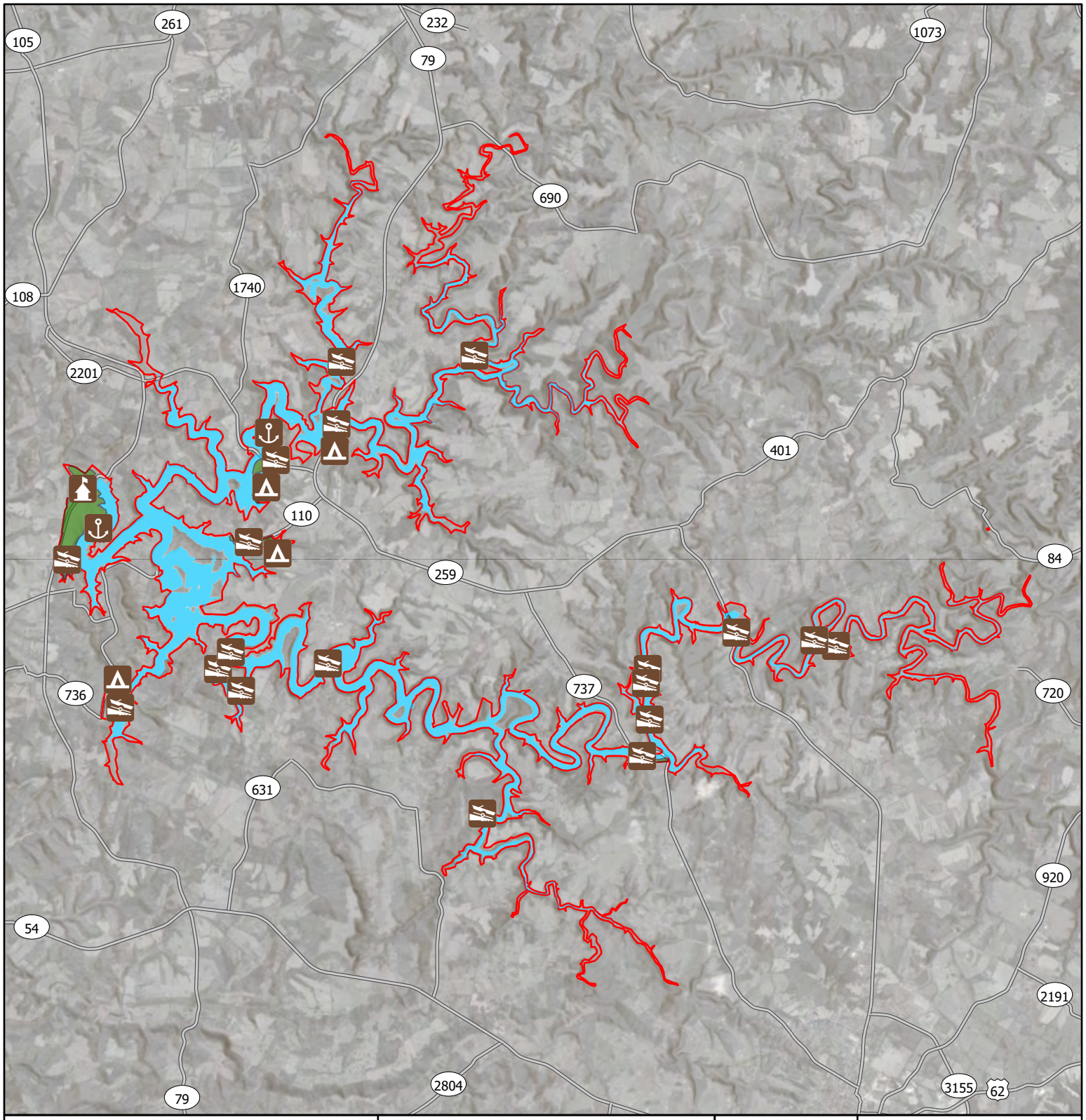
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Real Estate Boundaries

Date: 11/29/2022

DRAFT



Legend

- Major Road
- Summer Pool
- Project Site Area
- Fee Boundary
- Boat Ramp
- Campground
- Marina

N
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0 1 2 3 Miles

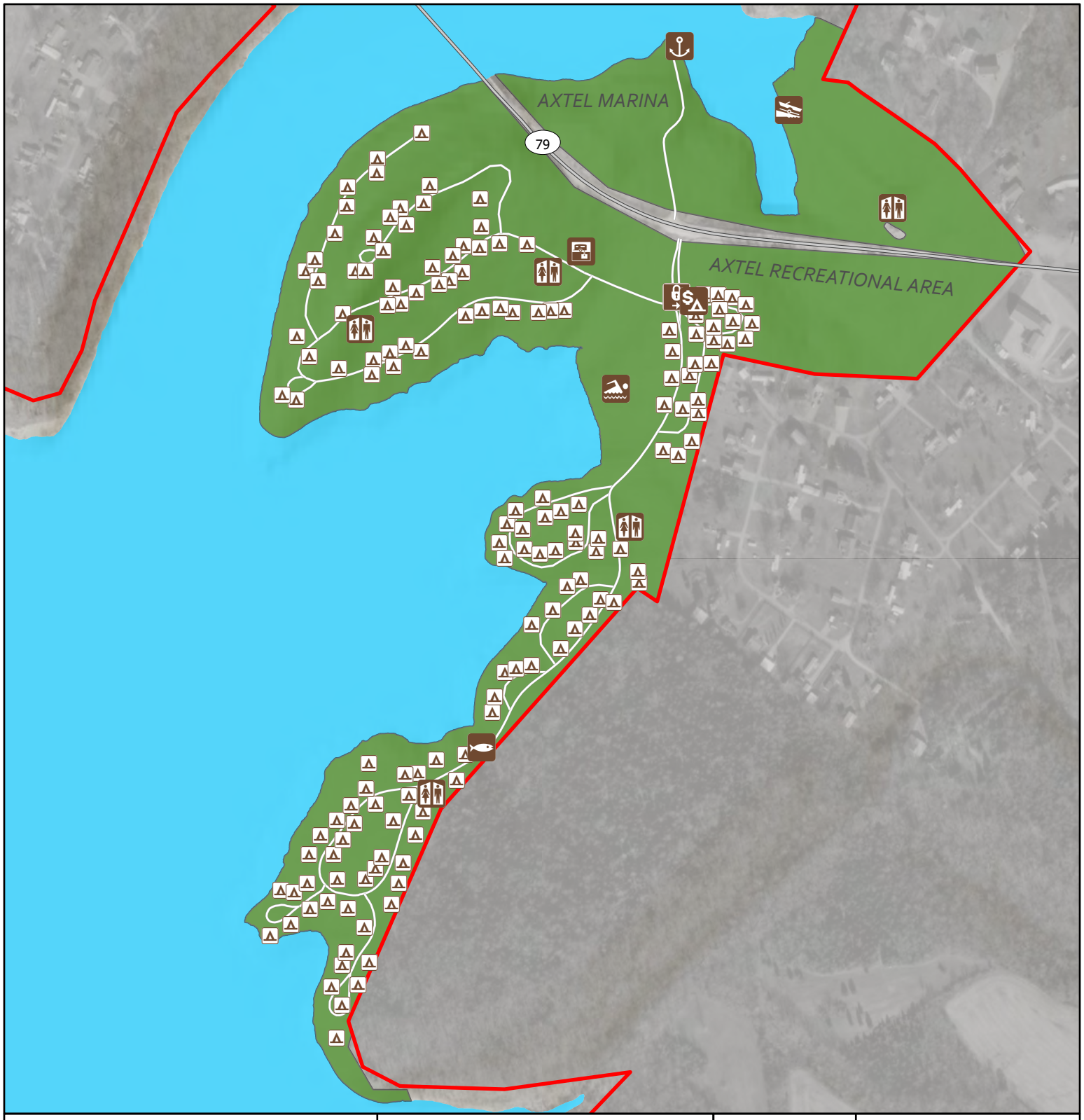
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

General Recreation Map

Date: 11/30/2022

DRAFT



Legend

- PSA Road
- Major Road
- Summer Pool
- Project Site Area
- Fee Boundary
- Boat Ramp
- Marina
- RV Dump Station
- Swimming Beach
- Gatehouse
- Restroom
- Fish Cleaning Station
- Attendant Camping
- Individual Camping

N
W E
S

0 250 500 750
Feet

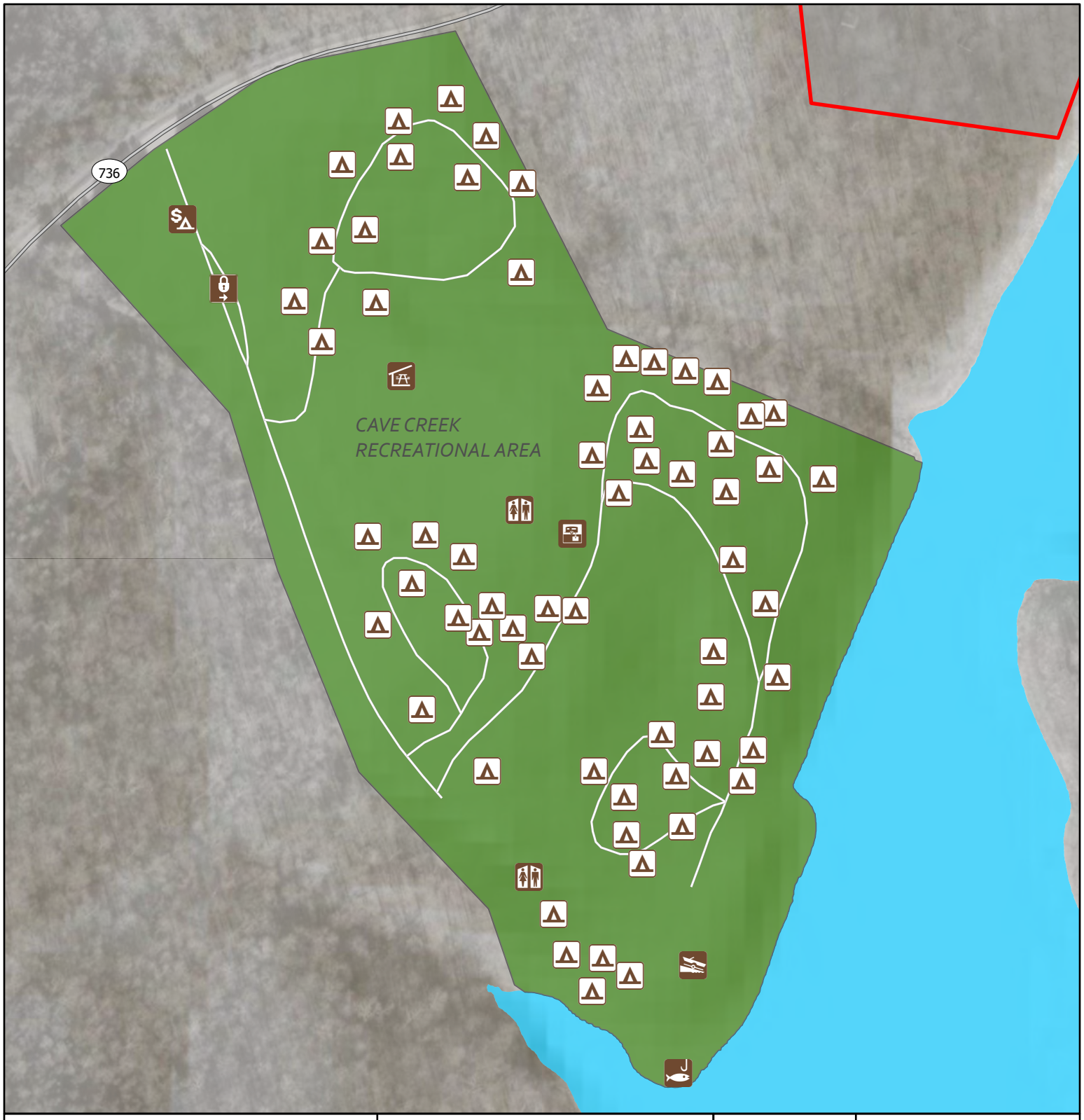
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Recreation Map: Axtel

Date: 11/30/2022

DRAFT



Legend

- PSA Road
- Major Road
- Summer Pool
- Project Site Area
- Fee Boundary
- Boat Ramp
- Gatehouse
- Restroom
- Fishing Pier
- Group Shelter
- RV Dump Station
- Attendant Camping
- Individual Camping

N
W E
S

0 100 200 300
Feet

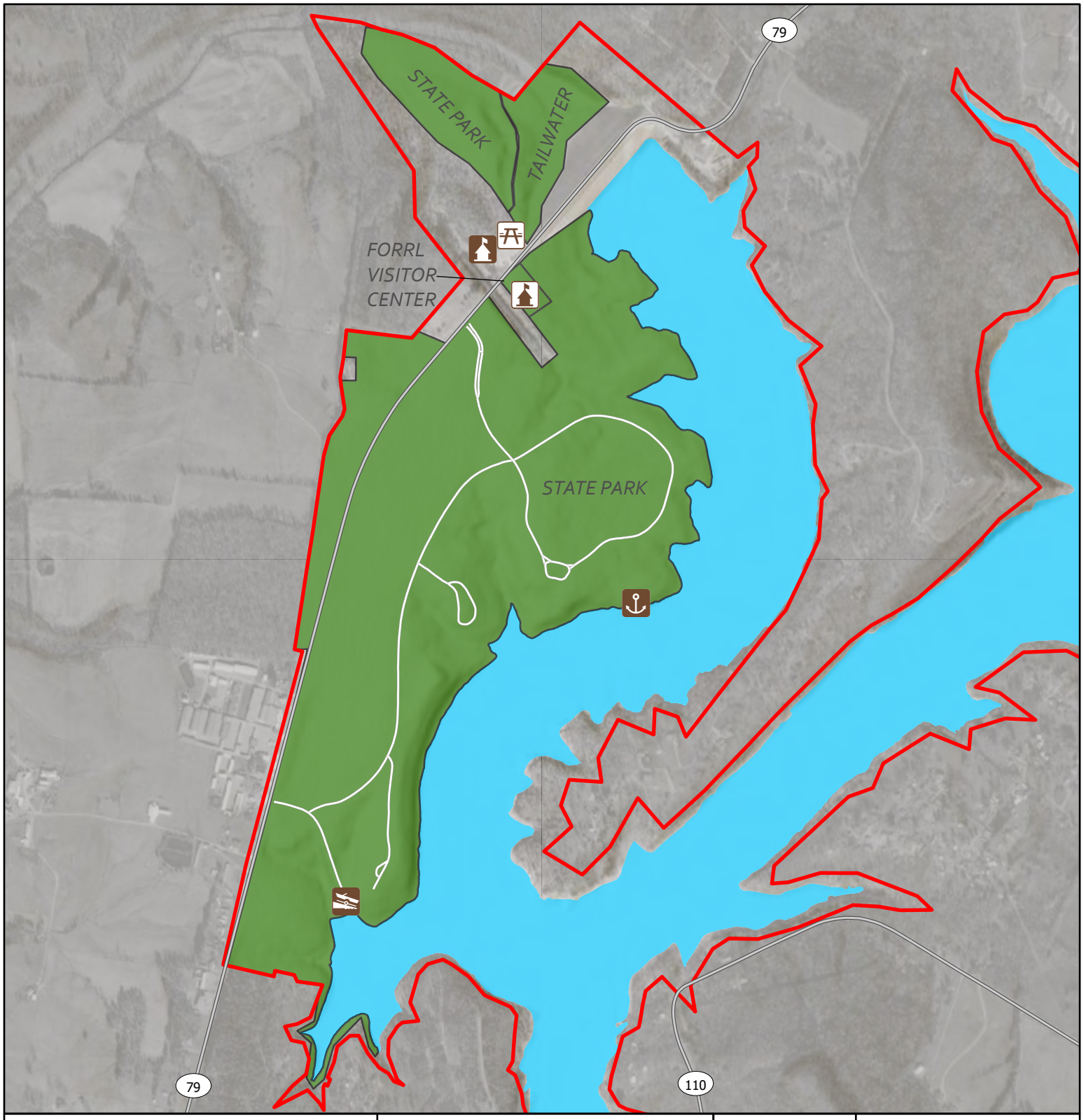
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Recreation Map: Cave Creek

Date: 11/30/2022

DRAFT



Legend

- PSA Road
- Major Road
- Summer Pool
- Project Site Area
- Fee Boundary
- Boat Ramp
- Project Office
- Marina
- Visitor Center
- Picnic Site

N
W E
S

0 500 1,000 1,500 2,000
Feet

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Recreation Map: Dam Area

Date: 11/30/2022

DRAFT

Legend

- PSA Road
- Major Road
- Summer Pool
- Project Site Area
- Fee Boundary
- Boat Ramp
- Gatehouse
- Restroom
- RV Dump Station
- Group Shelter
- Picnic Site
- Attendant Camping
- Individual Camping

N
W E
S

0 100 200 300 400 Feet

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Recreation Map: Laurel Branch

Date: 11/30/2022

DRAFT

Legend

- PSA Road
- Major Road
- Summer Pool
- Project Site Area
- Fee Boundary
- Swimming Beach
- Restroom
- Fish Cleaning Station
- Fishing Pier
- Picnic Site
- Individual Camping

N
W E
S

0 100 200 300 Feet

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Recreation Map: Laurel Branch

Date: 11/30/2022

DRAFT

Legend

- PSA Road
- Major Road
- Summer Pool
- Project Site Area
- Fee Boundary
- Boat Ramp
- Marina

N
W E
S

0 150 300 450 600
Feet

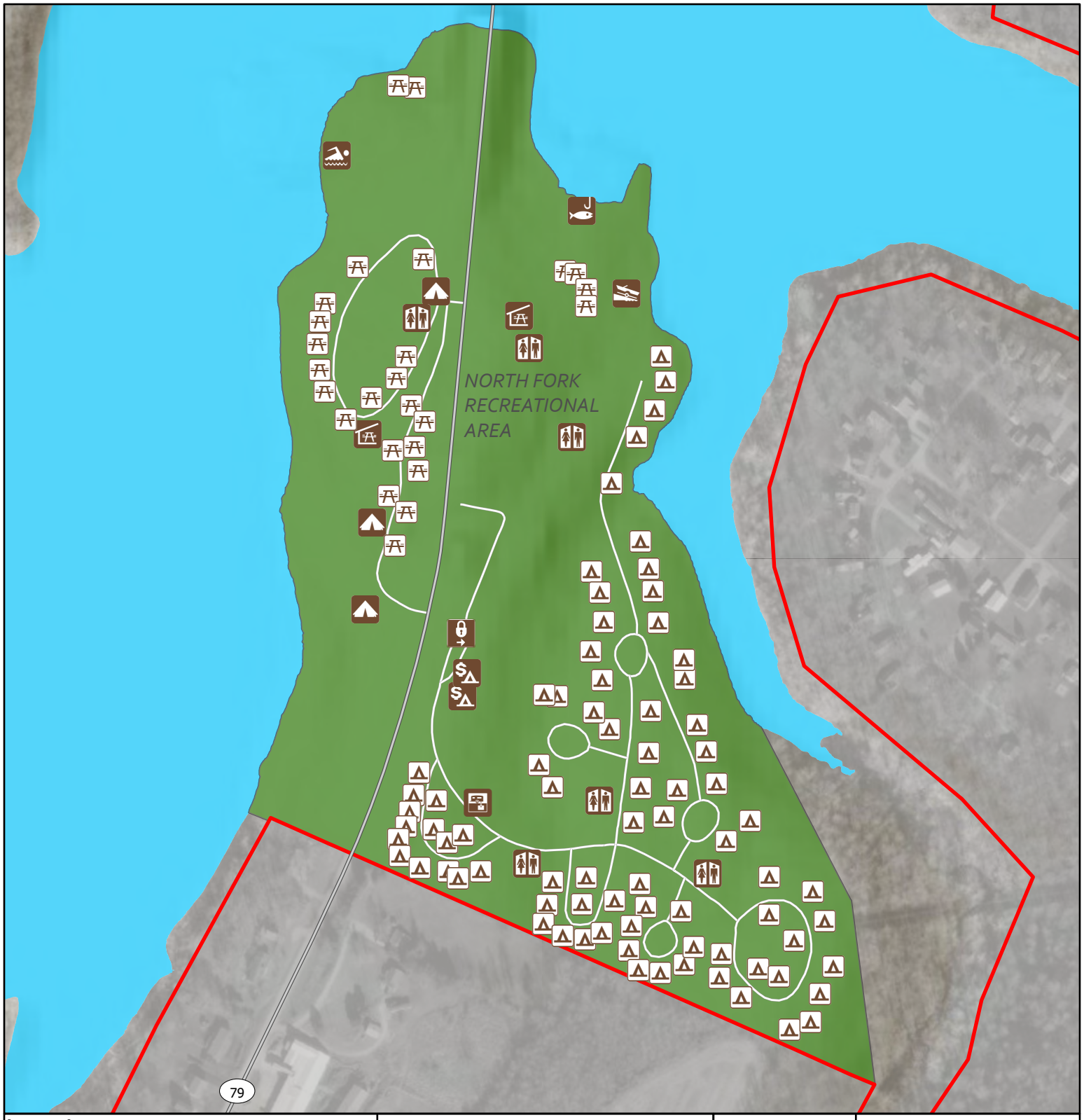
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Recreation Map: Peter Cave

Date: 11/30/2022

DRAFT



Legend

- PSA Road
- Major Road
- Summer Pool
- Project Site Area
- Fee Boundary
- Attendant Camping
- Volunteer Camping
- Individual Camping
- RV Dump Station
- Swimming Beach
- Boat Ramp
- Gatehouse
- Restroom
- Fishing Pier
- Group Shelter
- Picnic Site

N
W E
S

0 150 300 450
Feet

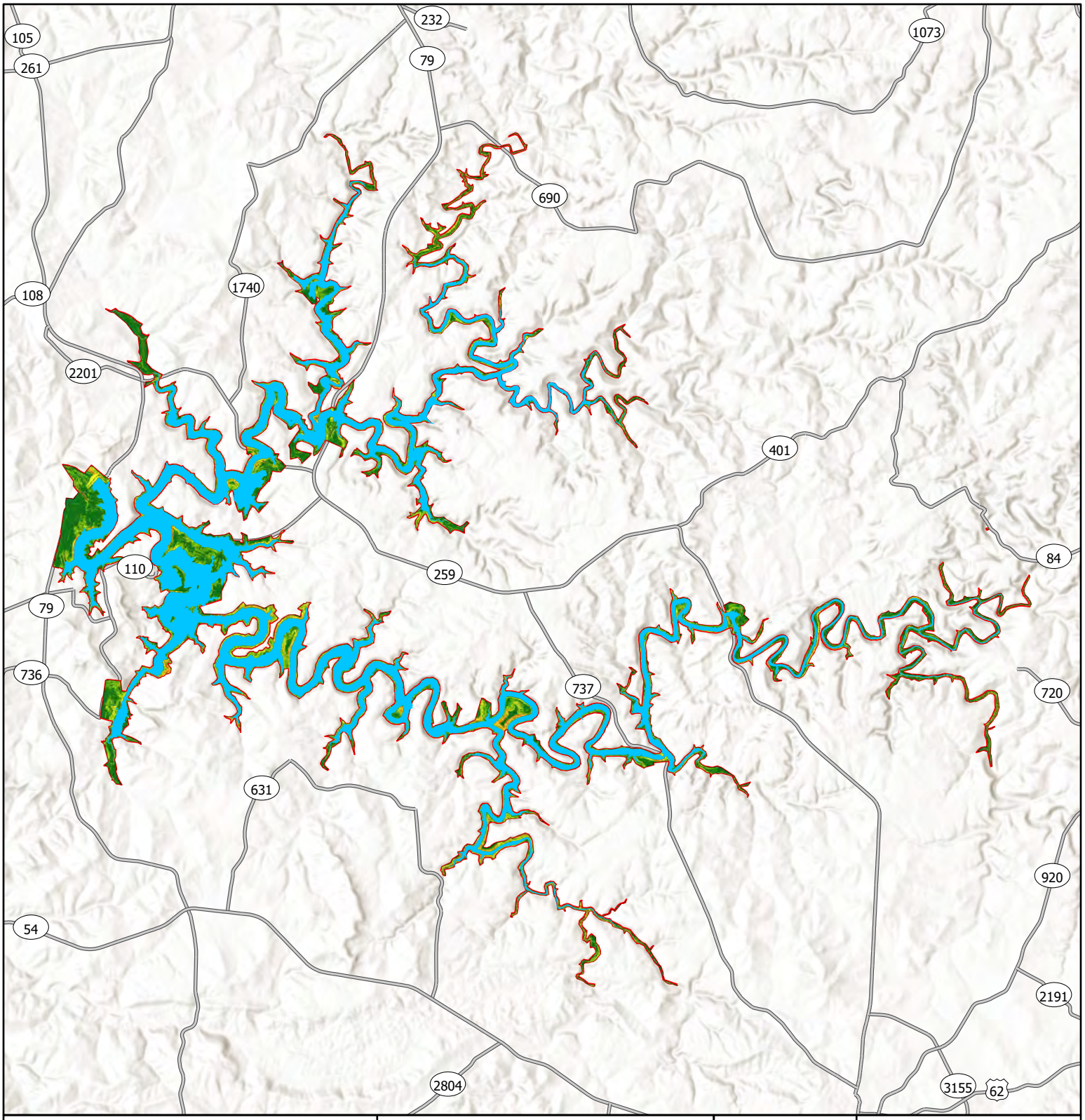
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Recreation Map: North Fork

Date: 11/30/2022

DRAFT



Legend

- Major Road
- Summer Pool
- Fee Boundary

Percent Slope

- <15%
- 15% - 30%
- 30% - 45%
- 45% - 60%
- >60%

N
W E
S

0 1 2 3 Miles

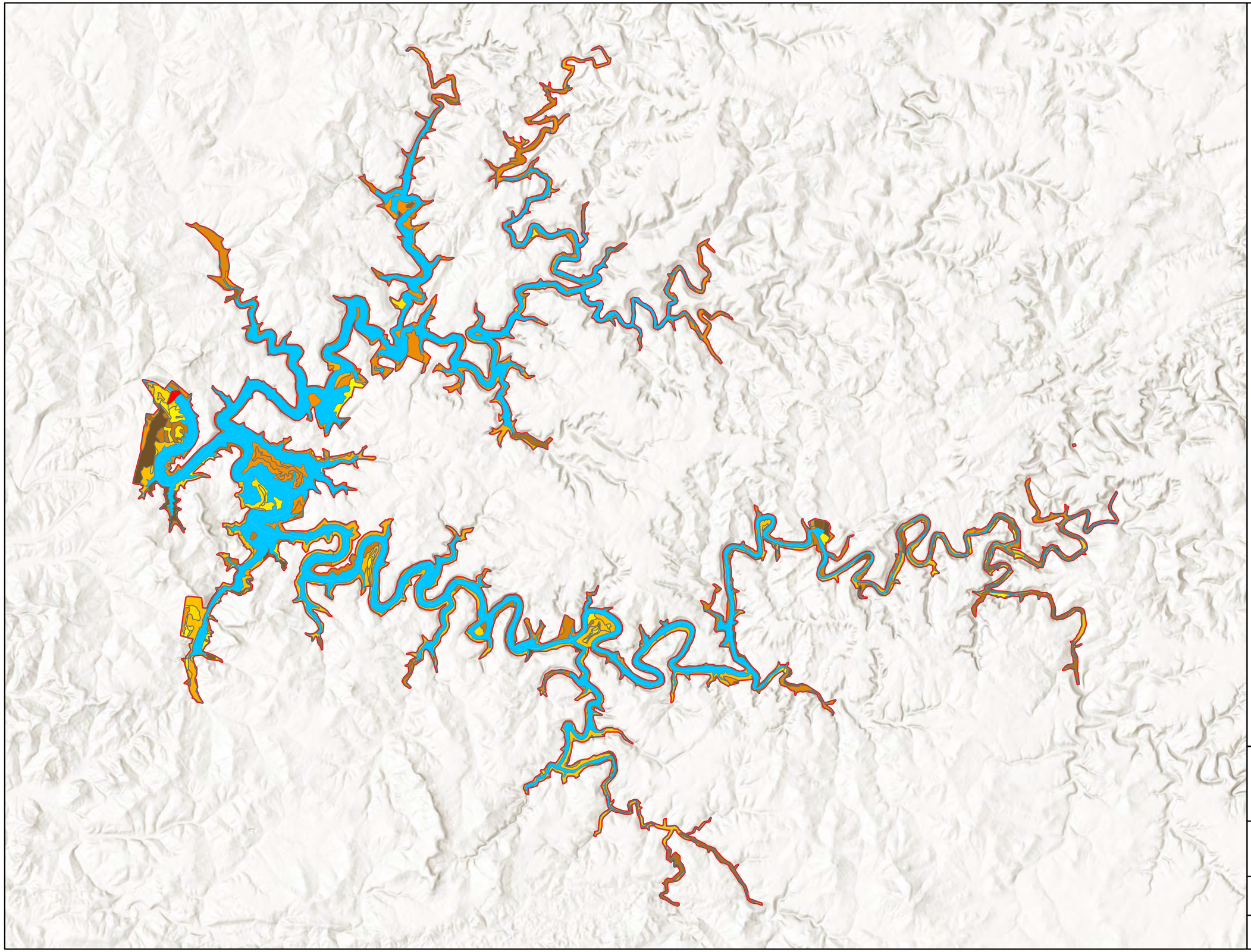
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Slope

Date: 11/30/2022

DRAFT



Legend

Fee Boundary

MUSYM

AeC
AlD
BaC2
BcC3
Bp
CaC2
CcC
CcD
CeD
CeD3
CeF
CkD
ClD3
CnD
CnD3
CnE
Co
CrB
CrB2
CrC
CrC2
CrD2
CsC3
Ct
CtC3
Cu
CvC3
Cw
DAM
FrD
GlC
GlC2
GlC3
GlD
GlE
GpC3
GpD3
GpE3
Gu
GwF
HnC
Ld
Nb
Ne
No
RaE
RaE3
RnC2
RoC3
RsD2
RsD3
RsE
SaA
SaB
SaB2
Sf
ShC
ShD
ShD3
Ss
St
VrF
W
WcE
WcE3
WgE
WgE3
WgF
WlB
WlC
WlC3
WlD
WnC3
WnD3
WsD3
ZaB
ZaB2
ZaC
ZaC2
ZcC3
ZnC3

N
W E
S

0 1 2
Miles

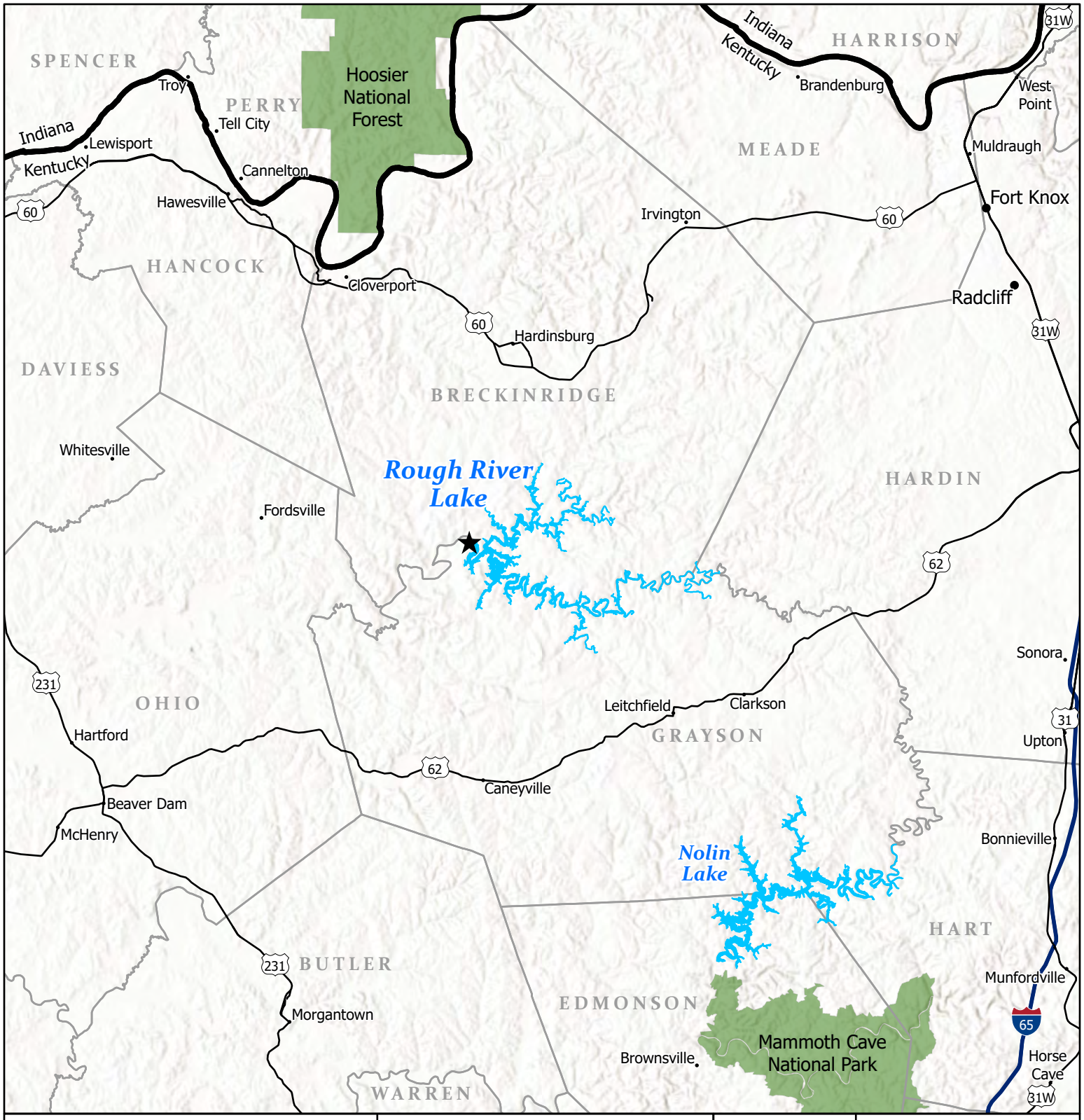
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Soils: Map Unit Symbols

Date: 5/27/2022

DRAFT



Legend

- Corps Office
- Interstate
- US Highway
- County
- State
- Corps Reservoir

N
W E
S

0 4 8 12 Miles

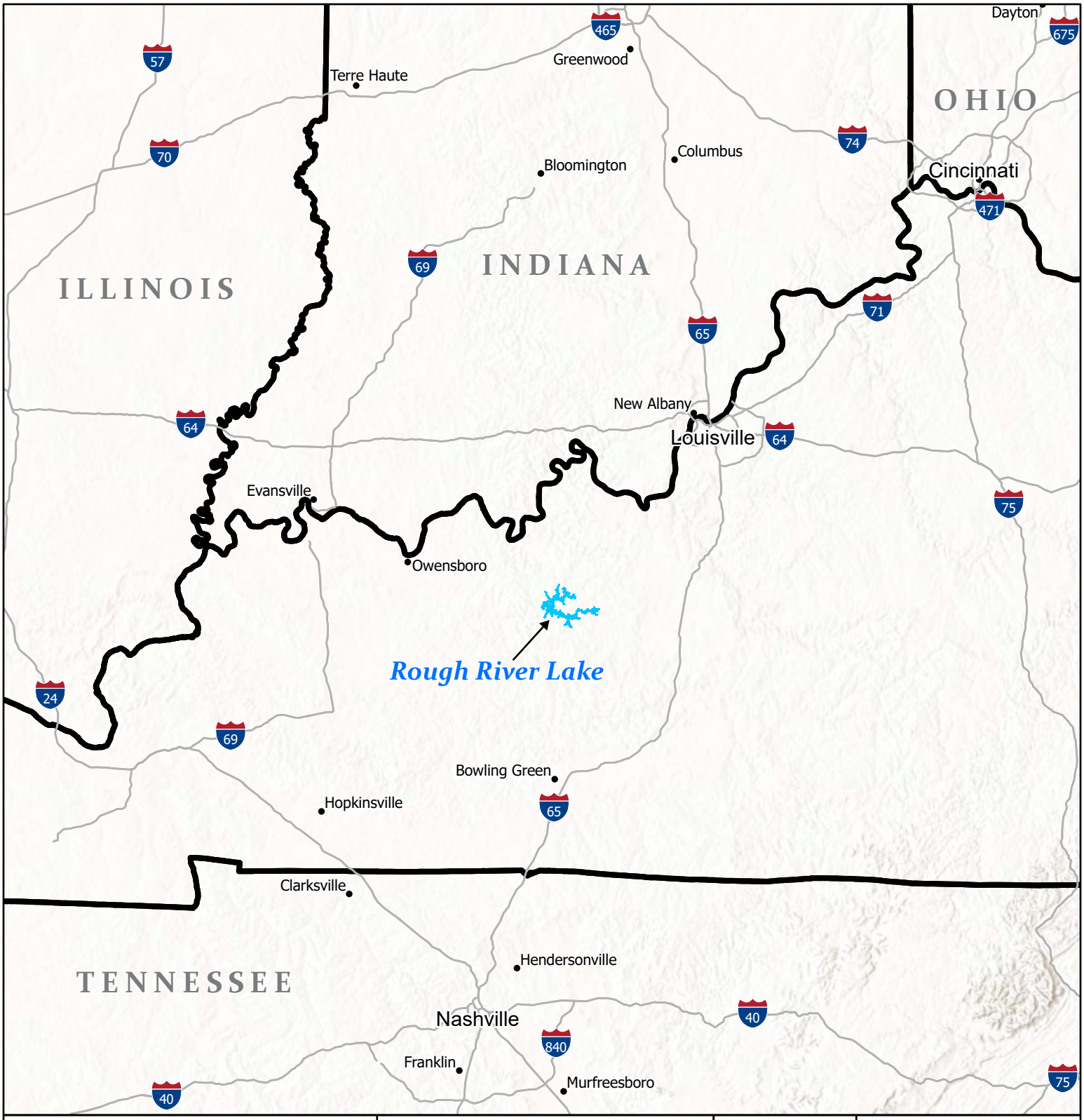
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Local Map

Date: 5/17/2022

DRAFT



Legend

- City
- Interstate
- State
- Rough River Lake

N
W E
S

0 15 30 45 60
Miles

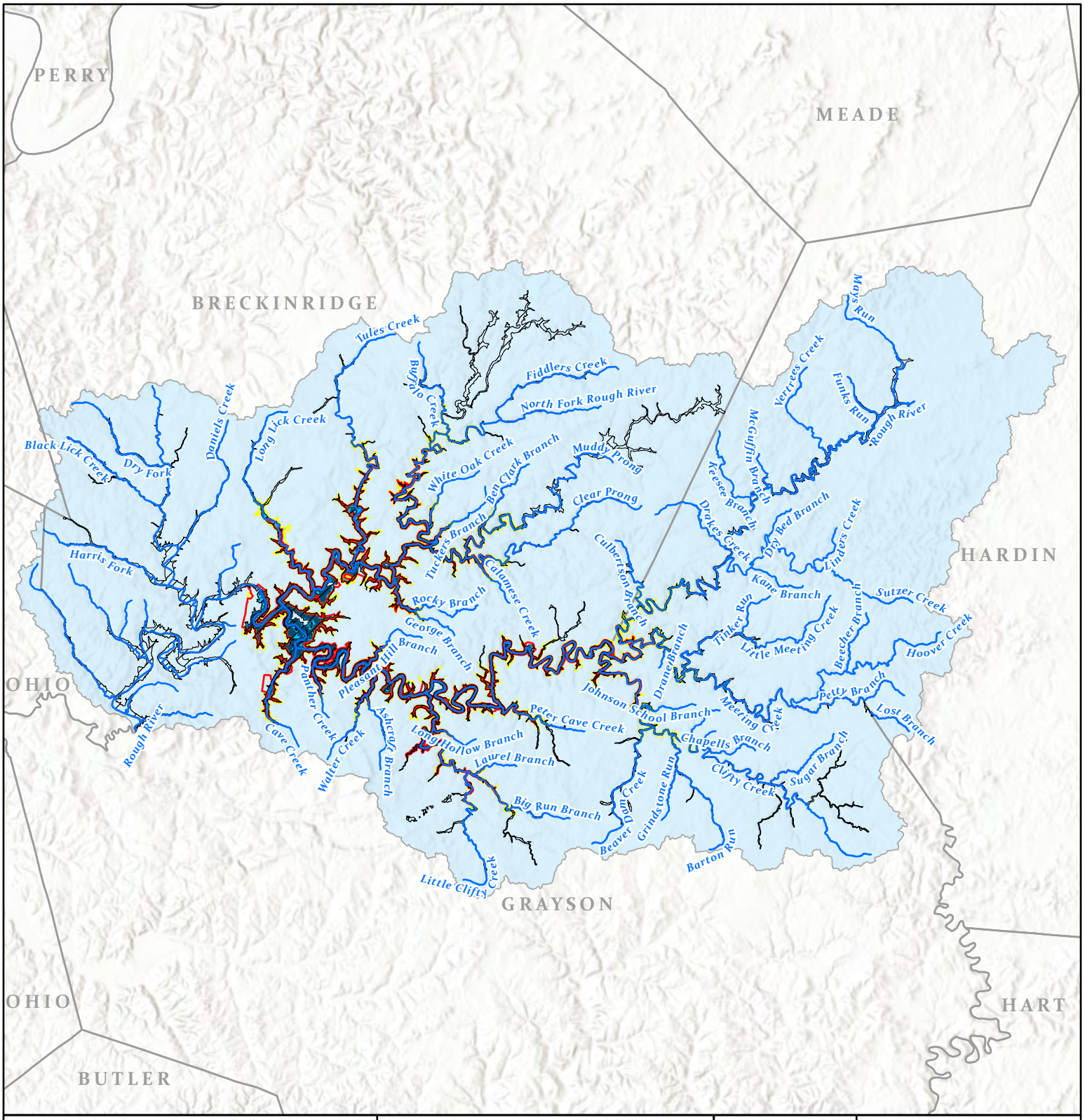
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Regional Map

Date: 6/7/2022

DRAFT



Legend

- Tributary
- Summer Pool
- Flood Pool
- 100 Year Floodplain
- Watershed
- Fee Boundary
- Flowage Easement
- County

N
W E
S

0 2 4 6 8 Miles

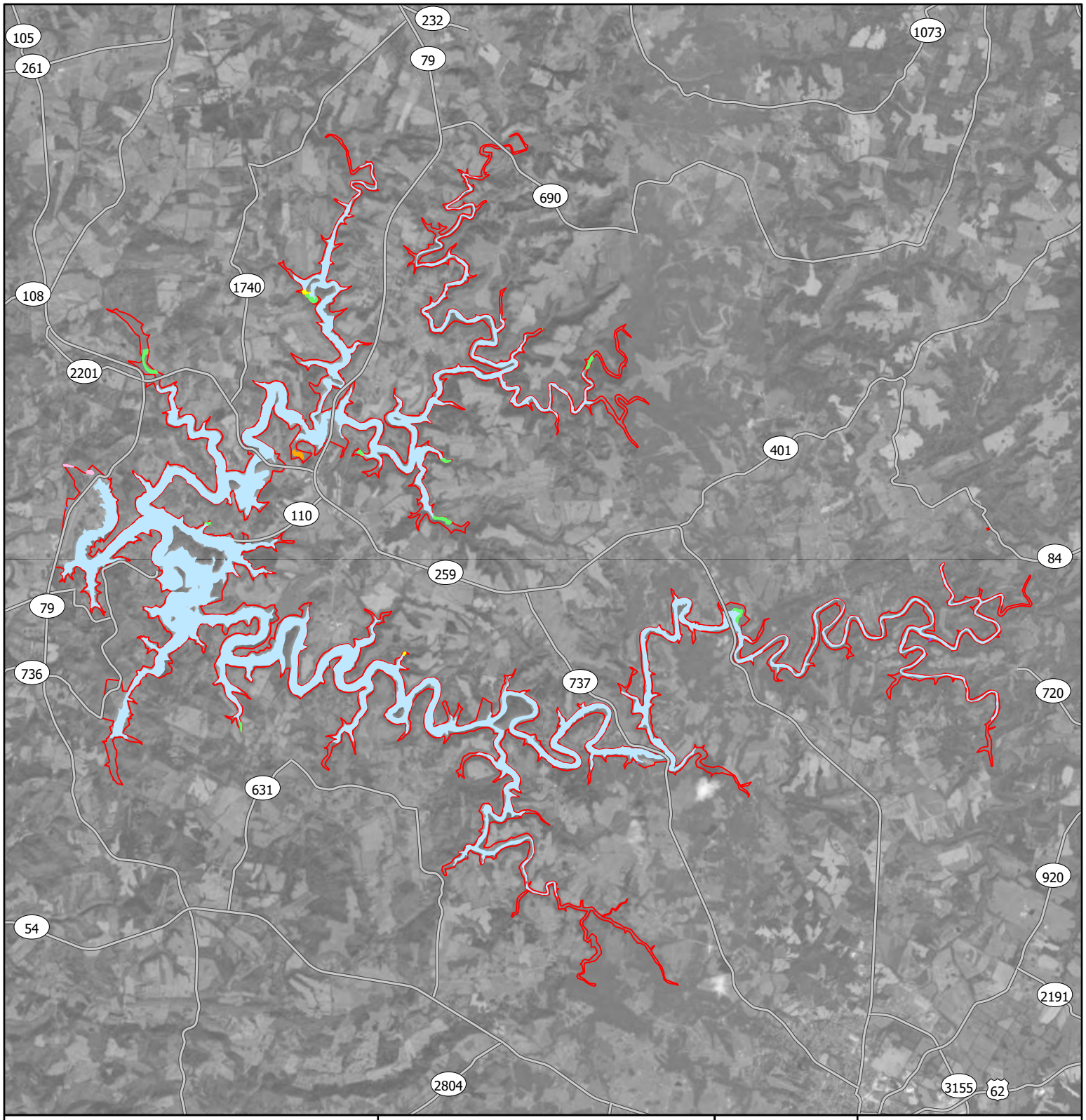
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Watershed

Date: 11/30/2022

DRAFT



Legend

- Major Road
- Fee Boundary

National Wetland Inventory (NWI)

- Lake
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine
- Other

N
W E
S

0 1 2 3 Miles

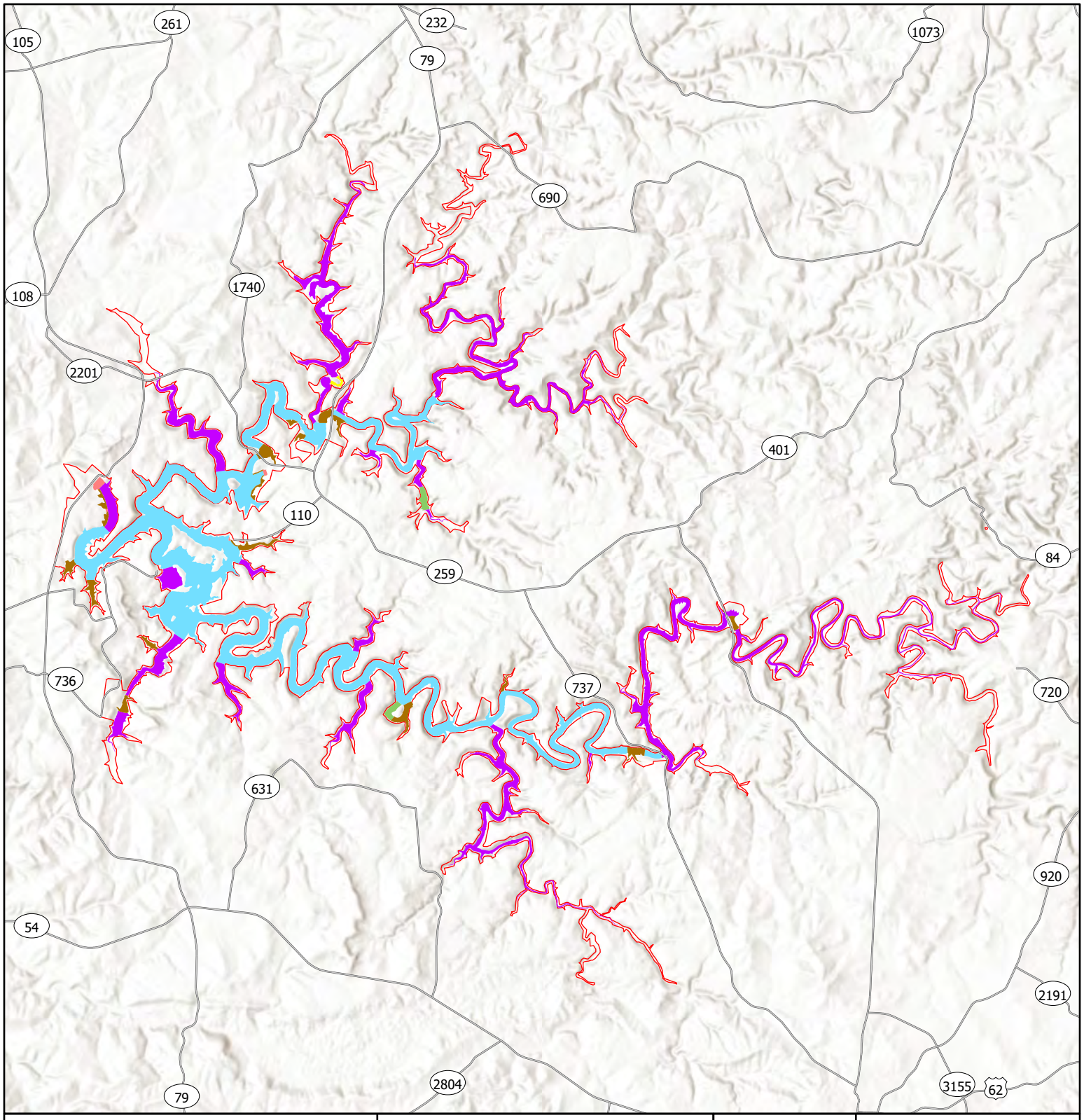
U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Wetlands

Date: 5/31/2022

DRAFT



Legend

- Major Road
- Fee Boundary

Water Classification

- No Restrictions
- Ski Course
- No Skiing
- Idle Speed
- Idle Speed and No Swimming
- Restricted

N
W E
S

0 1 2 3 Miles

U.S. ARMY CORPS OF ENGINEERS
LOUISVILLE DISTRICT

Rough River Lake Master Plan - 2022

Water Surface Classification

Date: 4/11/2023

DRAFT

United States Army Corps of Engineers
Louisville District

Rough River Lake
Master Plan

2023

Appendix C
Public and Agency Comments

USACE hosting public workshop for Rough River Lake Master Plan Update

U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT

Published July 27, 2022

LOUISVILLE, Ky. --The U.S. Army Corps of Engineers is in the process of updating its 1961 Master Plan for Rough River Lake located in Falls of Rough, Kentucky.

A Master Plan is the document that conceptually establishes and guides the orderly development, administration, maintenance, preservation, enhancement, and management of all natural, cultural, and recreational resources of a Corps water resource project.

Public input is critical in the Master Plan update process. USACE Louisville District will be hosting a workshop to provide the public with an opportunity to comment. The public comment period will be open until Sept. 12, 2022.

The public is invited to join USACE for a public meeting to provide input on Wednesday, Aug. 10, 2022, beginning at 6:00 p.m. CDT, at the Rough River State Park Resort (Breckinridge and Grayson rooms) located at 450 Lodge Road, Falls of Rough, KY 40119.

For those unable to attend in-person, the public meeting will also be held virtually simultaneously. To participate in the virtual public meeting, log in at : https://usace1.webex.com/meet/glenn.b.myrick and enter your name and email address. For the presentation's audio portion, call 1-844-800-2712 Access code: 199 639 4239.

Instructions for web access and phone-in are also available at: https://go.usa.gov/xS8ch.

Encroachment resolution, the Shoreline Management Plan, and the Dam Rehabilitation project are not part of the Master Plan revision process and will not be included in the presentation.

For more information, contact the U.S. Army Corps of Engineers Louisville District Public Affairs Office at (502) 315-6767.

United States Army Corps of Engineers
Louisville District

Rough River Lake
Master Plan

2023

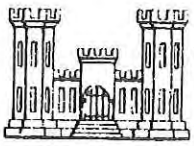
Appendix D
Reference Documents

ROUGH RIVER RESERVOIR

ROUGH RIVER, TRIBUTARY OF GREEN RIVER
OHIO RIVER BASIN
KENTUCKY

DESIGN MEMORANDUM
NO. 8 B

MASTER PLAN



LOUISVILLE DISTRICT

CORPS OF ENGINEERS U.S. ARMY

1961

OVLGP (9 Jun 61) 8th Ind
SUBJECT: Master Plan, Design Memorandum No. 8B, Rough River Reservoir, Kentucky

Dist Engr, US Army Engr Dist, Louisville, Ky. 9 April 1962

TO: Div Engr, US Army Engr Div, Ohio River, ATTN: OVDGR, Cincinnati, O.

1. The Master Plan has been revised as directed by 2nd Indorsement, paragraph c, Master Plan, Design Memorandum No. 7B, Buckhorn Reservoir, Ky., 19 December 1961. This revision required, also, that page 8, paragraph 4-06b. Subleases be changed. Inclosed are seven copies of revised 2nd Indorsement and page 8 of the Master Plan.

2. As the license issued to the Commonwealth of Kentucky is considered part of the Master Plan seven copies are herewith for inclosure in D.M. No. 8B, 1 thru 7.

FOR THE DISTRICT ENGINEER:

3 Incl
added 3 Incl (sep)
4. 2nd Ind (rev. Feb 1962)
5. Page 8 (rev. 12 Feb 1962)
6. Rough River Res
License to operate

DAVID G. CARTER
Captain, CE
Executive Officer

DEPARTMENT OF THE ARMY
LICENSE
FOR PUBLIC PARK AND RECREATIONAL DEVELOPMENT
AND CONSERVATION PURPOSES
ROUGH RIVER RESERVOIR AREA, KENTUCKY

Contract No.
DA-15-029-CIVENG-62-341

THE SECRETARY OF THE ARMY, under authority of Section 209 of the Flood Control Act of 1954, approved 3 September 1954 (68 Stat. 1248, 1266; 16 U.S.C. 460d), hereby grants to THE COMMONWEALTH OF KENTUCKY, a license for a period of fifty (50) years commencing on the date of execution hereof to use approximately 9,234 acres of fee owned land and water areas under the primary jurisdiction of the Department of the Army in the Rough River Reservoir Area, as shown generally on Exhibit "A", Master Plan, Rough River Reservoir, attached hereto and made a part hereof, for public park, recreation and conservation purposes, excepting therefrom, approximately 80 acres comprising the Dam Site and Operations Area extending approximately 1,000 feet upstream from the dam. The District Engineer, Corps of Engineers, in charge of the administration of the reservoir will monument the boundary of the licensed area at certain strategic points.

THIS LICENSE is granted subject to the following conditions:

1. That the licensee, in the exercise of the privileges hereby granted, shall conform to such rules and regulations as have been jointly prescribed by the District Engineer, Corps of Engineers, in charge of administration of the property, and the licensee, to govern the public use of the said reservoir area, and with the provisions of Section 209 of the Flood Control Act of 1954 (68 Stat. 1248, 1266).

2. That the licensee may construct upon said land such buildings, improvements, facilities, accommodations, fences, signs, wharves, piers, boat slips and other structures as may be necessary for the purposes of this license; and may plant seeds, shrubs, and trees, provided that all such structures shall be constructed and the landscaping accomplished in accordance with plans approved by the District Engineer, Corps of Engineers, in charge of the administration of the property; and, provided further, that no building or structure which, in the opinion of the said District Engineer, would be subject to flotation, shall be located below elevation 534 m.s.l.

3. That the licensee shall administer and maintain the said property, for the purposes of this license, in accordance with the Master Plan for the said reservoir area and with an Annual Management Program to be mutually agreed upon between the licensee and the

said District Engineer, which may be amended from time to time as may be necessary. Such Annual Management Program shall include, but is not limited to, the following:

a. Plans for management activities to be undertaken by the licensee or jointly by the Corps of Engineers and the licensee.

b. Budget of the licensee for carrying out the management activities.

c. Personnel to be used in the management of the area.

d. Harvesting of timber and reforestation.

e. Soil erosion prevention methods to be utilized.

f. Practices for prevention of despoilment of the licensed area by roads and waste materials.

g. Fire prevention plans.

4. That the licensee shall protect the property from fire, vandalism and soil erosion; and may make and enforce such rules and regulations as are necessary, and within its legal authority, in exercising the privileges granted in this license, including the regulation of boats operated thereon, provided that such rules and regulations are not inconsistant with those jointly prescribed to govern the public use of the reservoir area.

5. That the licensee, in exercising its Governmental or proprietary functions, may operate facilities and accommodations and provide services needed by the public directly, and may enter into concession agreements with third parties for providing needed services to the public, provided that any such agreements have the prior approval of the said District Engineer; and, provided further, that any profits obtained by the licensee from any such agreements or from operation by the licensee on the said Government property shall be utilized by the licensee in the further development of the area and that any profits not so utilized shall be paid to the said District Engineer at the expiration of each five-year period of this license. The licensee and its concessionaires may make reasonable charges for such services and for the use of such facilities and accommodations, provided that such charges shall have the prior written approval of the said District Engineer; and,

provided further, that each individual shall have the right to elect whether he desires to use such services without jeopardizing his privilege to use the reservoir area. No charge shall be made for admission to or for use of any facilities provided by the United States.

6. That the licensee may take, trap, remove or otherwise manipulate all forms of fish and wildlife; conduct any scientific research and operate research equipment upon the said lands and waters; and may place upon said lands and waters such additional forms of fish and wildlife as it may desire from time to time; and shall have the right to close the area to hunting, fishing and trappings; provided that the closing of any water areas to public use generally for hunting, fishing and trapping shall be consistent with the laws for the protection of fish and game of the Commonwealth of Kentucky.

7. That the licensee shall, within the limits of available funds, proceed immediately with the development of said lands for the purposes of this license and prosecute its program to completion in an orderly manner, and at a rate consistent with the needs of the public.

8. That this license is subject to all existing and future leases, easements, licenses and permits heretofore granted or to be hereafter granted by the United States on said lands; provided, however, that the United States, insofar as may be consistent with the other uses and purposes of the reservoir, will not enter into any new leases, easements, licenses, permits, or renewals thereof, which will affect the operations of the licensee or conflict with the scheduled program of the licensee for the operation of its Master Plan for development of the reservoir under the provisions of this license.

9. That the licensee shall, at all times, use every means within its legal powers to prevent pollution of the reservoir and waters adjacent to the licensed area from any cause or source arising from the use and occupancy by said licensee and which may be inimical or injurious to public health or to animal or aquatic life.

10. That the licensee shall not discriminate against any person or persons because of race, religion, color or national origin in the conduct of its operations hereunder.

11. That the licensee, in exercising its Governmental or proprietary functions, may cut timber, either directly or by contract, as may be necessary to further the development and conservation of forests, and collect and utilize the proceeds of any sales of

timber in the development, conservation, maintenance and utilization of said lands. Any funds received by the licensee from the sale of timber and not utilized in the furtherance of its activities as provided for in its Annual Management Program, will be paid to the United States of America at the expiration of each five (5) year period of the term of the license.

12. The licensee will establish and maintain adequate records and accounts and render periodic statements of receipts and expenditures in furtherance of its operation under this license as may be required by the said District Engineer.

13. That the right is hereby expressly reserved to the United States, its officers, agents and employees to enter upon the said land and water areas at any time and for any purpose necessary or convenient in connection with river and harbor and flood control work, and to remove therefrom timber or other material required or necessary for such work, to flood said premises when necessary, and/or to make any other use of said land as may be necessary in connection with public navigation and flood control, and the licensee shall have no claim for damages of any character on account thereof against the United States or any agent, officer or employee thereof.

14. That any property of the United States damaged or destroyed by the licensee incident to the exercise of the privileges herein granted shall be promptly repaired or replaced by the licensee to the satisfaction of the said District Engineer.

15. That the United States shall not be responsible for damages to property or injuries to persons which may arise from or be incident to the exercise of the privileges herein granted, or for damages to the property of the licensee, or for damages to the property or injuries to the person of the licensee's officers, agents, servants or employees, or others who may be on said premises at their invitation or the invitation of any one of them, arising from or incident to the flooding of said premises by the Government or flooding from any other cause, or arising from or incident to any other Governmental activities on the said premises, and the licensee shall hold the United States harmless from any and all such claims.

16. That this license may be relinquished by the licensee at any time by giving to the Secretary of the Army, through the said District Engineer, at least ninety (90) days' notice in writing.

17. That this license may be revoked by the Secretary of the Army in the event the licensee violates any of the terms and conditions of this license and continues and persists therein for a period of ninety (90) days after notice thereof in writing by the said District Engineer.

18. That on or before the date of expiration of this license or its relinquishment by the licensee, the licensee shall vacate the said Government premises, remove all property of the licensee therefrom and restore the premises to a condition satisfactory to the said District Engineer. If, however, this license is revoked, the licensee shall vacate the premises, remove said property therefrom, and restore the premises as aforesaid within such time as the Secretary of the Army may designate. In either event, if the licensee shall fail or neglect to remove said property and so restore the premises, then said property shall become the property of the United States without compensation therefor, and no claim for damages against the United States or its officers or agents shall be created by or made on account thereof.

IN WITNESS WHEREOF I have hereunto set my hand this 18th day of August 1961, by direction of the Assistant Secretary of the Army.

/s/ R. F. Alexander
R. F. ALEXANDER
Colonel, GS
Director, Mil Const and
Real Property, OASA (I&L)

The above instrument, together with the provisions and conditions thereof, is hereby accepted this 31st day of August 1961.

/s/ Edward V. Fox
Commissioner, Department of Parks

C O P Y

ENGCW-OM (9 Jun 61) 6th Ind
SUBJECT: Master Plan, Design Memorandum No. 8B, Rough River Reservoir, Kentucky

Office, Chief of Engineers, Washington 25, D. C., 9 November 1961

TO: Division Engineer, U. S. Army Engineer Division, Ohio River
Cincinnati, Ohio

1. The Master Plan as revised is approved as recommended by the Division Engineer in preceding 5th Indorsement.

2. It is expected that the management plan as required by the terms of the license to the State will provide for adequate steps in the development and management of forest and vegetative reserves as required by PL 86-117 (EM 1130-2-302, par. 5d).

FOR THE CHIEF OF ENGINEERS:

/s/ Mark S. Gurnee

Incls w/d

MARK S. GURNEE
Chief, Operations Division
Civil Works

OVDGR 7th Ind
OHIO RIVER DIVISION
Date 16 Nov 61

TO: DE, ATTN:OVLGP,U.S.Army Engr
Dist. Louisville
-0- Incls. OVLGP

REPLY DUE IN

ORD:_____

DIRECT REPLY, COPIES

TO:_____

C O P Y

OVDGR (9 June 1961) 5th Ind
SUBJECT: Master Plan, Design Memorandum No. 8B, Rough River Reservoir, Kentucky

U. S. Army Engineer Division, Ohio River, Cinti, Ohio 1 November 1961

TO: Chief of Engineers, ATTN: ENGCW-O

Request approval as recommended.

FOR THE DIVISION ENGINEER:

/s/ Robert W. Lockridge

2 Incl (quint.)
n/c exc 2 cys ea wd

ROBERT W. LOCKRIDGE
Colonel, Corps of Engineers
Deputy Division Engineer

C O P Y

OVLGP (9 Jun 61) 4th Ind
SUBJECT: Master Plan, Design Memorandum No. 8B, Rough River Reservoir, Kentucky

Dist Engr, US Army Engr Dist, Louisville, Ky. 17 October 1961

TO: Div. Engr, US Army Engr Div, Ohio River, ATTN: OVDGR, Cincinnati, Ohio

1. The Master Plan has been revised in accordance with paragraphs 1 and 2 of 2nd indorsement. Seven copies of page 8 of the Master Plan and page 1 of Section II, Operations, of the Appendix are herewith for insertion in copies of the plan in ORD and OCE.

2. With reference to paragraph 3 of 2nd indorsement, the following comments are made:

a. In frequent conference with Kentucky officials, the general agreement on private facilities was that none would be permitted on the Rough River Reservoir. Since the Master Plan is used for reference by Kentucky officials, it is not considered desirable for the Plan to contain items which are in conflict with mutual agreements made prior to signing the license agreement.

b. The comparatively limited water surface areas at Rough River Reservoir and the small amount of additional land available to the licensee preclude the use of any portion for private development.

3. In view of these conditions, it is recommended that the requirement of paragraph 3 of 2nd indorsement be revoked.

/s/ James L. Lewis

3 Incl
added 2 Incl
2. Sht 8, Master Plan (sep)
3. Pg 1, Sec II Oper (sep)

JAMES L. LEWIS
Colonel, CE
District Engineer

C O P Y

ENGCW-OM (9 Jun 61) 2nd Ind
SUBJECT: Master Plan, Design Memorandum No. 8B, Rough River Reservoir, Kentucky

Office, Chief of Engineers, Washington 25, D. C., 14 August 1961

TO: Division Engineer, U. S. Army Engineer Division, Ohio River
Cincinnati, Ohio

1. The Master Plan is approved subject to the comments of the Division Engineer as contained in paragraphs 2 and 4 of the preceding 1st indorsement and to the following additional comments.

2. Paragraph 4-06b. Subleases. There is no objection to the temporary grant, by the Commonwealth, of permits to third parties for public or quasi public recreation uses such as organized camping and group activities. This type of use should be considered Priority One use under the license. Grants to third parties for development for Priority Two and Three purposes are not permitted.

3. The language used in subpar. 4-06 c (1) should be supplemented by adding ". . .; and where practicable to adjacent land owners for non-commercial use."

FOR THE CHIEF OF ENGINEERS:

/s/ Mark S. Gurnee

1 Incl n/c
(3 cys w/d)

MARK S. GURNEE
Chief, Operations Division
Civil Works

Rev Feb 1962

OVDGR 3rd Ind. OHIO RIVER DIVISION Date 21 August 1961 TO: DE, ATTN: OVLGP,US ARMY Engr Dist. Louisville 1 Incls OVLGP	REPLY DUE IN ORD:_____ DIRECT REPLY, COPIES TO:_____

nc

COPY
OVDGR (undated) 1st Ind.
SUBJECT: Master Plan, Design Memorandum No. 8B, Rough River Reservoir, Kentucky

U.S. Army Engineer Division, Ohio River, Cinti., Ohio 6 July 1961

TO: Chief of Engineers, ATTN: ENGCW-O, Department of the Army, Washington 25, D.C.

1. Approval of the Master Plan for Rough River Reservoir is recommended as a basis for further processing of a license for park, recreation and conservation uses of project lands by the Commonwealth of Kentucky, subject to the following comment.

2. EM paragraph 4-06 b Sub-leases: This paragraph indicates that it is the intent of the District Engineer to authorize the licensee to sublet lands contained in its license, to public and quasi-public agencies for recreation use. This language should be changed to provide that the licensee may construct facilities on licensed lands the operation, maintenance and administration of which it may transfer to a third or quasi-public agency for public recreation use. It is not considered that the licensee should be permitted to sublet to third parties for the purposes of development.

3. EM paragraph 4-06 item c permits: This paragraph should be changed to read in effect that approval and issuance of permits by the District Engineer as outlined shall be upon the concurrence of the Commonwealth of Kentucky in consideration of the effects of such use on the proposed program of public recreation use.

4. APPENDIX: COMMONWEALTH OF KENTUCKY - MASTER PLAN II OPERATIONS, page 1, paragraph 3: This paragraph should be changed to read in effect that permits may be issued by the Corps of Engineers when the use thereof is in accordance with the desires of the licensee and the policies of the government.

5. The subject design memorandum has been coordinated with the Real Estate Division in accordance with EM 405-2-835, paragraph 5a.

FOR THE DIVISION ENGINEER:

1 Incl.
n/c (2 cys w/d)

E. E. ABBOTT
Chief, Engineering Division

cc: Louisville Dist.

U. S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
830 West Broadway
Louisville 3, Kentucky

OVLGP

SUBJECT: Master Plan, Design Memorandum No. 8B, Rough River Reservoir, Kentucky

TO: Division Engineer
U. S. Army Engineer Division, Ohio River
ATTN: OVDGB
Cincinnati, Ohio

1. Herewith are seven copies of a draft of the Master Plan, Design Memorandum No. 8B, Rough River Reservoir, Kentucky.

2. It is recognized that the Master Plan, in its present form, will require additional study by all approving echelons. However, it is considered essential that authority to control recreational activities and unauthorized private development be assigned to Commonwealth of Kentucky enforcement agencies as soon as possible.

3. The Commonwealth is prepared to proceed with further development of the recreational facilities of the reservoir upon receiving proper authorization.

4. The subject Master Plan has been coordinated with the Real Estate Division in accordance with EM 405-2-835, paragraph 5a.

5. It is recommended that the Master Plan be approved subject to suggestions and revisions considered desirable upon final study.

1 Incl (sep)
Draft -
Master Plan

JAMES L. LEWIS
Colonel, CE
District Engineer

DESIGN MEMORANDUM NO. 8B

MASTER PLAN FOR ROUGH RIVER RESERVOIR

ROUGH RIVER, TRIBUTARY OF GREEN RIVER

OHIO RIVER BASIN

KENTUCKY

PREPARED BY

LOUISVILLE DISTRICT

CORPS OF ENGINEERS

U. S. ARMY

DESIGN MEMORANDUM NO. 8B

MASTER PLAN FOR ROUGH RIVER RESERVOIR

ROUGH RIVER, TRIBUTARY OF GREEN RIVER

OHIO RIVER BASIN

KENTUCKY

PREVIOUSLY ISSUED DESIGN MEMORANDA

No.	Description	Date
1	General Design Memorandum	July 1953
2	Outlet Works	September 1953
3	Dam and Spillway	September 1953
	Dam and Spillway Supplement No. 1 to Design Memorandum No. 3	December 1956
	Dam and Spillway Supplement No. 2 to Design Memorandum No. 3	March 1957
4	Report on Necessity for Relocation of Kentucky Highways 65, 108 and 110	April 1957
5	Real Estate Partial Reservoir Area (Segments A, B, C and D)	October 1957
6	Pool Preparation	December 1957
7	Real Estate, Segments E through W	January 1958
8 (No. 8A)	Preliminary Master Plan	March 1958
8B	Master Plan	----------
9	Real Estate Highway Relocation	March 1958
10	Residences, Shop and Miscellaneous Items	July 1958
11	Low Flow Regulation	July 1958
12	Report on Necessity for Relocation of Electric Power and Telephone Lines	August 1958
13	Report on Necessity for Relocation of County Roads	October 1958
14	Channel Clearing of Rough River and Channel Improvement of Barnett Creek	August 1959
15	Real Estate Required for Channel Clearing	January 1960

DESIGN MEMORANDUM NO. 8B
MASTER PLAN FOR ROUGH RIVER RESERVOIR
ROUGH RIVER, TRIBUTARY OF GREEN RIVER
OHIO RIVER BASIN
KENTUCKY

TABLE OF CONTENTS

PLATES

APPENDIX

DESIGN MEMORANDUM NO. 8B
MASTER PLAN FOR ROUGH RIVER RESERVOIR
ROUGH RIVER, TRIBUTARY OF GREEN RIVER
OHIO RIVER BASIN
KENTUCKY

SECTION I

INTRODUCTION

1-01. Authorization. Federal laws provide that Department of the Army reservoirs constructed for the primary purposes of flood control, navigation or power shall be operated to encourage and develop collateral uses such as recreation, fish and wildlife propagation, conservation (Section 4 of the Flood Control Act approved 22 December 1944- Public Law 534, 78th Congress, Chapter 665, 2d Session), and other purposes in the public interests. Development of the plan for public use of Rough River Reservoir has been conducted in general accordance with the basic policies defined in the applicable legislation supplemented by pertinent directives of the Corps of Engineers.

1-02. Purpose. The purpose of this publication is to provide updated information contained in the preliminary Master Plan and to provide for progressive and orderly husbandry of resources and their development thru joint effort with the Commonwealth of Kentucky. It includes conservation of the natural resources, developments of the recreational potentialities for public benefit, and management of the property to the greatest benefit of all concerned, subject to the primary purpose of the reservoir for flood control. In formulating this plan, affected Federal, Commonwealth of Kentucky and county agencies, committees and representatives of the commonwealth counties, towns and civic groups and individuals have been consulted and their views incorporated in the plans for development and management where not incompatible with the regulations or policies of the Department of the Army and Corps of Engineers. The plan is comprehensive and as far as can be foreseen, complete.

SECTION II

DESCRIPTION OF THE PROJECT

2-01. General. Rough River Reservoir is a unit of the comprehensive plan for control of floods and for development of the water on the Ohio River. It will provide primarily for the reduction in flood stages at all points downstream from the reservoir.

2-02. Location and Accessibility. Rough River Reservoir is situated slightly west of the center of Kentucky. It is 45 miles southwest of the outskirts of Louisville and about 35 miles in a southeastward direction from Owensboro, Kentucky. It is in an area of what may be termed "pleasantly rough" terrain, having well-defined valleys with slopes which rarely become precipitous. Divides and ridges are usually well-rounded with elevations ranging from 650 to occasionally 750 feet above sea level in the area surrounding the portion of the reservoir which contains the permanent impoundment. The reservoir area is served by Kentucky State roads 65, 108, 110, 520 and 737. Other roads within the reservoir area and in the adjoining vicinity are very poor. They are, in many instances, impassible for automobile traffic after a light rain. Plate 1 shows the locations of the public access sites as well as outlining the flood control, seasonal and permanent pools.

2-03. Climatic Conditions. The average annual precipitation based on the records of four nearby stations having observations in excess of 30 years is 45.5 inches. The rainfall is generally well distributed throughout the year with minimum amounts during September and October and maximum amounts during January and March. Hot summers and cool winters with freezing temperatures lasting not more than a few days at a time are characteristic of the basin. The normal annual temperature is approximately 56 degrees with January having the lowest normal temperature of 35 degrees and July having the highest, that of 77 degrees. Considerable precipitation, moderate cloudiness and wind movement, together with high humidity, are characteristic of the basin.

2-04. Resources and Development. The area is predominantly agricultural and the best use is for general purpose farming. The principal products are hay, corn and other grain crops and tobacco. Considerable livestock is also raised in this area, with dairying entering the program lately. While most of the best timber has been cut, leaving large areas in scrub and second growth, a few tracts of virgin timber remain. The dam site is located about 50 miles northeast of the West Kentucky coal fields, which now have a relatively large output. The oil and gas industry in the Rough River Basin is extensively developed. There are however, only a few villages within the drainage area above the dam site.

2-05. Project Structures. The project is designed to provide flood control. Construction was started 8 November 1955, the outlet works were completed in January 1958, and the dam was completed on 30 December 1958.

The principal features of the project are summarized in the following tabulation.

Drainage Area	449 Sq. Miles

Reservoir

Pool	Pool Elev. M.S.L.	Capacity (Acre-feet)	Area (Acres)
Minimum	465	19,050	1,600
Normal recreation	495	113,630	4,860
Flood	524	303,650	10,180
Total storage	524	322,700	10,180

Length at Elev. 465	27 miles
Length at Elev. 495	
Shoreline length at Elev. 465	105 miles
Shoreline length at Elev. 495	220 miles
Fee guide taking line	Elev. 514
Easement guide taking line	Elev. 534
Acreage in Easement	4765
Fee	9235
Acreage reserved for operation	80

SECTION III

FACTORS INFLUENCING RECREATION

3-01. General. All factors bearing on the development of the recreational plan are being, and have been, considered in determinig the manner in which Rough River Reservoir lands should be developed and managed in order to provide the greatest sustained benefit to the public and yet not interfere, conflict or adversely affect the operation of the project for its authorized primary purpose. In many respects, conditions which prevail at Rough River are favorable for recreational development and use. The climate is reasonably mild, insuring a sustained recreational season of approximately eight months, and access the rest of the year with some interruption due to winter weather conditions. The amount of annual rainfall is not excessive, but is adequate for abundant growth of vegetation. The irregular shoreline creates many secluded spots, flanked by steep wooded hillsides or cliffs, which present natural scenic beauty.

3-02. Population and Existing Recreational Facilities of the Region. From the 1960 census, it is estimated that the population within a 25-mile radius of the reservoir probably does not exceed 60,000 persons. There is no town of appreciable size in this area. Within the range of 25 to 50 miles of the project the population is estimated at 500,000 persons. Located in this area are Owensboro (pop. 42,471), Ft. Knox, Bowling Green (pop. 28,338), and Elizabethtown (pop. 9,641). Louisville, Kentucky, Jeffersonville, New Albany and Clarksville, Indiana, with a combined population in excess of 500,000 are expected to be the source of many users although located outside the 50-mile range. Henderson, Kentucky, and Evansville, Indiana, are also just outside the 50-mile range. They have a combined population of over 158,000. There are no state parks within a 50-mile radius of the project. However, Mammoth Cave National Park is about 30 miles away and also the public is invited to use the facilities of the privately endowed Bernheim Forest about 50 miles from the project dam. The nearest similar recreational facilities are at Herrington Lake, about 95 miles due east and Lake Cumberland, about 109 miles southeast of the proposed reservoir.

3-03. Water-level Fluctuations. Studies established the feasibility of seasonal storage of water to elevation 495 during summer months for the purpose of low-flow regulation downstream, with the minimum pool of elevation 465 during the flood season. Managed water levels have been effectively employed in reservoirs for development of water fowl habitat and fisheries management. Water level control on Rough River Reservoir will materially enhance the fishery by increasing water area and volume, and by improving conditions and harvest of game fish. The fluctuation of 30 feet will be disadvantageous to dock operations at times and docks and waterfront facilities must necessarily be waterborne and provided with suitable mooring equipment for all water stages. Also improvements such as sanitary facilities and potable water must be placed above elevation 524 to eliminate flood damage. In general, water fluctuation does not adversely affect public use.

3-04. Recreational Resources of the Project. The plan for the Rough River Reservoir project provides for the impoundment of a permanent pool of 1,600 acres at elevation 465 feet and seasonal storage for low-flow regulation to a maximum elevation of 495 during part of the summer season. A flood pool of 10,180 acres at elevation 524 feet will be formed. It is expected that the shoreline and water areas will be made readily more accessible by improvement of the net work of State and County highways by these agencies and the project will offer an important and much-needed recreational area affording opportunities for pleasure boating, camping, picnicking, swimming, and fishing. Since acquisition of land is limited to the minimum requirements for operation of the project, generally only a very narrow strip of land around the reservoir is under Government control. Some additional areas have been purchased. These areas will be developed for public access and recreational purposes. Numerous smaller areas lie between the irregular shoreline and the real estate taking line, with access only from the water, and will be available to the public for camping. Many private cabin and residential sites and real estate subdivisions are under development at the present time on land abutting the reservoir. In view of the population pattern, the use factor is estimated at 200,000 person visits per year.

3-05. Fish and Wildlife Resources. a. The project is located within a relatively poor and sparsely settled section of Kentucky where recreational and fish and wild life opportunities are generally limited. The project should favorably influence the economic, social and recreational resources of the area. The proximity of the project to Louisville, Fort Knox, Owensboro, and Henderson, Kentucky, should assure public utilization of the project resources. Fish resources of the streams affected by the project are moderately low. Catfish are abundant and provide the bulk of the fishing, although muskellunge are occasionally taken from Rough River. Sport fishing is done mostly from the bank; commercial fishing is rare. By comparison to similar streams, that portion of Rough River in the area influenced by the project would be expected to support 15 fishing trips per mile annually. The project area and adjacent uplands support low populations of big game, fur animals, and waterfowl, and moderate populations of squirrel, rabbit and quail. At present, hunting is restricted almost entirely to local residents.

b. The U. S. Fish and Wildlife Service, in its report on the reservoir dated November 1956, stated that the impoundment would result in some loss of habitat for upland game. On the other hand, the Service found there would be an enhancement in the fishery resources and in waterfowl habitat and propagation. With proper cooperation and development of special areas, and coordinated operation of the reservoir levels, the Service concluded that there would be a net increase in the fish and wildlife resources of the area. Under the present land acquisition program no areas will be purchased specifically for replacement of wildlife habitat.

3-06. Forestry Resources. Much of the land was once forestland. A large water powered lumber mill was operated at Falls of Rough (about 6 miles downstream from the reservoir) for many years; however, this operation ceased several years ago, because of depletion of the better timber. A considerable area remains in woods or includes scattered timber areas; however, lumber production is generally limited to small portable mills.

3-07. Agricultural Resources. For the most part, the uplands adjoining the bottoms are too steep for successful cultivation. Approximately 45 percent of the total area is cleared, of which about two-thirds is in some type of crop production and the remainder in pasture or meadow. The soils of the flood plain are generally quite sandy, with many gravel deposits.

3-08. Industrial Resources. There are no industries located within the immediate vicinity of the reservoir, other than one small lumber mill. Leitchfield, Elizabethtown, Hardinsburg, Bowling Green and Owensboro, the nearest towns, have industries which provide the only other off-farm employment to supplement seasonal farm income.

SECTION IV

PLAN FOR DEVELOPMENT

4-01. General. The development of the recreational resources of Rough River Reservoir has been under way since 1955 and, as far as Government expenditures are concerned, is virtually completed except for Sites 7, 9 and 10. At these sites, minimum facilities, similar to those provided at the developed sites, will be constructed upon provision of proper roads leading into the areas by the Commonwealth, county or at project cost if not provided by others in time to meet public need. Application for the operation, management and further development of the reservoir has been submitted by the Commonwealth of Kentucky and it is assumed for the purpose of this plan that license has been granted under Priority 1 classification, to develop, operate and maintain the 9,234 acres acquired in fee by the Federal Government for project purposes except for the project structures and 80 acres reserved for project operation. The license, for a term of 50 years, is contingent upon compliance with Federal regulations and the plan presented herein and in the supplement. The plan for development is the result of the coordinated efforts of the Commonwealth, the Corps of Engineers, and other agencies concerned. However, ultimate control of all activities necessarily remains with the Corps of Engineers to assure an orderly development of the area and to guarantee the public that those operations do not adversely affect the primary purpose for which Congress provided funds for construction of the project.

The general criteria followed is that the cost of all improvement, except for the minimum initially provided with Federal funds, will be the responsibility of the Commonwealth. These minimum improvements consist of concrete launching ramps, parking areas, identification guide and instruction signs, and the improvement of sections of road where required. Provisions have also been made for sanitary facilities and potable water, as well as picnicking tables, grills and disposal containers.

4-02. Land Use Policy. The basic policies concerning the use of project lands owned by the Federal Government will be followed in accordance with established regulations. Under terms of license agreements, the Commonwealth of Kentucky will acquire all project lands, except those reserved for the operation of the project. Therefore no classification for priority allocations of lands for recreational purposes will be made by this office. However, no approval will be given for construction of buildings or other structures which would interfere with the operation of the project. Any structures or developments below the flowage easement elevation (534) must have the prior approval of the District Engineer. Plate R-1 shows the planned use of the reservoir lands by the Commonwealth.

4-03. Project Area. A parking area for accommodation and control of the visiting public in the vicinity of the project structures has been provided by the Corps of Engineers at the southern approach to the dam. This area, with supplementary observation sites at the dam, will furnish adequate viewing points for observation of most features of the project. No additional facilities are planned.

4-04. Public Access Points. The Corps of Engineers has provided 11 access points for free and unobstructed use by the public. With the exception of Site 8, downstream of the dam where only picnicking and bank fishing will be permitted, all other sites were provided with, or planned for, adequate parking, boat-launching ramp, minimum sanitation facilities, groups of picnic tables and outdoor grills. Additional progressive development is planned by the Commonwealth and programmed in accordance with available funds and public need. Plates R-1 to R-8 show such plans.

4-05. Private Areas. Many sections of the reservoir shoreline, because of their nearness and topographic relationship to the water, offer pleasant scenic views and a climatic condition more comfortable than in the densely populated areas. The interest in cabin and permanent home sites has been large. Many subdivisions have been opened and private cabins and homes have been placed under construction. No project property will be available for such use. Access to the water will be permitted with construction thereto regulated by both the Commonwealth and this District.

4-06. Administration, Development and Operation. The Commonwealth plan for administration, development and operation of the licensed area is supplemented hereto, and is considered adequate. Changes thereto will be considered by both Commonwealth or the District Engineer and made when the circumstances so warrant. A brief resume' of pertinent features is as follows:

a. Charges. The Commonwealth will assess charges only for personal services provided and for accommodations or facilities constructed with Commonwealth funds.

b. Sub-leases. There is no objection to the temporary grant, by the Commonwealth, of permits to third parties for public or quasi-public recreation uses such as organized camping and group activities. This type of use should be considered Priority One use under the license. Grants to third parties for development for Priority Two and Three purposes are not permitted.

c. Permits. Due to the comparatively small water-surface area available for boating and related recreational sport, zoning of the shoreline against private exploitation and policy detrimental to public safety must be adhered to. In accordance with past experience at Federally-operated and State-licensed reservoirs, issue and approval of permits by the District Engineer will be governed by the following:

(1) Boat docks. Limited to commercial areas and to clubs located on adjoining private lands.

(2) Boat houses. Excluded except as concessionaires.

(3) House boats. Subject to present Federal regulations and to those imposed by the Commonwealth.

(4) Boating clubs. Permits for dock privileges will be issued to individual club members rather than in the name of a club, to avoid commercial development and competition with concessionaires. Commercial operations by clubs on Federal land in the reservoir area, such as sale of gasoline, will not be permitted.

(5) Access roads. Access roads to the reservoir, except foot paths, from private lands will not be permitted, except on a group or club basis, and will be dedicated to public, rather than exclusive, use.

(6) Clearing. The natural character of the Federal lands, above the established clearance limits, except at the public access sites, will be maintained in order to conserve the natural wildlife habitat and to safeguard the area for public pleasure and education.

(7) Exclusive use facilities. To prevent usurpation of Federal lands for private usage, the construction of such facilities as barbecue pits, swimming pools, fencing, etc., on fee-owned land by the abutting property owner will not be permitted.

4-07. Alcoholic Beverages. In accordance with the policy of the Chief of Engineers, adopted after enactment of Section 4 of the Flood Control Act of 1944, relative to the sale of alcoholic beverages in a reservoir area, the sale or storage of alcoholic beverages will not be permitted at Rough River Reservoir.

4-08. Signs. Essential signs for convenience of the public have been provided. The Commonwealth will erect such additional signs as will be required. Such additional signs will provide space for appropriate recognition of the U. S. Army, Corps of Engineers.

4-09. Rules and Regulations. Rules and Regulations prescribed pursuant to the provisions of Section 209 of the Flood Control Act of 1954 (68 Stat. 1266) will govern. Such additional rules and regulations as may be deemed necessary will additionally be effected upon approval by the District Engineer. Requirements and restrictions agreed upon between the Commonwealth and the District Engineer will be publicized by the Commonwealth.

APPENDIX

COMMONWEALTH OF KENTUCKY

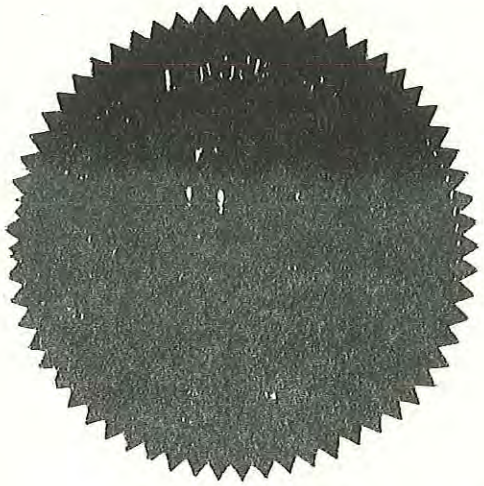
MASTER PLAN AND LICENSE APPLICATION

OFFICE OF THE GOVERNOR
FRANKFORT, KENTUCKY

APRIL 11, 1961

BERT THOMAS COMBS
GOVERNOR

I, BERT COMBS, GOVERNOR OF THE STATE OF KENTUCKY, DO HEREBY CERTIFY THAT EDWARD V. FOX WAS APPOINTED BY ME ON MARCH 17, 1960, TO SERVE AS COMMISSIONER OF THE KENTUCKY DEPARTMENT OF PARKS FOR A TERM TO END DECEMBER, 1963, AND THAT HE IS NOW SERVING IN THAT CAPACITY.



Bert Combs
BERT COMBS
GOVERNOR OF KENTUCKY

ATTEST: Henry V. Barth
SECRETARY OF STATE

Commonwealth of Kentucky
DEPARTMENT OF PARKS
Frankfort

May 24, 1961

District Engineer
U.S. Army Engineer District, Louisville
Corps of Engineers
P. O. Box 59
Louisville 1, Kentucky

Gentlemen:

Herewith, for consideration of the U. S. Army, Corps of Engineers, is an application for license of Rough River Reservoir, Kentucky, for public park and recreational purposes.

The Commonwealth of Kentucky proposes to license, develop, maintain and administer all the lands of the reservoir, except those reserved by the Federal Government for operational purposes, in accordance with policies of the Federal Government and approved Master Plans of the Commonwealth and the Corps of Engineers.

It is anticipated the Corps of Engineers will furnish the Commonwealth legal descriptions of all properties included in the project as well as easement agreements for those lands subject to flooding.

Copies of the Commonwealth Master Plan are inclosed for study, comment and/or approval by the Corps of Engineers in accordance with your regulations.

Cordially yours,

Edward V. Fox

Edward V. Fox
Commissioner

Incls.
1. Master Plan
2. Development Maps R1 to R 8

DEPARTMENT OF THE ARMY

APPLICATION

License for Public Park and Recreational Purposes

TO: District Engineer
U. S. Army Engineer District, Louisville
Corps of Engineers
P. O. Box 59
Louisville 1, Kentucky

1. The Commonwealth of Kentucky, acting by and through the Department of Parks,

hereby makes application for a license for public park and recreational purposes pursuant to Section 209 of the Flood Control Act of 1954 (68 Stat. 1248, 1266; 16 United States Code 460 d) on the following described property under the jurisdiction of the Department of the Army:

1. Land: Rough River Reservoir

2. Improvements:

A. Access Sites Developments constructed and to be constructed by the Corps of Engineers

a. Site 1 (Above Dam)

Toilets (single building for male & female)

Well (complete with hand pump, shelter and drainage) (if feasible)

10 picnic tables (concrete)

3 fireplaces (charcoal type on steel stand)

3 trash receptacles and bases

Launching ramp, parking area & access road

b. Site 2 (State Road 110)

Toilets

Well (if feasible)

15 picnic tables

5 fireplaces

5 trash receptacles and bases

Launching ramp and parking area.

c. Site 3 (Cove Creek)

Toilets

Well (if feasible)

15 picnic tables

5 fireplaces

5 trash receptacles and bases

Launching ramp, parking area & access road.

d. Site 4 (State Road 108)

2 toilets

Well (if feasible)

15 picnic tables

5 fireplaces

5 trash receptacles and bases

Launching ramp, parking area & access road.

e. Site 5 (State Road 65)

Toilets

Well (if feasible)

3

10 picnic tables

3 fireplaces

3 trash receptacles and bases.

Launching ramp, parking area & access road

f. Site 6 (Everleigh)

2 toilets

Well (if feasible)

10 picnic tables

3 fireplaces

3 trash receptacles and bases

Launching ramp & parking area.

g. Site 7 (Calvert Church) (Future)

Toilets

Well (if feasible)

6 picnic tables

2 fireplaces

2 trash receptacles and bases

Launching ramp, parking area and access road.

h. Site 8 (Below Dam)

Toilets

Well (if feasible)

10 picnic tables

3 fireplaces

3 trash receptacles and bases

Parking area and access road.

4

i. Site 9 (Panther Creek) (Future)

Toilets

Well (if feasible)

10 picnic tables

3 fireplaces

3 trash receptacles and bases

Launching ramp, parking area, access road

j. Site 10 (Little Clifty) (Future)

Toilets

Well (if feasible)

10 picnic tables

3 fireplaces

3 trash receptacles and bases

Launching ramp, parking area & access road

k. Site 11 (Millins Cemetery)

Toilets

Well (if feasible)

6 picnic tables

2 fireplaces

2 trash receptacles and bases

Launching ramp, parking area and access road.

2. In view of the planned phasing of development over an extended period of time and the expenditure of large sums of money during that period, it is respectfully requested that a license, without fee, be granted for a period of fifty years. Experience in similar operations over many years has proven the need of that period of time to amortize the investments.

3. The applicant agrees that the use of the property by the Commonwealth will be in accordance with applicable laws and pertinent rules and regulations of the Secretary of the Army governing the public use of the reservoir areas.

MASTER PLAN

FOR OPERATION, MAINTENANCE, ADMINISTRATION AND DEVELOPMENT

ROUGH RIVER RESERVOIR, KENTUCKY

I ADMINISTRATION

1. The Commonwealth recognizes that the project was constructed for the primary purpose of flood control and, therefore, the activities of the Federal Government in this field shall have priority over the secondary purpose of recreation. No activities proposed or contemplated by the Commonwealth shall be in conflict with this primary purpose.

2. The Commonwealth, with the interest and aid of all its departmental divisions and agencies, universities, County and Federal agencies, will administer the project for conservation, recreation, forestry, wildlife, public health and other public use purposes.

3. Developments and Administration by the Commonwealth of all lands licensed by the Federal Government will be subject to the availability of funds obtained from operation of the project and from provision of the Kentucky Legislative Assembly.

4. No charge will be made to the public for access to, and general use of, the land, water and facilities provided by the Federal Government. In accordance with Section 209 of the 1954 Flood Control Act, the Commonwealth will provide, and make reasonable charges for, personal services and for accommodations or facilities constructed with funds provided by the Commonwealth or by concessionaries. Each visitor will have the right to elect whether he desires to use

7

such services without jeopardizing his privileges to use the reservoir area. Personal services will include the following:

a. Information attendant.

b. Attendants at public rest rooms, (Periodic)

c. Naturalist service, (If natural history exhibits are provided)

d. Lifeguard service at beach.

e. First aid attendants.

f. Sanitation service.

g. Police protection and park patrol.

h. Attendants at wildlife exhibits, (if such exhibits are provided)

i. Attendants at recreation fields, (part time)

j. Playground equipment.

k. Parking area guard, (on heavy use periods only)

l. Camping area attendants.

m. Golf greenskeeper and operator for pro-shop, (if golf course is constructed)

8

II OPERATION

1. The Commonwealth will have complete control of all public traffic into and from the area which it has licensed. This control will include all public use of the project lands and developments except the area and operation structures reserved by the Federal Government.

2. Foot access to the project lands and waters by adjacent land owners and the public will be permitted, except the Commonwealth reserves the right to restrict and control public use in areas and under conditions where such access would be inimical to good project administration.

3. Permits to construct roads and facilities on Federal land may be issued when the use thereof is in accordance with the desires of the Commonwealth and the policies of the Federal Government.

4. Standards of public sanitation and safety will be provided acceptable to the State Board of Health and State Police.

5. Overnight camping and tenting will not be permitted knowingly below elevation 524. Influence, where possible, will be exerted to limit such occupation to areas above the flowage easement line.

6. Schedule of Fees and Charges

a. Boats

(1)	Buoy rental - 14' boat ($.50 each additional foot)	$ 3.50 per month
	Inboard boats	$ .50/foot per month
(2)	Dock rental	$7.50/$8.50 per month

(3) Concession-operated

(a) Power-boat rides	$ 1.00 per person .50 children under 12
(4) State-owned boats (rental) 5 H.P. ($1.50 per hour with 2 hr. minimum)	$ 8.00 per day
10 H.P. ($2.00 per hour with 2 hr. minimum)	$ 10.00 per day
Row boat - no motor	$ 2.00 per day

b. Camp ground

(1) $.50 each for 1 to 2 persons $.25 for each additional person ($.50 extra for electricity)	per day

ALL FEES SUBJECT TO REVISION

7. It is proposed to zone the pool for various activities such as swimming, low-speed boating, water-skiing and fishing. The size and speed of motor boats to be permitted on the pool will be determined by experience and regulated accordingly.

III DEVELOPMENT

1. For plan of development at each site see appended drawings, R-1 to R-12.

2. The Commonwealth proposes to develop, in accordance with available funds, each access site as the attendance pressure and public needs indicate. The initial major emphasis will be at Site 1, where a complete vacation park is planned. (See drawing R-2). Development of this park is scheduled to start upon assignment of the license and will include a bathing beach and bath-house with convenient parking, a lodge and dining room, swimming pool, boat docks and boat house, cabins, and other recreation facilities.

3. As indicated above, development of the other sites will consist of initial improvement until the trend of attendance and use has been determined for each access site. Development will then follow a phased plan in accordance with available funds. A major effort will be made toward the acquisition of additional lands and the improvement and provision of roads for ready access to all recreational areas.

4. Exclusive of the Federal Government reservation and the proposed Commonwealth area, there are many miles of privately-owned lands bordering the perimeter of the project which hold possibilities of development for cottages, resorts, tourist camps, stores, concessions, hotels and other conveniences. Within its powers the Commonwealth will endeavor to control and zone such operations in order to make the greatest possible use of the project potential for public recreation as well as to provide taxable property for the Commonwealth. The encouragement and emphasis on sound planning of private development is recognized as being of primary

importance to public interest and the future of the project as a desirable public recreation center.

5. The following proposed improvements have been included in a program for development of Rough River Reservoir:

Fiscal Years 1961 - 1963

1.	Land acquisition	$ 100,000
2.	Beach construction	50,000
3.	Buildings	610,000
4.	Water supply & distribution	85,000
5.	Picnic areas	15,000
6.	Roads and parking	130,000

Fiscal Years 1963 - 1965

1.	Airport	85,000
2.	Golf Course	90,000

Fiscal Years 1965 - 1967

1.	Airport Buildings	50,000
2.	Picnic Area expansion	30,000
3.	Expansion of Service Area	50,000

Total proposed construction 1961 - 1967 $1,295,000

12

IV Division of Game

The Division of Game, Department of Fish and Wildlife Resources, will be charged with the responsibility of managing wildlife species on all fee acreage outside of the recreational areas at Rough River Reservoir. Past efforts of this Department in the vicinity of this reservoir has resulted in adequate stocking of all adapted game species and the acquisition of considerable knowledge regarding the management of woodland and farm food and cover vegetation. Upon assignment of the area by license to the Commonwealth, the Department, through its Forest Game, Farm Game and Waterfowl Restoration projects, will initiate surveys designed to serve as the basis for specific area management plans. Completed plans will include provisions for any additional stocking which may be deemed necessary in the future and for manipulation of food and cover to create optimum habitat for all game species. Presently-assigned Area Biologists will conduct the surveys and effect planned management operations.

V Division of Fisheries

Since 1958, the Kentucky Division of Fisheries has been conducting a biological survey of the Rough River Reservoir area. These surveys are designed to determine the standing crops of fishes in the river and the subsequent standing crops in the years following impoundment. Concurrently, public usage of the project area is being studied in order to measure the future increases in use and to determine the monetary expenditures of present and future sport fishermen.

With the above information available, the Division of Fisheries will be in an excellent position to manage the sport fishery on a sustained basis. During 1960, the Division stocked a large number of largemouth bass and redeard sunfish, because it was found that these two desirable sport fishes were not present in the river system above Rough River Dam. Stocking with other species is planned where need for them is discovered. Additional limnological and biological investigations are planned for the project areas on an intensified scale during the next five years. All known and necessary fishery management techniques will be employed by our biologists in future years to maintain a satisfactory sport fishery in the reservoir.

Zoning of the pool will be accomplished in accordance with a usage plan prepared jointly with other Commonwealth departments. It is not contemplated that commercial fishing will be permitted except as a conservation measure.

VI FORESTRY AND AGRICULTURE

Because of the project topography, it is unlikely that any fields will be found suitable for pasture or crops. Should such areas be found, the Commonwealth may develop them for the production of feed and cover for game and other wildlife.

VII FIRE PROTECTION PLAN

The Commonwealth Forest Fire Organization. The Commonwealth of Kentucky forest fire program is controlled by the Division of Forestry, Department of Conservation. The Commonwealth is divided into nine fire control districts and each district is responsible for fire detection, suppression and prevention within its area.

Rough River Reservoir watershed lies in the Central District, which is supervised from Elizabethtown, Kentucky. The portion of the district that is in Breckinridge County is under county guard at Lodiburg, Kentucky.

Lookout towers that cover the watershed are shown on drawing R1. They are Hudson Tower, in Breckinridge County and Short Creek Tower, in Grayson County. Another tower is under construction along Highway 60, at the head of the watershed and will be in operation by Fall of 1971. Four other towers oversee portions of the watershed. They are Cloverport, in the northwestern section of Breckinridge County, Meredith in the south central central section of Grayson County and Ekron and Macedonia in Meade County.

The supervisors in Elizabethtown and Leitchfield have access to a crawler-tractor, equipped with SIECO fire line plow, which is transported by a 1-1/2 ton truck equipped with a loading ramp and a two-way radio. Pickup trucks with slip-on Panama pumps and tanks are also available for use during emergencies.

Eleven wardens and crews have been organized in Breckinridge County and four warden crews at Leitchfield.

VIII FEDERAL AND COMMONWEALTH AREAS OF RESPONSIBILITY

1. Installations and improvements pertinent to flood control will be provided and maintained by the Federal Government. The basic facilities listed under Paragraph 1 of the license application will be constructed or provided by the Federal Government. Administration and further development in accordance with this Master Plan and subsequent approved additions, will be the responsibility of the Commonwealth of Kentucky.

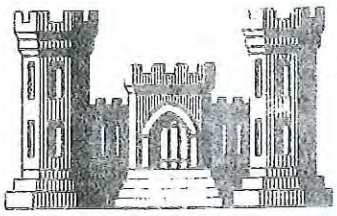
2. Erosion or drainage problems natural to the topography, removal of debris, whether in the pool or on the shore, will be the responsibility of the Commonwealth.

3. The Commonwealth will submit to the District Engineer for consideration and approval, all plans for development or for operational enterprises. Following initial approval by the District Engineer this Master Plan and the entailed construction, the Commonwealth will furnish the District Engineer an annual plan of proposed development with work priorities and estimated budgets.

IX RULES AND REGULATIONS

The Commonwealth will prescribe and publish rules and regulations, within its statutory authority, governing the public use of the project. They may be changed from time to time as deemed necessary. Such rules and regulations shall not be inconsistant with any rules and regulations which may be prescribed by the Secretary of the Army.

ROUGH RIVER LAKE



PUBLIC USE PLAN

DESIGN MEMORANDUM NO. 15

U. S. ARMY
ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
LOUISVILLE KY

PUBLIC USE PLAN

DESIGN MEMORANDUM NO. 15

ROUGH RIVER LAKE, KENTUCKY

U. S. Army Engineer District, Louisville
P. O. Box 59
Louisville, Kentucky 40202

PUBLIC USE PLAN
DESIGN MEMORANDUM NO. 15
ROUGH RIVER LAKE, KENTUCKY

Table of Contents

EXHIBITS

PUBLIC USE PLAN
DESIGN MEMORANDUM NO. 15
ROUGH RIVER LAKE, KENTUCKY

SUMMARY

This study was initiated to evaluate the present and future recreational demands at Rough River Lake, and compare these demands with the planned facilities in the presently approved DM No. 8B, in order to determine if that design memorandum is still valid as a basis for supplying facilities at the public use areas at this reservoir.

Based on preliminary work it was determined that DM No. 8B was totally inadequate because the public's tastes in and demands for outdoor recreational opportunities have changed since the DM was completed. Because of these changes, DM No. 8B should no longer be used as a basis for supplying both present and future recreation facilities at Rough River Lake.

The overall trend in the public's demand for outdoor recreational opportunities has shifted from day use activities (Picnicking) to extended use activities (Camping) and projections of future demand for such facilities indicate that this trend will continue as Americans have more and more leisure time and disposable income.

To adequately meet existing and future demands at Rough River Lake this study shifted the emphasis from day use activities to camping. Camping demand is expected to increase from 313 units now to 2,000 units in the year 2020. Present demand for camping facilities exceeds picnicking demand by almost 250 percent. Demand for access facilities at this project has increased at a greater than expected rate and necessary changes have been recommended to meet this demand.

Rough River Lake is a category A project as defined in ENGCW-Y letter, dated 5 August 1965, SUBJECT: Implementation of the Federal Water Project Recreation Act (PL 89-72) in previously authorized projects. Therefore, in order to provide urgently needed recreational facilities to meet present demand, a program has been outlined in this design memorandum to provide the necessary facilities to meet the recreational demand of 1979 by Fiscal Year 1976 after which cost-sharing by local interests will be required for further improvement under the Code 711 program. The total estimated cost involved in this program (5.1 million) is to be spread over a six year period. This design memorandum has been coordinated with ORLRE as required in ER 405-2-835.

SECTION I – INTRODUCTION

1–01 Authority. Federal laws provide that Department of the Army reservoirs constructed for the primary purpose of flood control, navigation or power shall be operated to encourage and develop collateral uses such as recreation, fish and wildlife propagation, conservation (Section IV of the Flood Control Act approved 22 December 1944, Public Law 534, 78th Congress, Chapter 665, 2nd Session), and other purposes in the public interests. Development of the plan for public use of Rough River Lake has been conducted in general accordance with the basic policies defined in the applicable legislation supplemented by pertinent directive of the Corps of Engineers.

1–02 Purpose of DM No. 15. The purpose of this study is to evaluate the existing approved Master Plan (Design Memorandum No. 8B) and propose any necessary changes to completely utilize the public use areas under present design criteria and ultimate project user demand. This study is authorized under ER 1110–2–400, paragraph 13.

1–03 Prior Pertinent Design Memoranda Reference. Reference is made to the following previously issued Design Memoranda:

Number	Description	Date
1	General Design Memorandum	Jul 1953
2	Outlet Works	Sep 1953
3	Dam and Spillway	Sep 1953
	Dam and Spillway Supplement No. 1 to Design Memorandum No. 3	Dec 1956
	Dam and Spillway Supplement No. 2 to Design Memorandum No. 3	Mar 1957
4	Report on Necessity for Relocation of Kentucky Highways 65, 108 and 110	Apr 1957
5	Real Estate Partial Reservoir Area (Segments A, B, C & D)	Oct 1957
6	Pool Preparation	Dec 1957
7	Real Estate Segments E through W	Jan 1958
8 (No. 8A)	Preliminary Master Plan (Land Requirements Plan - Public Use)	Mar 1958
8B	Master Plan	Dec 1961
9	Real Estate Highway Relocation	Mar 1958
10	Residences, Shop and Miscellaneous Items	Jul 1958
11	Low Flow Regulation	Jul 1958
12	Report on Necessity for Relocation of Electric Power and Telephone Lines	Aug 1958
13	Report on Necessity for Relocation of County Roads	Oct 1958
14	Channel Clearing of Rough River and Channel Improvement of Barnett Creek	Aug 1959

Of the above listed Design Memoranda, Nos. 8 (No. 8A) and 8B are pertinent to this present study because they form the basis for the present policy of recreational development at Rough River Lake.

1–04 Scope of Study. This memorandum will examine and evaluate: project area resources specifically relating to recreation; existing facilities in relation to present user demand facilities planned in previous memoranda; and future ultimate demand. Comparisons will be made between existing, planned, and ultimate projected user demands. Finally, a revised development plan for the optimum ultimate development of this project will be proposed.

SECTION II – PROJECT DESCRIPTION

2–01 General. Rough River Lake is a unit of the comprehensive plan for flood control and development of water resources on the Ohio River. It provides for the reduction in flood stages at all points downstream from the reservoir.

2–02 Location and Accessibility. Rough River Lake is situated in west central Kentucky about 45 miles southwest of the outskirts of Louisville and about 35 miles in a southeastward direction from Owensboro, Kentucky. Main access to the project is via State route 79 which runs north-south and crosses the lake at the dam and about midway on the North Fork. The Western Kentucky Parkway intersects route 79 about 16 miles south of the dam providing easy access from any point in the State.

2–03 Real Estate. Project lands consist of 9,211 acres in fee and 4,550 acres with flowage easements. Water areas are as follows: minimum 1,600 acres; seasonal or recreation pool, 4,860 acres; and flood control pool, 10,180 acres. There are eleven major areas designated as public use totaling 524 acres. They are: Site 1 – State Park (114A); Site 2 – Laurel Branch (22A); Site 3 – Cave Creek (84A); Site 4 – Axtel (46A); Site 5 – North Fork (26A); Site 6 – Everleigh (31A); Site 7 – Calvert (26A); Site 8 – Below Dam (30A); Site 9 – Panther Creek (41A); Site 10 – Little Clifty (83A); and Site 11 – Peter Cave (21A).

2–04 Description of Reservoir Area. The principal surface characteristic of the Rough River Basin is, in general, a rugged topography with well-defined drainage. The project is in an area of karst topography and many of the hills bordering the reservoir contain outcroppings of rock which provide scenic enhancement to the area. Most of the area has been developed for agriculture with the exception of hills and drainages which were too rough to farm. These areas are covered with second and third growth timber which is composed of mixed upland hardwoods. Many fields on the project are in the stage of old field succession with sassafras being the predominant pioneer species on these areas.

2–05 Status of Project. Rough River Lake was completed and went into operation during October 1959. It reached seasonal or recreational pool (elevation 495) in 1960. Since that time the reservoir has been at or above seasonal pool approximately 85 percent of the recreation season. Maximum elevation of the pool was 512.9 and this occurred on 19 March 1964. Total visitation to the reservoir since March 1963 through July 1971 was 5.8 million. Table 1 illustrates annual project visitation since 1963.

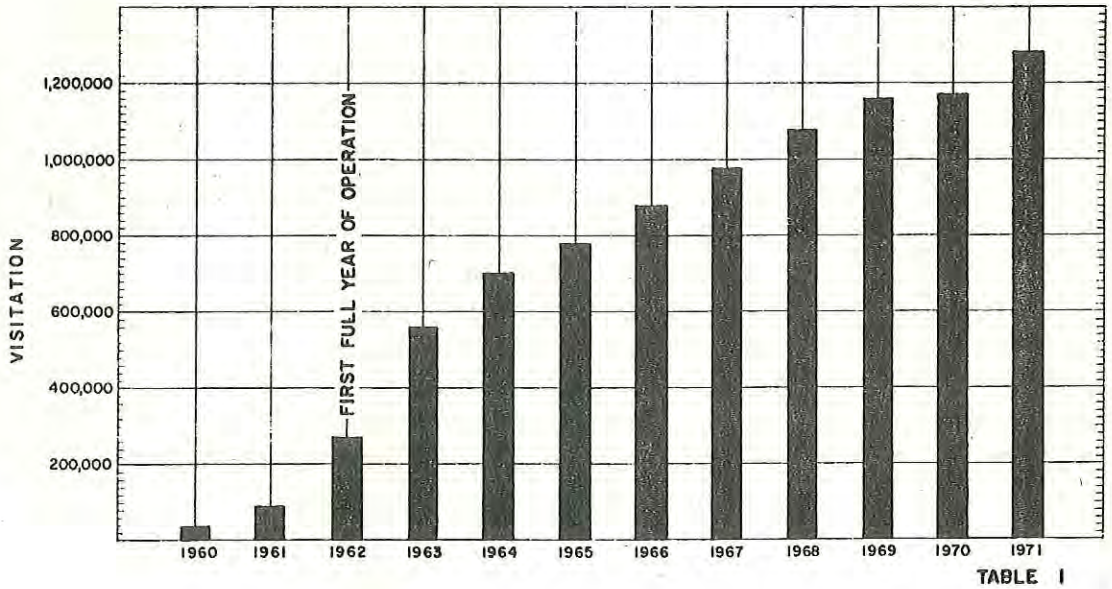


TABLE 1

SECTION III – PROJECT AREA RESOURCES

3–01 General. This is primarily an agricultural area suited to general farming. Principal crops include hay, corn and other grains, tobacco, and livestock. There is also some dairy farming in the area. As a result of agricultural clearing, most of the remaining timber reserves are on lands unsuitable for farming. Heavy logging pressure has resulted in reducing most of the remaining timber stands to the younger age classes. Relatively few old growth stands remain scattered over the area. There are also some developments in coal, oil and gas in the area.

3–02 Fish and Wildlife. The Rough River above the Rough River Damsite was considered a high value stream type fishery, providing habitat for smallmouth bass, spotted bass, rock bass and other desirable warm water species. The game fish population since impoundment has been considered good. There has not been adequate fisheries research at Rough to draw scientific conclusions on the fish population.

Wildlife resources values are moderate on project lands surrounding the reservoir. Principal species providing hunting opportunity are rabbit, squirrel, bobwhite quail, dove, raccoon, oppossum and white-tailed deer. Waterfowl values are considered low.

SECTION IV – FACTORS INFLUENCING RESOURCE DEVELOPMENT

4–01 Region Served. It is estimated that ultimately Rough River Lake will play an integral role in the total recreational experience of residents living within a two hour drive (100 air miles) of the project. Some of the major urban areas located within the region are Louisville, Frankfort, Bowling Green, and Owensboro, Kentucky; and Evansville, Indiana. Nashville, Tennessee is just on the edge of the radius.

4–02 Population. The 1970 census indicated that 3,620,000 persons lived within a two hour drive of Rough River Lake. It is estimated that the 2020 population (basis for calculation of ultimate user demand) will exceed 4.1 million.

4–03 Existing and Planned Related Recreation Areas. Mammoth Cave National Park and Nolin Lake are two related recreational attractions with approximately 25 miles of Rough River Lake. Both Mammoth Cave National Park and Nolin Lake provide for such activities as camping, picnicking, fishing, and hiking. Visitation to these projects exceeded 1.9 million in 1968. It is estimated that further development of Rough River Lake for recreation can only increase the overall quality of the recreation potential of this area.

4–04 Fish and Wildlife Development. In order to enhance fish and wildlife management and development a license for fish and wildlife management was granted to the Kentucky Department of Fish and Wildlife Resources. Under the terms of this license the State is given authority to implement and manage a fish and wildlife program on project lands and waters excluding specific use recreation lands. Three areas designated for Public Use, Panther Creek, Calvert and Little Clifty which compose 190 acres, are included in the license on an interim basis. These areas are subject to withdrawal of all or any part of the area for recreational use subject to 30 days notice by the District Engineer. The fish and wildlife license is included in this report as Exhibit A.

Prior to execution of this license, fish and wildlife development was limited to the stocking of two-fish species. In 1968 140,000 walleye were stocked in the lake and 23,700 rainbow trout were stocked in the tailwater.

SECTION V – EVALUATION OF EXISTING FACILITIES

5–01 Quality of Existing Facilities.

Parking Facilities. The parking facilities at Rough River Lake are not presently adequate to handle normal summer Sunday demand. There are no designated overflow parking areas and severe parking problems arise during periods of peak use. Distribution of these facilities throughout the project area is also poor. During periods of peak demand, some areas at the State Park receive little use while other access areas are overcrowded.

Boat Launching Facilities. The quality of existing launching facilities is good; however, current demand for launching lanes far exceed the supply. In addition, Site 7 – Calvert, Site 9 – Panther Creek and Site 10 – Little Clifty which are located at strategic points on the lake do not have any launching facilities.

Camping Facilities. The existing 313 units are located over five different sites. Most of the campsites in these areas are too closely spaced and located so near the shoreline that on peak days there is heavy overuse which has resulted in deterioration of the areas. It should also be noted that there is considerable shoreline camping on unimproved areas along the lake.

Campsites too closely spaced and located too near the shoreline

Picnic Facilities. Six public access sites have picnic areas at Rough River. Because of the great demand for camping facilities, most of the existing picnic facilities are used for camping. The areas are in very poor condition as a whole.

Swimming Facilities. Presently there is one formal supervised beach at Rough River Lake, which is located at the State Park. Much swimming activity occurs near the boat launching ramps which creates a serious safety hazard to swimmers and inhibits boat launching operations.

An existing picnic area at North Fork. It receives heavy camping use and illustrates site deterioration through overuse typical of most public access areas at Rough.

5–02 Existing User Demand. The existing user demand can be reflected in the minimum existing design requirements. Visitation figures for 1968 were used as a basis for the following computations.

Specific Design Load (SDL). The SDL for an activity at an existing project, based on visitation figures is:

$$SDL = \frac{Y \times AP}{N} \times \frac{60}{T}$$

WHERE:

Y = Percent of total participation expected to occur during recreation season.

AP = Annual participation in the activity for the past year

N = Number of weeks in the normal recreation season (15)

.60 = Percent of weekly participation in the activity expected to occur on a normal summer Sunday

T = Turnover factor for the activity

$$SDL\ (Boating) = \frac{.67 \times 101638}{15} \times \frac{.60}{2.5} = 1{,}089$$

$$SDL\ (Camping) = \frac{.67 \times 251433}{15} \times \frac{.60}{1} = 6{,}470$$

$$SDL\ (Fishing) = \frac{.67 \times 314290}{15} \times \frac{.60}{3} = 2{,}807$$

$$SDL\ (Picnicking) = \frac{.67 \times 122687}{15} \times \frac{.60}{2} = 1{,}644$$

$$SDL\ (Swimming = \frac{.100 \times 213797}{15} \times \frac{.60}{2} = 4{,}275$$

Minimum Existing Design Requirements (MEDR)

$$MEDR = \frac{SDL\ (Activity)}{P}$$

WHERE:

P = The number of persons per unit, site or parking space, whichever is applicable

MEDR (Boating) = 363 Car Trailer Spaces

$$\frac{1{,}089\ \text{Persons}}{3\ \text{Persons/Car Trailer Spaces}} = 363$$

MEDR (Camping) = 1,294 Camp Units

$$\frac{6{,}470\ \text{Persons}}{5\ \text{Persons / Camp Unit}} = 1{,}294$$

MEDR (Fishing) = 1,122 Car Trailer Spaces

$$\frac{2{,}807\ \text{Persons}}{2.5\ \text{Persons/Car Trailer Spaces}} = 1{,}122$$

MEDR (Picnicking) = 328 Picnic Units
328 Parking Spaces

$$\frac{1{,}644\ \text{Persons}}{5\ \text{Persons/Picnic Unit}} = 328$$

MEDR (Swimming) = 427,500 Square Feet Beach (Beach Area)

4,275 Persons x 100 Sq Ft Person = 427,500

MEDR (Swimming) = 1,068 Parking Spaces (Parking)

$$\frac{4{,}275\ \text{Persons}}{4\ \text{Persons/Parking Space}} = 1{,}068$$

Summary of Existing User Demand. Based on the above computations, the present user demand on a normal summer Sunday is for 1,294 camp units, 1,485 car trailer parking spaces, 328 picnic units, 1,396 car parking spaces and 427,500 square feet of beach area. Sightseers are not included in this evaluation because they normally benefit from the facilities considered for other activities.

5–03 Existing User Supply. Determinations of existing user supply can be made by tabulating the type and number of facilities present at Rough River Lake. See Appendix B for breakdown by site.

Boating and Fishing 941 Car Trailer Spaces

SDL = 941 x 2.75 = 2,587 Persons

Picnicking 45 Picnic Units

SDL = 45 x 5 = 225 Persons

Swimming 4500 Sq Ft

SDL = 4,500 x 4 = 18,000 Persons

Camping 313 Units

SDL = 204 x 5 = 1,565Persons

5–04 Evaluation of Existing Demand and Supply. Below is a tabulation of existing demand and supply based on design requirements. For example, number of picnic units in demand and number of units supplied.

Activity	Existing Demand*	Existing Supply	Supply Deficit
Boating and Fishing Parking Spaces	1,485	980	505
Camping Units	1,294	313	981
Picnic Units	328	45	283
Swimming – Sq Ft Beach Area	427,500 Sq Ft	45,000 Sq Ft	736 Sq Ft
Swimming – Parking	1,068	350	718

*Based on normal summer Sunday demand.

Boating and Fishing. Based on the above table, parking for boating and fishing is not adequate for normal summer Sunday use. On peak days the lack of appropriate overflow areas increases the problem. Present launching ramps are inadequate.

Camping. Present demand for camp units is slightly over five times existing supply. If overuse persists further deterioration of existing camp areas will result causing a significant reduction in the overall quality of the camping experience at Rough.

Picnicking. Present demand for these type of facilities is slightly more than six times the supply. Although total units needed is not high, future demand may cause serious shortages in this type of facility.

Swimming. The current demand for beach area is approximately 427,500 square feet. Because supply is limited, swimmers are using areas which cause serious safety problems. The practice of swimming at or near a boat launching ramp is prohibited but because of the lack of sufficient facilities this regulation is difficult to enforce.

SECTION VI – PROJECTED ULTIMATE USER DEMAND

6–01 Annual Visitation to Project. Using presently approved methods of determining project visitation, it is estimated that 2,231,200 visitors will annually use the facilities at this project

Effective Design Load (EDL). To determine the type and quality of facilities needed, six activities are considered. These are sightseeing, swimming, picnicking, camping, boating and fishing at this project. Sightseers are believed to comprise 35 percent of visitation and will normally benefit from facilities which are considered for the other activities. Therefore, effective design load is:

$$EDL = \frac{.75 \times AV}{N} \times \frac{.60}{T} \times .65$$

Where:

.75 = Percent of annual visitation expected to use facilities during recreational season

N = Number of weeks in normal recreation season (15)

.60 = Percent of weekly visitation on a normal summer Sunday

T = Turnover factor

.65 = Percent of total visitors excluding sightseers

EDL = .75 x 2,200,000 x .60 x .65 = 43,000

EDL = 43,000

6–02 Specific Design Loads (SDL). Design loads for specific users or the number of persons to design for in a particular activity are derived by

$$SDL = \frac{EDL \times P}{T} \quad \frac{43,000 \times P}{T}$$

Where:

EDL = Effective Design Load
P = Participation in percentage of EDL for specific activity
T = Turnover factor

Activity	P*	T
Boating	18%	2.5
Camping	25%	1
Fishing	29%	3
Picnicking	15%	2
Swimming	20%	2

*Based on current participation rates at Rough River Lake.

SDL (Boating) = 3,100Persons

$$\frac{43,000 \times .18}{2.5} = 3,100$$

SDL (Camping) = 10,075 Persons

$$\frac{43,000x .25}{1} = 10,075$$

SDL (Fishing) = 4,150 Persons

$$\frac{43,000 \times .29}{3} = 4,150$$

SDL (Picnicking) = 3,200 Persons

$$\frac{43,000 \times .15}{2} = 3,200$$

SDL (Swimming) = 4,300 Persons

$$\frac{43,000 \times .20}{2} = 4,300$$

6–03 Minimum Ultimate Design Requirements (MUDR). From the SDL (Activity) a determination can be made as to the minimum ultimate design requirements, e.g., the minimum number of units or parking spaces required for an activity.

$$MUDR = \frac{SDL\ (Activity)}{P}$$

Where:

P = The number of persons per unit, area or car, whichever is applicable

MUDR (Boaters' Parking) = 1,033 Car Trailer Spaces

$$\frac{3{,}100 \text{ Boats}}{3 \text{ Boaters/CTS}} = 1{,}033$$

MUDR (Camping) = 2,000 Camp Units

$$\frac{10{,}075 \text{ Campers}}{5 \text{ Campers/Camp Unit}} = 2{,}000$$

MUDR (Fishermen) = 1,660 Car Trailer Spaces

$$\frac{4{,}150 \text{ Fishermen}}{2.5 \text{ Fishermen/CTS}} = 1{,}660$$

MUDR (Picnickers) = 640 Picnic Units

$$\frac{3{,}200 \text{ Picnickers}}{5 \text{ Picnickers/Picnic Unit}} = 640$$

MUDR (Swimmer Parking) = 1,075 Parking Spaces

$$\frac{4{,}300 \text{ Swimmers}}{4 \text{ Swimmers/Parking Space}} = 1{,}075$$

MUDR (Swimmers Beach Area) = 430,000 Sq Ft

4,300 Swimmers x 100 Sq Feet Beach/Swimmer

6–04 Minimum Land Requirements for Ultimate Development (MLR)

$$MLR = \frac{MUDR\ (Activity) \times 4^*}{S}$$

Where:

MUDR = Minimum ultimate design requirements for a specific activity

S = Spaces or units per acre

MLR (Boaters Parking) = 124 Acres

$$\frac{1{,}038 \text{ CTS}}{33 \text{ CTS/Acre}} \times 4 = 124$$

*The acreage figures, set forth for S, represents only those required for development to meet the needs of a given activity. Substantial additional acreage will be needed to separate the activities and to provide the open space necessary for quality recreational experiences. Normally, only ten percent of a land area should be developed for intensive uses for various recreational activities. The other 90 percent of the land should be utilized for separate activities, one from another, and to provide open spaces for hiking, sightseeing, and other related activities. However, for an existing project such as this, additional land acquisition is difficult and the rates have been revised to 25 percent and 75 percent respectively.

MRL (Campers) = 1,000 Acres

$$\frac{2{,}000 \text{ Camp Units}}{8 \text{ Units/Acre}} \times 4 = 1{,}000$$

MLR (Fishermen) = 200 Acres

$$\frac{1{,}660 \text{ CTS}}{33 \text{ CTS/Acre}} \times 4 = 200$$

MLR (Picnickers) = 260 Acres

$$\frac{640 \text{ Picnic Units}}{10 \text{ Picnic Units/Acre}} \times 4 = 260$$

MLR (Swimmers Parking) = 48 Acres

$$\frac{1{,}075 \text{ Parking Spaces}}{87 \text{ Parking Spaces/Acre}} \times 4 = 48$$

Total Acres	1,632
Present Acres	524
Acres Short	1,108

6–05 Summary of Ultimate User Demand. The following table summarizes projected ultimate user demand for a normal summer Sunday.

Activity	Minimum Units or Spaces Required
Boating and Fishing Parking	2,690
Boat Launching Ramp	10
Boat Launching Lanes 1/	26
Camping	2,000
Picnicking	640
Swimming (Parking)	1,075
Swimming (Beach Area)	430,000 Sq Ft

1/ Based on ER 1130-2-312 criteria. Assumed to mean one launching lane for each 40,000 annual visitors. Also, there is need for additional lands at this project.

SECTION VII – REVISED DEVELOPMENT PLAN

7–01 General. The first step in formulating a revised development plan is to compare present demand, present supply and ultimate demand with the facilities planned in DM 8B and supplement.

Below is a table summarizing those items. It should be stated that only ramps, parking and picnicking were planned in DM 8B.

Item	Present Demand	Present Supply	Planned Facilities	Ultimate Demand	Deficit of Planned Facilities
Boating and Fishing (Parking)	1,485	941	1,291	2,690	1,399
Boat Launching Lanes	26	16	24	55	39
Camping Units	1,294	313	0	2,000	1,687
Picnic Units (Parking)	328	45	130	640	510
Swimming (Sq Ft)[1/]	427,500	45,000	45,000	430,000	385,000 Sq Ft
Swimming (Parking)	1,068	350	350	1,075	725

1/ Based on 100 Sq Ft beach area per person.

7–02 Basic Assumptions.

(1) Because of the general lack of facilities in relation to existing demand, present visitation to this project is an indication of its true potential.

(2) Criteria set forth in EM 1110-2-312 will be used as a basis for revision of the Public Use Plan. In conjunction with this, facilities shown in Louisville District, Recreational Facilities–Standard Plan will be used as a basis for construction specifications. In the event facilities other than those shown in "Recreation Facilities" are proposed appropriate descriptions and drawings of such facilities will be included as part of the present study. Current methods of estimating annual visitation will be used in computing estimated annual visitation.

assume responsibility for the proper design, construction, operation and maintenance of most public use area at Rough River.

(4) Revisions to DM 8B will be made to insure optimum development of each Public Use Area.

(5) Additional land is needed for recreational purposes at Rough River.

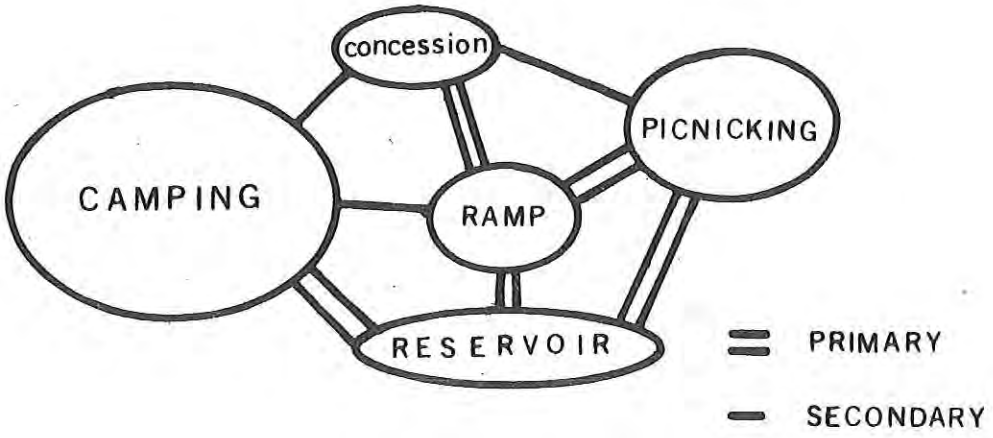
(6) Projections indicate that future camping demand will far exceed picnicking demand at this project. Consequently, preference will be given to camping over picnicking.

(7) It should be noted that any future development at Panther Creek, Site 9 and Calvert, Site 7 will require 50-50 cost sharing to the lessee who assumes management responsibility for these sites.

7–03 Ideal Site-Use Relationships. In order to arrive at a workable design for Rough River Lake, a basic or ideal site-use relationship is needed. This site-use relationship is based on factors and priorities unique to this particular project.

Because camping demand is projected to be very high at this project, emphasis will be placed on planning for this activity.

The demand for picnicking and day use is expected to be much lower than camping and consequently, will be given a number two priority. Facilities for boat launching, fishing, waterskiing, and other such activities will be in great demand. Expansion of existing facilities will be essential. Figure I shows the considered ideal site-use relationship with the above factors considered.



IDEAL SITE-USE RELATIONSHIPS

FIGURE I.

Picnicking and day use activities will be concentrated around and near boat launching facilities. This will, in effect, concentrate the total day use activities (including boat launching) in one area.

Camping, the major activity, will be located in most other areas of the sites.

There are several sites (Everleigh – Site 6, Calvert – Site 7, and Peter Cave – Site 11) which because of locations, size and rugged topography will be developed for day use activities only.

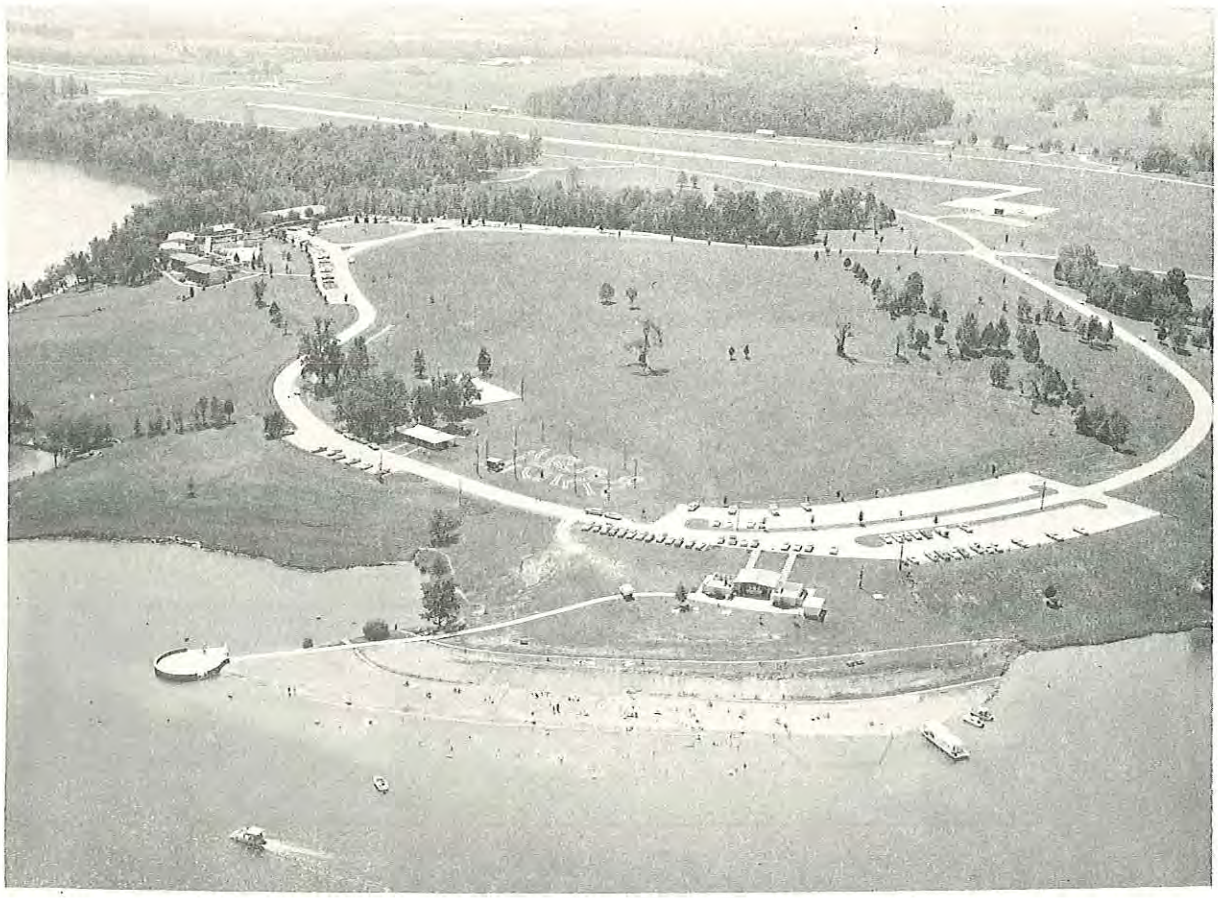
7–04 Individual Site Development. Following are specific proposals for the future development of the eleven public use areas at Rough River Lake. Included in these proposals are recommended changes to existing facilities which will greater enhance their aesthetic qualities and more fully meet the need for present and projected recreation demands.

Rough River State Park (Sites 1 and 8) (Plates 2 and 3). Sites 1 and 8 are presently under a license agreement with the Commonwealth of Kentucky. (See Appendix A). Facilities existing at the park site include a pool, beach, marina, collages, minature golf, picnic facilities, airstrip with a terminal building, lodge and camping with a wash and laundry building and comfort station. The Commonwealth is in the process of developing a new Master Plan for the park. Included is a recommendation for acquisition of a 356 acre peninsula on the north shore of the lake across from the existing park. The acquisition is discussed in detail in Supplement Number 1 to DM 8. This development will include a major camping area and recreational complex including a swimming pool and nature interpretation.

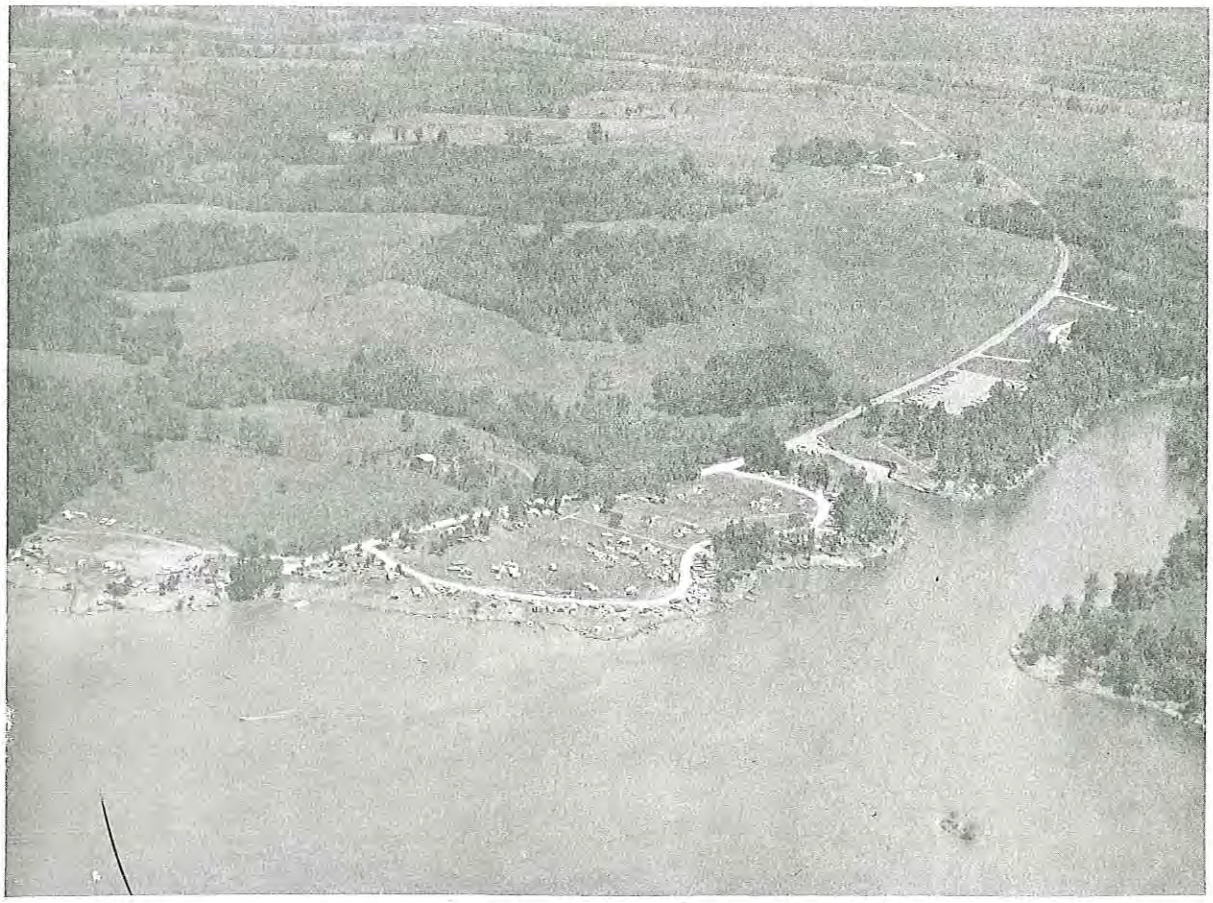
Laurel Branch (Site 2) (Plate 4). This area presently consists of 22 acres which have been developed primarily for camping. At this site an additional 194.1 acres have been proposed for acquisition. This acquisition is discussed in detail in Supplement of DM 8.

The proposed development is divided into two areas. Area 1 is day use. The boat launching ramp is to be enlarged from 24 foot to 48 foot. There will be an increase of 30 picnicking units with three flush toilets. Part of the existing campground is to be converted into picnicking. Area 2 will increase camping experience from the existing 32 units to an ultimate of 350 units with the following facilities included: 40 car parking spaces, 8 comfort stations, 6 wash buildings, 2 sewage dump stations, water treatment and sewage treatment.

The above plan is the most feasible design under the following limiting criteria: location, access, and high usage rate. If the existing boat launching ramp was to be incorporated into the overnight use area, access to the lake by day-users would be limited. Axtel and Laurel Branch receive most of the day-use launching. The usage of these sites is as great as that at all of the other launching ramps.



State Park – Site 1



Laurel Branch – Site 2

Cave Creek Site 3 (Plate 5) This site is comprised of 84 acres of varied topography which provides an excellent opportunity for a variety of recreational facilities. Rapid development of the area should help to reduce the present problems of camping at Rough River.

The primary function at this site will be camping. 195 camp units are proposed for development, also 3 wash buildings, 5 comfort stations, and one 40 car-trailer parking lot. It should be noted that an existing 150 car trailer parking lot has been incorporated into one of the camping areas. This was done to obtain maximum utilization of the land and because very few people use the present lot as it is too far from the ramp.

Axtel, Site 4 (Plate 6). This site has approximately 46 acres and is the most extensively developed of the sites managed by the Corps. Present development at this site consists of 87 camp units, two vault toilets, three prefab vault toilets, a 24 foot ramp with 150 car trailer spaces, ten picnic units, and a water treatment plant. There is also a marina concession with 40 slips and boat storage.

The proposed development is for an additional 83 camp units, four wash buildings, 4 comfort stations, sewage disposal plant and a 24 foot expansion of the existing boat launching ramp.

Cave Creek – Site 3

Axtel – Site 4

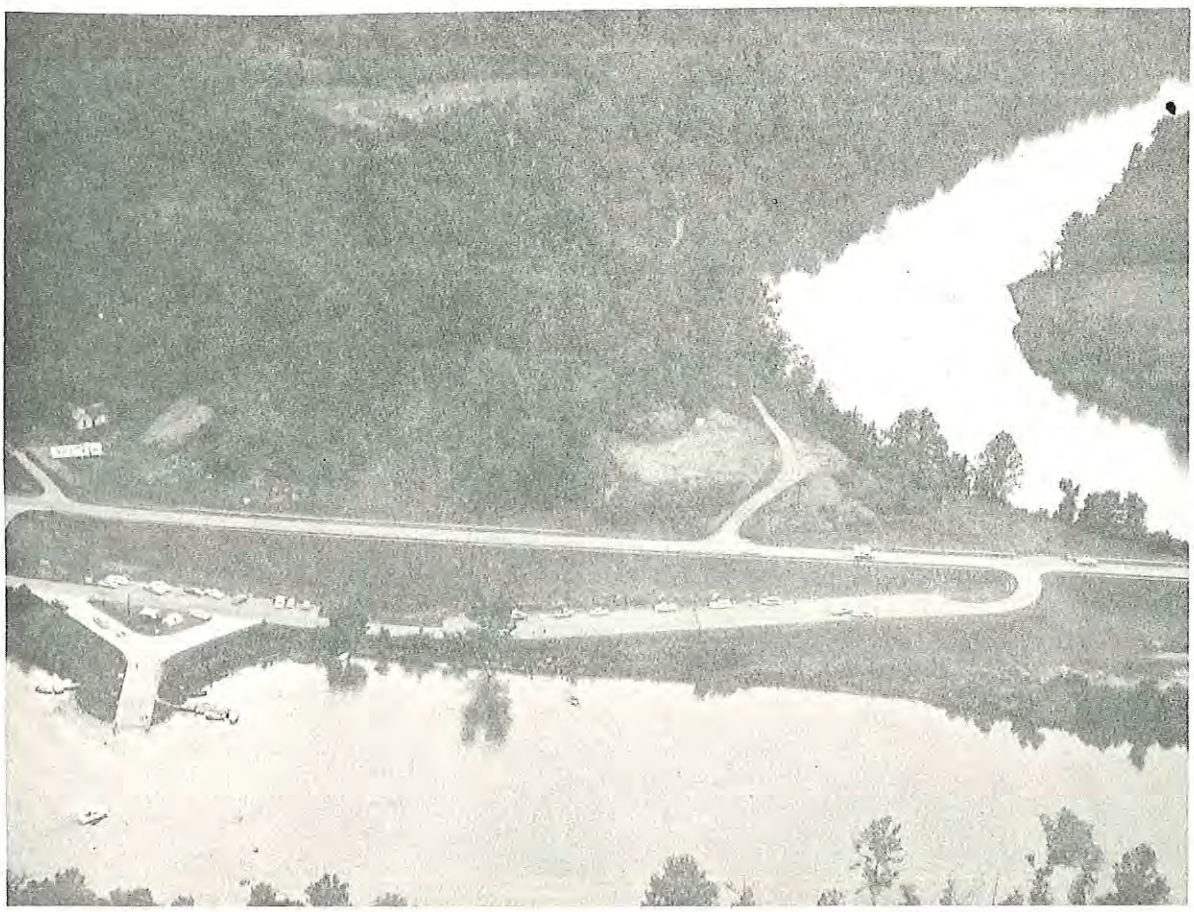
North Fork, Site 5 (Plate 7). This site, located on the North Fork Rough River, is bisected by Route 259 and is situated the closest to Louisville of all the public access areas which accounts for the intense use of receives. Present facilities at this site include 69 camp units, ten picnic units, water treatment, one vault toilet, a 144 car trailer space and a 24 foot boat launching ramp. Planned for the site are an additional 28 camp units, five picnic units, two wash buildings, two comfort stations, sewage disposal plus an additional 24 feet to the existing ramp.

North Fork – Site 5

Everleigh, Site 6 (Plate 7). Because of factors such as location and topography, it is felt that this site is presently developed to its optimum. It is primarily a fisherman access site with a potential for primitive overflow camping if needed. Existing facilities are a 24 foot boat launching ramp with 40 car trailer spaces.

Calvert, Site 7 (Plate 8). There is presently no development at this site. Although this is a small site with little usable land, it will provide needed access to the lake where presently there is none. The plan of development calls for a 30 foot ramp with 30 car trailer spaces, vault toilet and ten picnic units.

Since this is a future site it must be cost shared under 89–72.



Everleigh – Site 6

Panther Creek, Site 9 (Plate 6). There is presently no development at this 41 acre site. It is a very beautiful area and will provide a pleasing recreational experience; however, it poses some problem as far as development because of its rugged terrain.

Proposed development on the area includes 124 camp units, five comfort stations, two wash buildings, water treatment, sewage disposal, and a 30 foot boat launching ramp with 20 car trailer spaces. In order to develop this site, the road to the area will have to be improved to provide adequate access.

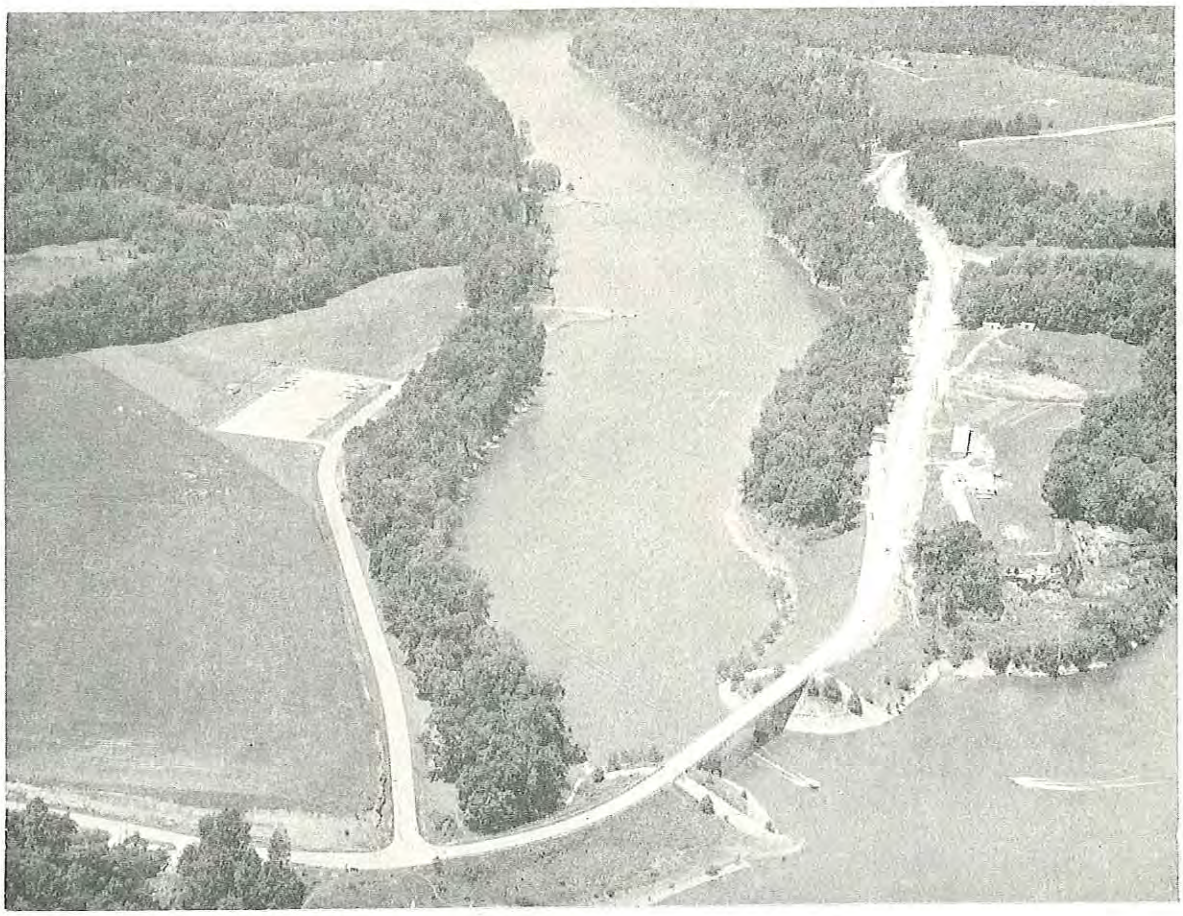
Since it is unlikely that a governmental agency can be found to participate in cost sharing for this site, a concessionaire will be sought to participate in this development.

Little Clifty, Site 10 (Plate 8). This 84 acre site poses the greatest problems for recreational development. Steep cliffs cover extensive portions of the area which prohibits most activities. There are only about 12 acres of useable land on this site. Access for a boat launching ramp and parking area will be extremely difficult and costly.

In order to obtain the maximum use of this site, it is being designed as a group camping area. Included in the design are a dining hall, infirmany, ranger's residence, administration building, wash buildings, comfort stations and sewage disposal and water treatment buildings. Since this is a future site it must be cost shared under 89–72.

Peter Cave, Site 11 (Plate 5). This site has 21 acres. There is existing at present a 24 foot boat launching ramp, 150 car trailer spaces and a vault toilet. Due to its size and location, it was determined that picnicking should be the only facility to be added. A picnic shelter with flush toilet and sewage treatment will be included. Water is to be provided by the City of Leitchfield, Kentucky.

Because of the immediate need for additional lands for overnight use, this site will be set aside as an overflow area for primitive camping. User fees will be charged in accordance with ER 1130 – 2 – 404. At such time when additional land is purchased to alleviate the problem of



Peter Cave – Site 11

overcrowdedness, this site will be turned back into a day use area.

7–05 Summary of Revised Development Plan The following table compares facilities with expected ultimate demand.

	DM 15	Ultimate Demand
Boating and Fishing Parking	1,050	2,726
Camp Units	1,285	2,175
Picnic Units	370	652
Launching Lanes	28	55

SECTION VIII – PLAN IMPLEMENTATION

8–01 General. Because most public use facilities to be constructed at Rough River Lake are expected to be operated and managed by the Corps of Engineers for the foreseeable future and cost sharing by local interests is required after Fiscal Year 1976, the approach toward development of this project will be in the following manner.

It is proposed that the estimated visitation for 1979 be used as a guide for the determination of what facilities should be provided under the Code 711 Program by the end of Fiscal Year 1976. This will enable the reservoir project to meet the demands for recreational facilities during that time. These facilities are expected to remain the responsibility of the Corps of Engineers.

8–02 Projected Demand in 1979. Based on projected annual project visitation of 1,660,000 the following basic facilities will be required by 1979.

Item	1979 Demand
Boating and Fishing	1,000
Boat Launching Lanes	30
Camp Units	900
Picnic Units	250

8–03 Schedule of Development. The recommended schedule of needed development to offset the projected demand is presented in detail in Appendix B. Development is concentrated at five sites, North Fork (site 4); Axtel (site 5); Cave Creek (site 3); Laurel Branch (site 2); State Park Site (site 1). Full development of these sites will add the following facilities: 1,161 camp units, 132 picnic units, 55 car-trailer parking spaces, 1 launching ramp, 12 additional launching lanes, and other associated facilities needed for proper operation of the areas. These facilities added to the existing will create a supply that will be sufficient to meet the project 1979 demand.

SECTION IX – ADMINISTRATION AND MANAGEMENT

9–01 Regulations. Rough River Lake is administered in accord with the provisions of "Title 36, Chapter III, Part 327,Federal Code of Regulations" and the applicable state policy (see Exhibit B).

9–02 Administrative and Management Organizations

a. Corps of Engineers. The chart of page 9–2 depicts the organizational structure of those elements within the Louisville District which have administrative and reservoir management responsibilities. The responsibilities of these organizational elements will be in accord with ER 1130 – 2 – 400 and specifically as described in Louisville District Regulation DR 45 - 2-1 (see Exhibit C).

b. Commonwealth of Kentucky. Page 9–3 depicts the organizational structure of those elements within the Commonwealth of Kentucky which will have administrative and management responsibilities. The Department of Parks and Fish and Wildlife Resources will have basic responsibility but will call on other state departments when needed.

9–03 Functional Responsibilities. The Corps of Engineers will be principally concerned with determining the nature and extent of the recreation development; preparing construction codes and requirements; initiation, coordination and reconciling activities relative to management policies and regulations; and relations with agencies and public relations in general. The Corps will also concern itself with reservoir regulation, operation and maintenance of dam structure area, and checking on compliance with terms of outgrant instruments.

The Department of Parks, Commonwealth of Kentucky, under the license agreement will be principally concerned with Sites 1 and 8 in determining the nature and extent of recreation development, preparing construction codes and requirements. The Commonwealth is also required to submit an annual management plan to the District Engineer for his approval.

9–04 Land Use Management. Land Use Plate 1A shows designations of land use for all project lands. The designations were based on existing natural conditions that could best serve the specific activity. It is intended to serve as a guide for any future development or land use consideration.

Fees and Charges. All fees and charges for use of developed area and facilities, when managed by the Corps, will be consistent with the schedule of charges suggested in implementation of Land and Water Conservation Fund Act of 1965.

Outgrant Coordination. Outgrants, leases, and easements to others for the use of project lands, and waters will be granted as prescribed by ORDR 1130 – 2 – 12. All outgrants will be thoroughly reviewed by the District Engineer.

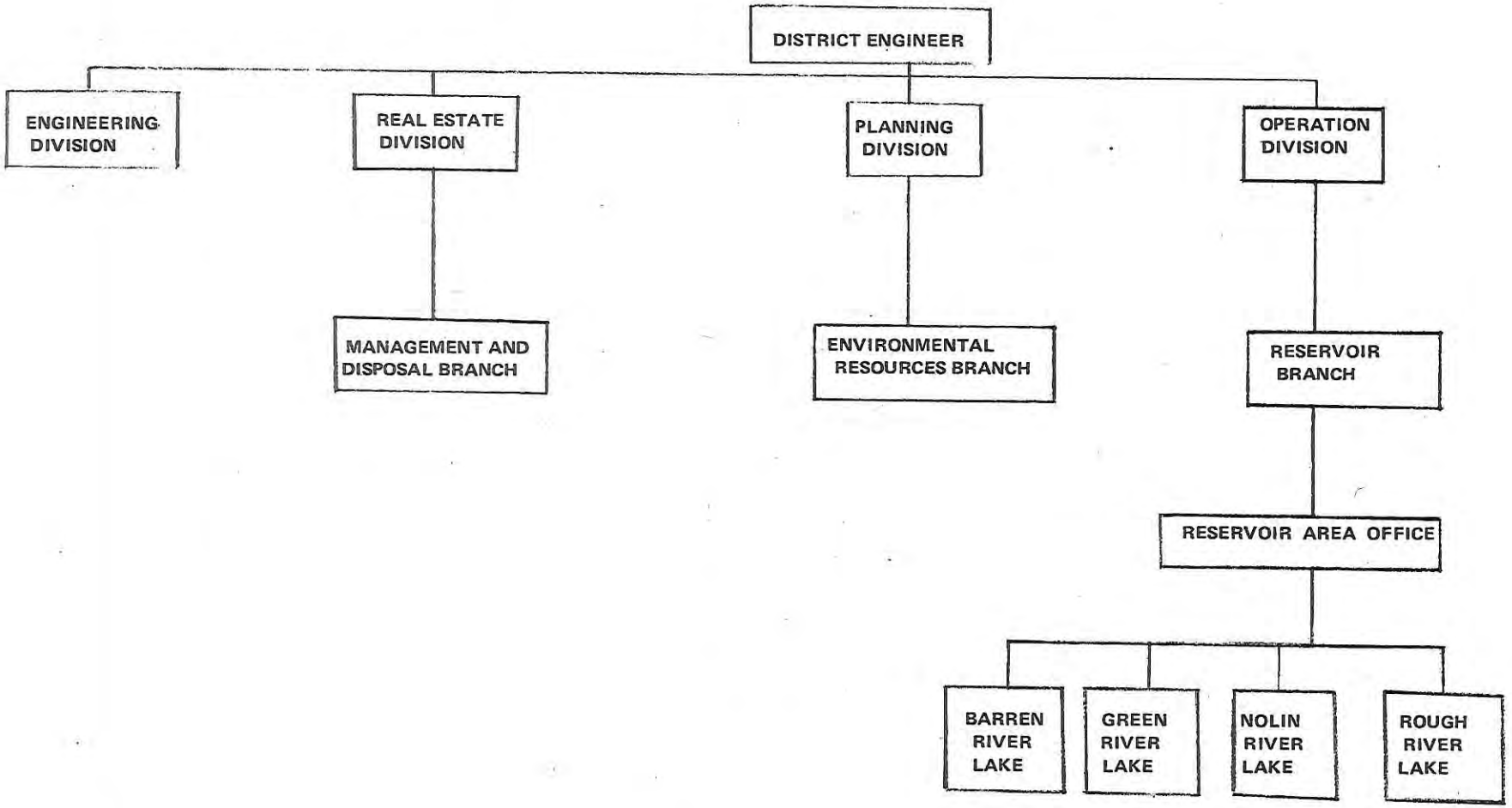
Encroachments. Those project lands abutting privately owned lands have been monumented as a means for guarding against encroachment onto project lands. The Corps will take all practical measures to prevent any encroachments on project lands, and will take prompt action to terminate any unauthorized uses.

Fire Control. The 9,233 acres of project lands are covered with timber and open grass fields which will constitute a major fire hazard in dry weather. In this regard, Corps reservoir management personnel should be adequately trained in fire prevention and control procedures and assigned definite duties in accordance with a specific plan for mobilization for fire suppression. Fire suppression should have priority over any other reservoir management duties.

Erosion Control. It shall be the responsibility of the reservoir management personnel to effect proper erosion control measures over all project lands where corrective treatment becomes necessary for prevention of continuing or accelerating damage to natural features. Erosion control is also essential for preservation of reservoir siltation and for the assurance of maintaining water quality for enjoyment of certain recreational activities. Erosion control of lands

LOUISVILLE DISTRICT
CORPS OF ENGINEERS

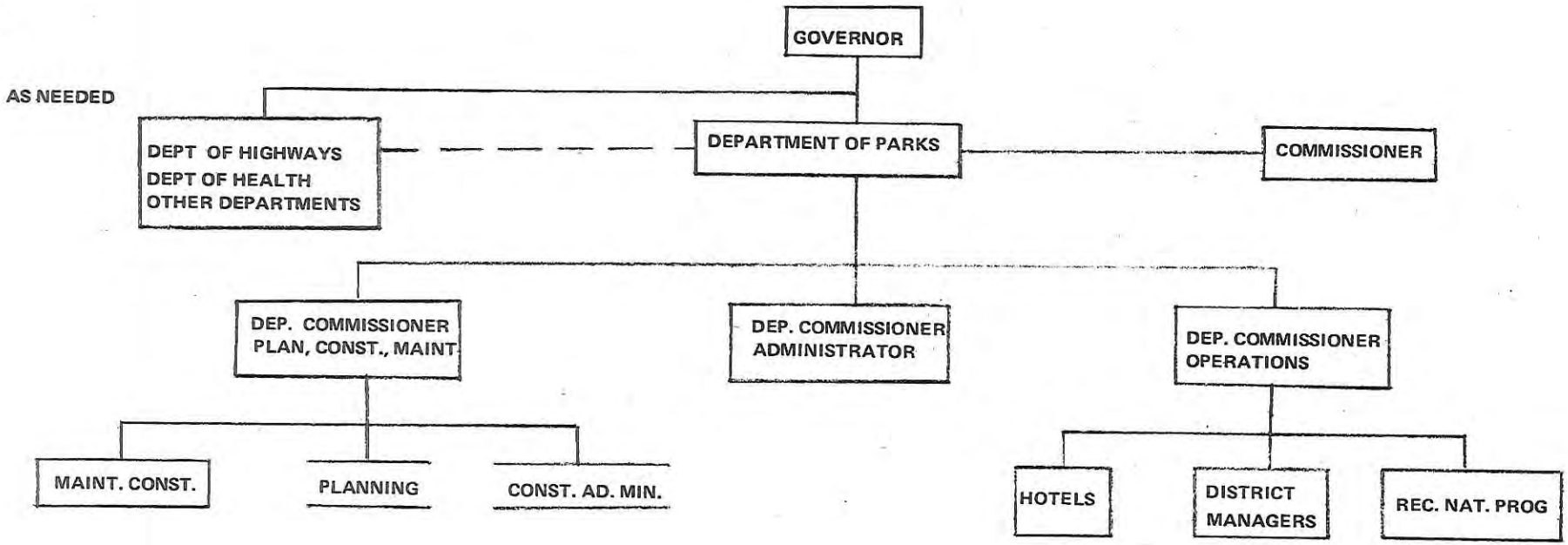
DISTRICT ORGANIZATIONAL CHART FOR ADMINISTRATION
OF ROUGH RIVER LAKE, KENTUCKY*



* This table is subject to change as necessary to reflect any pertinent changes in organizational studies.

COMMONWEALTH OF KENTUCKY

ORGANIZATIONAL CHART FOR ADMINISTRATION
OF ROUGH RIVER LAKE, KENTUCKY



leased to concessionaires will be the concessionaire's responsibility.

Fish and Wildlife Management. Fish and wildlife resources of the project lands are managed under a license agreement by the Commonwealth of Kentucky. A copy of this license is included as Exhibit A. Appendix D (Fish and Wildlife Management Plan) to this Public Use Plan will be developed within the near future.

9–05 Water Use Management

Water Zoning. A water zoning plan to minimize conflicts between water skiing, boating, fishing, swimming and waterfowl refuge is included here as Plate 1B.

Permits for Community Boat Mooring Docks. Permits for community boat docks will be issued by the District. Applications for such permits should be formally considered only in cases which do not conflict with the general public interest.

License for Community Boat Launching Ramps. Applications for such license will be formally considered only when such use does not conflict with the interests of the general public.

Debris Control. Debris in the reservoir is dangerous to pleasure craft and when blown ashore often makes shoreline areas unsightly and unuseable. Therefore, if debris accumulates in the reservoir in volume enough to cause such conditions, a definite program for debris removal and subsequent disposal will be formulated and implemented by reservoir management personnel.

Health, Sanitation and Pollution Control. In promoting the adequate standards relating to health, sanitation and pollution control, all developments for public use will be thoroughly coordinated with the Kentucky Department of Health. It will be the responsibility of the Corps to initiate such coordination for any contemplated development on all project lands. A working agreement, pertaining to all phases of environmental health has been consummated between the Corps and Kentucky Department of Health, which serves as a working guide, and covers all phases of health sanitation.

Law Enforcement. Presently all project lands and water area fall under the jurisdiction of the Kentucky Water Police, and local law officials.

In addition, this project is covered under Title 36, Code of Federal Regulations, and violators of the regulations are subject to citation by Corps Rangers and a fine of not more than $500.00, or imprisonment for not more than six months or both in accordance with section 234 of the River and Harbor Act of 1970.

Forest Management. The forest resources on project lands are a valuable renewable natural resource and through proper management will provide several benefits to the project area. The primary forest management objectives at this project are aesthetic enhancement and watershed protection. The extremely heavy public use being experienced by the presently developed public access areas is resulting in degradation of these areas due to soil compaction and erosion. It is felt that the development of additional access sites will relieve some of the recreation pressure on the existing sites thereby allowing them to regenerate themselves. All open areas to be developed for recreation should be planted at the earliest possible time with tree seedlings of species which are indegenous to the area. Cutting will be restricted to salvage operations for the removal of dead and diseased trees; however, as the removal of these trees is basically for aesthetic or safety reasons in cases where they do not provide a safety hazard, they should be left standing to provide den trees for wildlife. Appendix B (Forest Management Plan) of the Public Use Plan will be developed in accordance with ER–1130–2–400.

Concessionaires will coordinate all cutting, clearing, or planting programs on a continuing basis with the District Engineer to assure conformance with good forestry practies; compatibility with approved sites plans; and lack of conflict with the overall public interest.

All timber lands will be managed with due regard to good forestry practices.

9–06 Estimate of Operations and Maintenance Costs - Ultimate Development. The 841 campsites and 126 public units would require the services of two garbage packer trucks and a three man crew consisting of a driver and two tippers per truck.

Based on facilities to be provided, nine female attendants will be required to provide assistance eight hours a day seven days a week.

a. North Fork	1 Attendant
b. Axtel	2 Attendants
c. Panther Creek	2 Attendants
d. Cave Creek	1 Attendant
e. Laurel Branch	3 Attendants

It is estimated that four additional temporary Rangers would be required to perform necessary surveillance of the visiting public and to check the six water supply systems and the six sewage treatment plants. Eight temporary employees would have to be used to collect entrance fees in the two areas that would qualify as a class "B" campground, as authorized in Public Law-90 – 483, 90th Congress.

Four two-man crews will be required to perform necessary maintenance and clean up of the comfort stations, wash houses, and shelter house. Six additional laborers will be required to perform necessary maintenance and moving in the Public Use Areas.

Additional equipment requirements are as follows:

Item	Number	Unit Cost	Installed
Garbage Packer Trucks	2	$7,500	15,000
Tractors and Mowers	2	4,500	9,000
Small Mowers	4	700	2,800
Pickup Trucks	4	2,800	11,200
Dump Trucks	2	5,500	11,000
TOTAL			49,000

It is estimated that supply costs will increase about $25,000 per year. Utility costs will increase by $15,000 per year.

Additional staffing requirements (based on one calendar year).

Title	Number	Full or Part Time
a. Fee Collectors WG-03	25	1/3 Time
b. Wash House Attendants (Female) WG-03	9	1/3 Time
c. Truck Drivers WG-03	2	1/3 Time
d. Garbage Tippers WG-03	4	1/3 Time
e. Laborers (Mowing and Maintenance) WG-03	14	1/3 Time
f. Temporary Rangers WG-03	4	1/3 Time

The following is an estimate of cost, manpower requirements, and equipment needed to perform services on existing and ultimate development facilities at Rough River Lake.

COST OF OPERATION*

Existing Development		Ultimate Development
Corps	State and Other	Corps
Total Recreation Cost $154,400	$336,988	$297,700

* All estimates based on 1971 prices.

ADDITIONAL STAFFING REQUIREMENTS FOR ULTIMATE DEVELOPMENT

Title	Grade	Number	Time (yr)	Cost
a. Fee Collectors	WG-03	8	1/3 (ea)	20,000
b. Temporary Rangers	WG-03	4	1/2 (ea)	12,300
c. Truck Driver	WG-03	2	1/3	5,000
d. Garbage Tipper	WG-03	4	1/3 (ea)	10,000
e. Laborers-Toilets, Water Treatment	WG-03	8	1/3 (ea)	20,000
f. Laborers-Mowing and General Maintenance	WG-03	6	1/3 (ea)	15,000
g. Attendants (female)	WG-03	8	1/3 (ea)	20,000
			Sub-Total	102,300
Other: Total Estimate for supplies, utilities, administration and other cost.				40,000
			Sub-Total	40,000
			Total	142,300

ADDITIONAL EQUIPMENT REQUIRED NOT INCLUDED IN THE O & M COST ABOVE

Item	Number	Unit Cost	Total Cost
Garbage, Packer Truck	2	$7,500	$15,000
Tractor, Loader and Blade	1	7,500	7,500
Tractor and Mowers (large)	2	5,000	10,000
Tractors and Mowers (small)	4	1,5000	6,000
Pickup Truck	5	3,000	15,000
Dump Truck	2	5,500	11,000
		Total	64,500

SECTION X – RECOMMENDATIONS

10–01 Recommendations. It is recommended that this design memorandum be approved and that it replace the currently approved DM8B as the basis for development and management of both present and future recreation facilities at Rough River Lake, Also it is recommended that the site plans and utility plans presented in this report be approved as a basis for development of detailed construction drawings and specifications.

It is further recommended that at the time detailed construction drawings are made, deviation from the walking distance criteria as stated in EM–1110–2–400 for sanitary facilities be approved. The utility plans presented in this report do not show this deviation. This deviation will reduce the total cost for each site.

ADMINISTRATION AND MANAGEMENT
Coordination With Commonwealth Of Kentucky

Appendix A

DEPARTMENT OF
PARKS

STATE OFFICE BUILDING ANNEX · FRANKFORT, KENTUCKY

April 8, 1970

Colonel John Rhett
District Engineer
U. S. Army Corps of Engineers
Louisville District
Louisville, Kentucky 40201

Dear Colonel Rhett:

I wish to thank you and your staff for their thorough preparation for our meeting on March 24, 1970, to bring me up to date on the Louisville District Corps of Engineers recreation projects in Kentucky. You have assisted me to recognize the many possibilities for additional recreation development in the state, with our two agencies cooperating.

Pursuant to our conversation, I would like to request a lease on the future campground site on Laurel Branch at Rough River Reservoir. Due to the current demand for campgrounds and the availability of several campground developers who are anxious to work with the Department of Parks to build campgrounds immediately, we would ask that this property be obtained and made available to the Department of Parks at the earliest possible date. Please advise us of your anticipated schedule of purchase and availability of this property.

Thank you for your continued cooperation and efforts in behalf of park development in the Commonwealth.

Sincerely yours,

W. James Host
Commissioner

WJH:jw

cc: Commissioner James Shropshire
William H. Ray

COMMONWEALTH OF KENTUCKY

LOUIE B. NUNN
GOVERNOR

DEPARTMENT OF PARKS
FRANKFORT

W. JAMES HOST
COMMISSIONER

October 22, 1970

Colonel John T. Rhett
District Engineer
Louisville District
U. S. Army Corps of Engineers
P. O. Box 59
Louisville, Kentucky 40201

Dear Colonel Rhett:

On August 25, 1970, we reviewed the Master Plan for Rough River State Resort Park with you and your staff. At that time, we discussed the need for the immediate addition of 3,000 camp sites for public use in the State of Kentucky. Pursuant to this discussion, we request that you purchase the peninsula North of the existing State Park which immediately joins the right bank of the dam, approximately 1200 acres, for the development of camp sites at this State Park. These camp sites would be developed in the immediate future according to the Department of Parks Master Plan, subject to your approval.

Deputy Commissioner William H. Ray will meet with your Real Estate and Planning staff to identify this area on your maps and to coordinate our action on this program.

Sincerely,

W. James Host
Commissioner

WJH:cm

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF PARKS
FRANKFORT

LOUIE B. NUNN
GOVERNOR

W. JAMES HOST
COMMISSIONER

December 28, 1970

Colonel John T. Rhett
District Engineer
Louisville District
U. S. Army Corps of Engineers
P. O. Box 59
Louisville, Kentucky 40201

Re: Rough River Lake

Dear Colonel Rhett:

Pursuant to our conversation of December 4, 1970, we wish to request that steps be taken to purchase the peninsula adjacent to the right descending bank of the dam at Rough River Dam State Park on Rough River Lake which is across the reservoir from the lodge, for the purpose of development into a self-contained campground by the Kentucky Department of Parks.

This project has been planned by our Master Planners, Vollmer Engineers, Inc., and is recommended for immediate development. Upon receipt of their final Master Plan for this park, a copy will be sent for your records.

The acquisition of this 326 acre peninsula will allow the Department of Parks to establish a major campground development of approximately 500 sites, with a major recreational complex in the campground center which would include a swimming pool, nature interpretation and indoor-outdoor recreation complex. The plans also included development of a beach and bathhouse and additional marina facilities.

We ask that the highest priority be given to the acquisition of this peninsula area in order that construction can be programmed at the earliest possible

date to meet the existing demand for campgrounds and recreational facilities at this state park.

Please advise us of your expected time schedule for acquisition of this land.

Sincerely,

W. James Host
Commissioner

WJH:cm

cc: William H. Ray
James Shropshire
Don Penegor

August 10, 1964

Colonel Wilbur Roper
District Engineer
Corps of Engineers
830 West Broadway
Louisville, Kentucky

Dear Colonel Roper:

In accordance with the last discussion held between you and representatives of the Corps and the Department of Parks, this letter is our formal request to be relieved of the control, operation and maintenance of all of the fee land previously leased or licensed to this Department on Rough River Reservoir, approved August 18, 1961, with the exception of the following sites:

1. Site #1, Main park area
2. Site #8, Area below dam

Attached are three prints of the reservoir area showing these sites. A reproducible tracing is being forwarded under separate cover.

Very truly yours,

Robert D. Bell
Commissioner

May 24, 1961

District Engineer
U.S. Army Engineer District, Louisville
Corps of Engineers
P. O. Box 59
Louisville 1, Kentucky

Gentlemen:

Herewith, for consideration of the U.S. Army, Corps of Engineers, is an application for license of Rough River Reservoir, Kentucky, for public park and recreational purposes.

The Commonwealth of Kentucky proposes to license, develop, maintain and administer all the lands of the reservoir, except those reserved by the Federal Government for operational purposes, in accordance with policies of the Federal Government and approved Master Plans of the Commonwealth and the Corps of Engineers.

It is anticipated the Corps of Engineers will furnish the Commonwealth legal descriptions of all properties included in the project as well as easement agreements for those lands subject to flooding.

Copies of the Commonwealth Master Plan are inclosed for study, comment and/or approval by the Corps of Engineers in accordance with your regulations.

Cordially yours,

Edward V. Fox

Edward V. Fox
Commissioner

Incls.
1. Master Plan

DEPARTMENT OF THE ARMY

APPLICATION

License for Public Park and Recreational Purposes

TO: District Engineer
U. S. Army Engineer District, Louisville
Corps of Engineers
P. O. Box 59
Louisville 1, Kentucky

1. The Commonwealth of Kentucky, acting by and through the Department of Parks,

hereby makes application for a license for public park and recreational purposes pursuant to Section 209 of the Flood Control Act of 1954 (68 Stat. 1248, 1266; 16 United States Code 460 d) on the following described property under the jurisdiction of the Department of the Army:

1. Land: Rough River Reservoir

2. Improvements:

A. Access Sites Developments constructed and to be constructed by the Corps of Engineers

a. Site 1 (Above Dam)

Toilets (single building for male & female)

Well (complete with hand pump, shelter and drainage)

10 picnic tables (concrete)

3 fireplaces (charcoal type on steel stand)

3 trash receptacles and bases

Launching ramp, parking area & access road

b. Site 2 (State Road 110)

Toilets

Well

15 picnic tables

5 fireplaces

5 trash receptacles and bases

Launching ramp and parking area.

c. Site 3 (Cove Creek)

Toilets

Well

15 picnic tables

5 fireplaces

5 trash receptacles and bases

Launching ramp, parking area & access road.

d. Site 4 (State Road 108)

2 toilets

Well

15 picnic tables

5 fireplaces

5 trash receptacles and bases

Launching ramp, parking area & access road.

e. Site 5 (State Road 65)

Toilets

Well

10 picnic tables

3 fireplaces

3 trash receptacles and bases.

Launching ramp, parking area & access road

f. Site 6 (Everleigh)

2 toilets

Well

10 picnic tables

3 fireplaces

3 trash receptacles and bases

Launching ramp & parking area.

g. Site 7 (Calvert Church) (Future)

Toilets

Well

6 picnic tables

2 fireplaces

2 trash receptacles and bases

Launching ramp, parking area and access road.

h. Site 8 (Below Dam)

Toilets

Well

10 picnic tables

3 fireplaces

3 trash receptacles and bases

Parking area and access road.

i. Site 9 (Panther Creek) (Future)

Toilets

Well

10 picnic tables

3 fireplaces

3 trash receptacles and bases

Launching ramp, parking area, access road

j. Site 10 (Little Clifty) (Future)

Toilets

Well

10 picnic tables

3 fireplaces

3 trash receptacles and bases

Launching ramp, parking area & access road

k. Site 11 (Millins Cemetery)

Toilets

Well

6 picnic tables

2 fireplaces

2 trash receptacles and bases

Launching ramp, parking area and access road.

2. In view of the planned phasing of development over an extended period of time and the expenditure of large sums of money during that period, it is respectfully requested that a license, without fee, be granted for a period of fifty years. Experience in similar operations over many years has proven the need of that period of time to amortize the investments.

3. The applicant agrees that the use of the property by the Commonwealth will be in accordance with applicable laws and pertinent rules and regulations of the Secretary of the Army governing the public use of the reservoir areas.

MASTER PLAN

FOR OPERATION, MAINTENANCE, ADMINISTRATION AND DEVELOPMENT

ROUGH RIVER RESERVOIR, KENTUCKY

I ADMINISTRATION

1. The Commonwealth recognizes that the project was constructed for the primary purpose of flood control and, therefore, the activities of the Federal Government in this field shall have priority over the secondary purpose of recreation. No activities proposed or contemplated by the Commonwealth shall be in conflict with this primary purpose.

2. The Commonwealth, with the interest and aid of all its departmental divisions and agencies, universities, County and Federal agencies, will administer the project for conservation, recreation, forestry, wildlife, public health and other public use purposes.

3. Developments and Administration by the Commonwealth of all lands licensed by the Federal Government will be subject to the availability of funds obtained from operation of the project and from provision of the Kentucky Legislative Assembly.

4. No charge will be made to the public for access to, and general use of, the land, water and facilities provided by the Federal Government. In accordance with Section 209 of the 1954 Flood Control Act, the Commonwealth will provide, and make reasonable charges for, personal services and for accommodations or facilities constructed with funds provided by the Commonwealth or by concessionaries. Each visitor will have the right to elect whether he desires to use

such services without jeopardizing his privileges to use the reservoir area. Personal services will include the following:

a. Information attendant.

b. Attendants at public rest rooms, (Periodic)

c. Naturalist service, (If natural history exhibits are provided)

d. Lifeguard service at beach.

e. First aid attendants.

f. Sanitation service.

g. Police protection and park patrol.

h. Attendants at wildlife exhibits, (if such exhibits are provided)

i. Attendants at recreation fields, (part time)

j. Playground equipment.

k. Parking area guard, (on heavy use periods only)

l. Camping area attendants.

m. Golf greenskeeper and operator for pro-shop, (if golf course is constructed)

II OPERATION

1. The Commonwealth will have complete control of all public traffic into and from the area which is has licensed. This control will include all public use of the project lands and developments except the area and operation structures reserved by the Federal Government.

2. Foot access to the project lands and waters by adjacent land owners and the public will be permitted, except the Commonwealth reserves the right to restrict and control public use in areas and under conditions where such access would be inimical to good project administration.

3. Permits to construct roads and facilities on Federal land may be issued upon prior written approval of the District Engineer.

4. Standards of public sanitation and safety will be provided acceptable to the State Board of Health and State Police.

5. Overnight camping and tenting will not be permitted knowingly below the area of fee purchase by the Federal Government. Influence, where possible, will be exerted to limit such occupation to areas above the flowage easement line.

6. Schedule of Fees and Charges

a. Boats

(1)	Buoy rental - 14' boat ($.50 each additional foot)	$ 3.50 per month
	Inboard boats	$ .50/foot per month
(2)	Dock rental	$ 7.50/$8.50 per month

III DEVELOPMENT

1. For plan of development at each site see appended drawings, R-1 to R-12.

2. The Commonwealth proposes to develop, in accordance with available funds, each access site as the attendance pressure and public needs indicate. The initial major emphasis will be at Site 1, where a complete vacation park is planned. (See drawing R-2). Development of this park is scheduled to start upon assignment of the license and will include a bathing beach and bath-house with convenient parking, a lodge and dining room, swimming pool, boat docks and boat house, cabins, and other recreation facilities.

3. As indicated above, development of the other sites will consist of initial improvement until the trend of attendance and use has been determined for each access site. Development will then follow a phased plan in accordance with available funds. A major effort will be made toward the acquisition of additional lands and the improvement and provision of roads for ready access to all recreational areas.

4. Exclusive of the Federal Government reservation and the proposed Commonwealth area, there are many miles of privately-owned lands bordering the perimeter of the project which hold possibilities of development for cottages, resorts, tourist camps, stores, concessions, hotels and other conveniences. Within its powers the Commonwealth will endeavor to control and zone such operations in order to make the greatest possible use of the project potential for public recreation as well as to provide taxable property for the Commonwealth. The encouragement and emphasis on sound planning of private development is recognized as being of primary

importance to public interest and the future of the project as a desirable public recreation center.

5. The following proposed improvements have been included in a program for development of Rough River Reservoir:

Fiscal Years 1961 - 1963

1.	Land acquisition	$ 100,000
2.	Beach construction	50,000
3.	Buildings	610,000
4.	Water supply & distribution	85,000
5.	Picnic areas	15,000
6.	Roads and parking	130,000

Fiscal Years 1963 - 1965

1.	Airport	85,000
2.	Golf Course	90,000

Fiscal Years 1965 - 1967

1.	Airport Buildings	50,000
2.	Picnic Area expansion	30,000
3.	Expansion of Service Area	50,000

Total proposed construction 1961 - 1967 $1,295,000

IV Division of Game

The Division of Game, Department of Fish and Wildlife Resources, will be charged with the responsibility of managing wildlife species on all fee acreage outside of the recreational areas at Rough River Reservoir. Past efforts of this Department in the vicinity of this reservoir has resulted in adequate stocking of all adapted game species and the acquisition of considerable knowledge regarding the management of woodland and farm food and cover vegetation. Upon assignment of the area by license to the Commonwealth, the Department, through its Forest Game, Farm Game and Waterfowl Restoration projects, will initiate surveys designed to serve as the basis for specific area management plans. Completed plans will include provisions for any additional stocking which may be deemed necessary in the future and for manipulation of food and cover to create optimum habitat for all game species. Presently-assigned Area Biologists will conduct the surveys and effect planned management operations.

V Division of Fisheries

Since 1958, the Kentucky Division of Fisheries has been conducting a biological survey of the Rough River Reservoir area. These surveys are designed to determine the standing crops of fishes in the river and the subsequent standing crops in the years following impoundment. Concurrently, public usage of the project area is being studied in order to measure the future increases in use and to determine the monetary expenditures of present and future sport fishermen.

With the above information available, the Division of Fisheries will be in an excellent position to manage the sport fishery on a sustained basis. During 1960, the Division stocked a large number of largemouth bass and redeard sunfish, because it was found that these two desirable sport fishes were not present in the river system above Rough River Dam. Stocking with other species is planned where need for them is discovered. Additional limnological and biological investigations are planned for the project areas on an intensified scale during the next five years. All known and necessary fishery management techniques will be employed by our biologists in future years to maintain a satisfactory sport fishery in the reservoir.

Zoning of the pool will be accomplished in accordance with a usage plan prepared jointly with other Commonwealth departments. It is not contemplated that commercial fishing will be permitted except as a conservation measure.

VI FORESTRY AND AGRICULTURE

Because of the project topography, it is unlikely that any fields will be found suitable for pasture or crops. Should such areas be found, the Commonwealth may develop them for the production of feed and cover for game and other wildlife.

CONSTRUCTION ESTIMATE

Appendix B

Tabulation of Existing Facilities

Site 1 — State Park

Boating and Fishing	200 Spaces 48 Foot Ramp
Camping	0 Units
Picnicking	7 Units
Swimming	45,000 Sq Ft Beach (Swimming Pool)
Parking	350 Spaces

Site 2 — Laurel Branch

Boating and Fishing	150 Spaces 24 Foot Ramp
Camping	33 Units
Picnicking	9 Units
Swimming	No Facilities

Site 3 — Cave Creek

Boating and Fishing	150 Spaces 24 Foot Ramp
Camping	6 Units
Picnicking	3 Units
Swimming	No Facilities

Site 4 — Axtel

Boating and Fishing	146 Spaces 24 Foot Ramp
Camping	87 Units
Picnicking	8 Units
Swimming	No Facilities

Site 5 — North Fork

Boating and Fishing	144 Spaces 24 Foot Ramp
Camping	0 Units
Picnicking	0 Units
Swimming	No Facilities

Site 6 — Everleigh

Boating and Fishing	40 Spaces 24 Foot Ramp
Camping	0 Units
Picnicking	0 Units
Swimming	No Facilities

Site 7 — Calvert

Boating and Fishing	0 Spaces No Ramp
Camping	0 Units
Picnicking	0 Units
Swimming	No Facilities

Site 8 — Below Dam

Boating and Fishing	0 Spaces No Ramp
Camping	50 Units
Picnicking	3 Units
Swimming	No Facilities
Parking	350 Spaces

Site 9 — Panther Creek

Boating and Fishing	0 Spaces No Ramp
Camping	0 Units
Picnicking	0 Units
Swimming	No Facilities

Site 10 — Little Clifty Creek

Boating and Fishing	0 Spaces No Ramp
Camping	0 Units
Picnicking	0 Units
Swimming	No Facilities

Site 11 — Peter Cave

Boating and Fishing	150 Spaces 24 Foot Ramp
Camping	0 Units
Picnicking	6 Units
Swimming	No Facilities

Summary of Expenditures through FY 1969. Below is a tabulation of monies spent for recreational development through FY 1969.

Rough River State Park - Site -1	Initial Construction Funds	Code 710 & 711 Funds	APW Funds
Roads	25,000		
Parking	15,000		
Ramp	26,000		
Toilets			
Water Supply			
Picnic Units			
E & D and S & A	14,000		
Monumentation & Shoreline Clearing			3,000
	80,000		3,000
Total - 83,000			
Laurel Branch Site - 2			
Roads	9,000		
Parking	27,700		
Ramp	5,300		
Toilets	6,200		
Water Supply	5,600		
Picnic Units	7,100		
Camping Units		8,800	
E & D and S & A	12,800		
Monumentation & Shoreline Clearing			40,200
	73,700	8,800	40,200
Total - 122,700			
Cave Creek Site - 3			
Roads	32,500		
Parking	21,100		
Ramps	22,800		
Toilets	7,600		
Water Supply	5,500	2,000	
Picnic Units	5,600		2,000
Camping Units			
E & D and S & A	20,200		
Monumentation & Shoreline Clearing			18,300
	116,300	2,000	20,300
Total - 138,600			

Axtel Site - 4	Initial Construction Funds	Code 710 & 711 Funds	APW Funds
Roads	14,400		
Parking	9,000		
Ramps	4,400		
Toilets	7,400		
Water Supply	1,600		
Picnic Units	2,800		
Camping Units		49,300	
E & D and S & A	8,400		
Monumentation & Shoreline Clearing			58,500
	48,000	49,300	58,500
Total - 155,700			

North Fork Site - 5			
Roads	27,900		
Parking	11,500		
Ramp	6,600		
Toilets	7,100		
Water Supply	1,700	38,000	
Picnic Units	4,700		2,000
Camping Units		47,500	
E & D and S & A	12,500		
Monumentation & Shoreline Clearing			24,000
	72,000	85,500	26,000
Total - 183,500			

Everleigh Site - 6			
Roads	17,100		
Parking	13,500		
Ramp	6,500		
Toilets			
Water Supply			
Picnic Units			
E & D and S & A	7,800		
Monumentation & Shoreline Clearing		3,000	7,400
	44,900	3,000	7,400
Total - 55,300			

Below Dam Site - 8	Initial Construction Funds	Code 710 & 711 Funds	APW Funds
Roads	25,500		
Parking	16,200		
Ramp			
Toilets	7,300		
Water Supply	1,700		
Picnic Units	4,700		
E & D and S & A	11,700		2,000
Monumentation & Shoreline Clearing		3,000	9,600
Total - 81,700	67,100	3,000	11,600
Calvert Site - 7			
Panther Creek Site - 9			
Little Clifty Site - 10			
	No Development	No Development	9,000 Monumentation of Sites
Total - 9,000			
Peter Cave Site - 11			
Roads	34,800		
Parking	18,100		
Ramp	28,100		
Toilets	8,600		
Water Supply	1,600		
Picnic Units	2,800	3,000	
E & D and S & A	19,800		
Monumentation & Shoreline Clearing			20,300
Total - 137,100	113,800	3,000	20,300

SCHEDULE OF DEVELOPMENT

FY 1974 - Funds Available	0
FY 1975 - Funds Requested	$493,000.
North Fork (Site 4)	
2 Toilets, Flush	50,000
1 Wash Building	78,000
Job Sewage Lines	20,000
Job Water Lines	10,000
1 Control Station	20,000
Job Widen Boat Ramp	20,000
5 Waste Water Dumps	5,000
S & I	14,000
By Contract	$217,000
24 LF Camp Area Road	36,000
Campsites	20,000
S & I	5,000
Hired Labor	61,000
Site Total	$278,000
Axtel (Site 5)	
2 Toilet, Flush	50,000
1 Wash Building	80,000
Job Sewage Lines	10,000
Job Water Lines	8,000
1000 LF Road	10,000
1 Sanitary Dump Station	1,300
6 Waste Water Dumps	6,000
560 SY Exp. Boat Ramp	20,000
1 Control Station	20,000
S & I	9,700
By Contract	$215,000
FY 1976 - Funds Requested	$738,725
Laurel Branch (Site 2)	
Acquisition of 194.1 acres of additional land	141,625
State Park Site (Site 1)	
Acquisition of 326 acres of additional land	127,100
E & D for Development of	
Laurel Branch (Site 2)	300,000
Cave Creek (Site 3)	170,000
	$470,000

FY 1977 - Funds Requested	$3,943,662
Balance to Complete facilities at:	
Laurel Branch (Site 2)	1,536,746
Cave Creek (Site 3)	1,061,522
North Fork (Site 4)	477,144
Axtel (Site 5)	868,250
FY 1978 - Funds Requested	52,220
E & D for Development at:	
Clifty Creek	
FY 1979 - Funds Requested	618,138
Balance to Complete Facilities at:	
Clifty Creek	

COST ESTIMATE FOR FACILITIES DEVELOPMENT

DESCRIPTION OF WORK	UNIT OF WORK	UNIT COST	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976 QUANTITY	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976 COST	FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976 QUANTITY	FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976 COST	HIRED LABOR COST UNIT COST	HIRED LABOR COST COST
BRIDGE	JOB							
BOAT LAUNCHING RAMP (CONCRETE)	SQ.YD.	20.00	1,000	20,000.00				
ROAD 20 BITUMINOUS	LIN. FT.	17.00						
ROAD 18 BITUMINOUS	LIN. FT.	14.00	19,200	268,800.00				
ROAD 12 BITUMINOUS	LIN. FT.	10.00	10,200	102,000.00				
ROAD (18 GRAVEL)	LIN. FT.	12.00						
ROAD (12 GRAVEL)	LIN. FT.	9.00						
PARKING (BITUMINOUS PAVING)	SQ. YD.	7.00	936	6,552.00				
WATER SUPPLY (GAL/DAY)	G.P.D.	2.00	30,000	60,000.00				
WATER DISTRIBUTION LINES	LIN. FT.	2.94	20,255	59,470.00				
COMFORT STATION (FLUSH)	EACH	20,000.00	10	200,000.00				
WASH BUILDING (CAMP AREA)	EACH	60,000.00	6	360,000.00				
SEWAGE TREATMENT PLANT	G.P.D.	3.50	167,000	584,500.00				
SEWAGE LIFT STATIONS	EACH	10,000.00	2	20,000.00				
SEWAGE FORCE MAINS	LIN. FT.	6.00	350	2,100.00				
SEWAGE LINES	LIN. FT.	5.00	17,535	87,675.00				
SEWAGE SEPTIC SYSTEM	G.P.D.							
SANITARY DUMP STATION	EACH	1,700.00	3	5,100.00				
CAMPING FACILITIES (DRIVE IN)	EACH	300.00	350	105,000.00				
CAMPING FACILITIES (WALK IN)	EACH	200.00						
PICNIC FACILITIES	EACH	100.00	30	3,000.00				
PICNIC SHELTER	EACH	7,000.00						
PICNIC SHELTER WITH TOILET	EACH	25,000.00						
MOTEL & LODGE COMPLEX	JOB							
MARINA DEVELOPMENT	JOB							
BOAT LOADING DOCKS	EACH	2,500.00	1	2,500.00				
ENTRANCE CONTROL STATION	EACH	15,000.00	1	15,000.00				
OVERLOOK	EACH	10,000.00						
FOOT TRAILS	LIN. FT.	2.00	5,720	28,600.00				
ELECTRICAL DISTRIBUTION	LIN. FT.	5.00	100	20,000.00				
TREE PLANTING (SEEDLINGS)	ACRE	200.00						
SIGNS	SQ. FT.	2.50	200	500.00				
FOOTBRIDGE	JOB							
FISHING PIER	JOB							
DRINKING FOUNTAINS	EACH		4	2,800.00				
ROAD RELOCATION	JOB							
BEACH & DIVING AREA	JOB							
BEACH BATH HOUSE	JOB							
RESTAURANT	JOB							
INTERPRETIVE CENTER	JOB							
FAUCETS	JOB	150.00	43	6,450.00				
CONSTRUCTION COST				1,960,047.00				
CONTINGENCIES 15%				294,007.00				
ENG. & DESIGN 9%				202,865.00				
SUP. & ADMIN. 6%				147,415.00				
TOTAL DEVELOPMENT COST				2,604,334.00				

LAUREL BRANCH
SITE 2

LAUREL BRANCH
SITE 2

COST ESTIMATE FOR FACILITIES DEVELOPMENT

DESCRIPTION OF WORK	UNIT OF WORK	UNIT COST	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976 QUANTITY	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976 COST	FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976 QUANTITY	FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976 COST	HIRED LABOR COST UNIT COST	HIRED LABOR COST COST
BRIDGE	JOB							
BOAT LAUNCHING RAMP (CONCRETE)	SQ.YD.	20.00						
ROAD 20 BITUMINOUS	LIN. FT.	17.00	1,800	30,600.00				
ROAD 18 BITUMINOUS	LIN. FT.	14.00	5,600	78,400.00				
ROAD 12 BITUMINOUS	LIN. FT.	10.00	12,400	124,000.00				
ROAD (18 GRAVEL)	LIN. FT.	12.00						
ROAD (12 GRAVEL)	LIN. FT.	9.00						
PARKING (BITUMINOUS PAVING)	SQ. YD.	7.00	3,765	26,355.00				
WATER SUPPLY (GAL/DAY)	G.P.D.	2.00	34,600	69,200.00				
WATER DISTRIBUTION LINES	LIN. FT.	3.30	7,970	26,300.00				
COMFORT STATION (FLUSH)	EACH	20,000.00	5	100,000.00				
WASH BUILDING (CAMP AREA)	EACH	60,000.00	3	180,000.00				
SEWAGE TREATMENT PLANT	G.P.D.	3.50	81,000	283,500.00				
SEWAGE LIFT STATIONS	EACH	10,000.00	2	20,000.00				
SEWAGE FORCE MAINS	LIN. FT.	10.00	250	2,500.00				
SEWAGE LINES	LIN. FT.	8.25	8,420	69,465.00				
SEWAGE SEPTIC SYSTEM	G.P.D.	4.00						
SANITARY DUMP STATION	EACH	1,700.00	2	3,400.00				
CAMPING FACILITIES (DRIVE IN)	EACH	300.00	195	58,500.00				
CAMPING FACILITIES (WALK IN)	EACH	200.00						
PICNIC FACILITIES	EACH	100.00						
PICNIC SHELTER	EACH	7,000.00						
PICNIC SHELTER WITH TOILET	EACH	25,000.00						
MOTEL & LODGE COMPLEX	JOB							
MARINA DEVELOPMENT	JOB							
BOAT LOADING DOCKS	EACH	2,500.00						
ENTRANCE CONTROL STATION	EACH	15,000.00	1	15,000.00				
OVERLOOK	EACH	10,000.00						
FOOT TRAILS	LIN. FT.	2.00	5,600	11,200.00				
ELECTRICAL DISTRIBUTION	LIN. FT.	5.00	4,160	20,800.00				
TREE PLANTING (SEEDLINGS)	ACRE	200.00	20	4,000.00				
SIGNS	SQ. FT.	2.50	50	5,000.00				
FOOTBRIDGE	JOB							
FISHING PIER	JOB							
DRINKING FOUNTAINS	EACH							
ROAD RELOCATION	JOB							
BEACH & DIVING AREA	JOB							
BEACH BATH HOUSE	JOB							
RESTAURANT	JOB							
INTERPRETIVE CENTER	JOB							
FAUCETS	JOB	150.00	20	3,000.00				
CONSTRUCTION COST				1,131,220.00				
CONTINGENCIES 15%				169,683.00				
ENG. & DESIGN 9%				117,081.00				
SUP. & ADMIN. 6%				85,079.00				
TOTAL DEVELOPMENT COST				1,503,063.00				

CAVE CREEK
SITE 3

CAVE CREEK
SITE 3

COST ESTIMATE FOR FACILITIES DEVELOPMENT

DESCRIPTION OF WORK	UNIT OF WORK	UNIT COST	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976		FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976		HIRED LABOR COST	
			QUANTITY	COST	QUANTITY	COST	UNIT COST	COST
BRIDGE	JOB							
BOAT LAUNCHING RAMP (CONCRETE)	SQ.YD.	20.00	500	10,000.00				
ROAD 20 BITUMINOUS	LIN. FT.	17.00						
ROAD 18 BITUMINOUS	LIN. FT.	14.00	800	11,200.00				
ROAD 12 BITUMINOUS	LIN. FT.	10.00	5,200	52,000.00				
ROAD (18 GRAVEL)	LIN. FT.	12.00						
ROAD (12 GRAVEL)	LIN. FT.	9.00						
PARKING (BITUMINOUS PAVING)	SQ. YD.	7.00						
WATER SUPPLY (GAL/DAY)	G.P.D.	2.00						
WATER DISTRIBUTION LINES	LIN. FT.	5.00						
COMFORT STATION (FLUSH)	EACH	20,000.00	5	100,000.00				
WASH BUILDING (CAMP AREA)	EACH	60,000.00	4	240,000.00				
SEWAGE TREATMENT PLANT	G.P.D.	4.00	90,000	360,000.00				
SEWAGE LIFT STATIONS	EACH	10,000.00	4	40,000.00				
SEWAGE FORCE MAINS	LIN. FT.	6.00	1,380	8,280.00				
SEWAGE LINES	LIN. FT.	5.00	6,610	33,050.00				
SEWAGE SEPTIC SYSTEM	G.P.D.	4.00						
SANITARY DUMP STATION	EACH	1,700.00	1	1,700.00				
CAMPING FACILITIES (DRIVE IN)	EACH	300.00	83	24,900.00				
CAMPING FACILITIES (WALK IN)	EACH	200.00	2	400.00				
PICNIC FACILITIES	EACH	100.00						
PICNIC SHELTER	EACH	7,000.00						
PICNIC SHELTER WITH TOILET	EACH	25,000.00						
MOTEL & LODGE COMPLEX	JOB							
MARINA DEVELOPMENT	JOB							
BOAT LOADING DOCKS	EACH	2,500.00						
ENTRANCE CONTROL STATION	EACH	15,000.00	1	15,000.00				
OVERLOOK	EACH	10,000.00						
FOOT TRAILS	LIN. FT.	2.00						
ELECTRICAL DISTRIBUTION	LIN. FT.	5.00	320	1,600.00				
TREE PLANTING (SEEDLINGS)	ACRE	200.00						
SIGNS	SQ. FT.	2.50	20	50.00				
FOOTBRIDGE	JOB							
FISHING PIER	JOB							
DRINKING FOUNTAINS	EACH	700.00						
ROAD RELOCATION	JOB							
BEACH & DIVING AREA	JOB							
BEACH BATH HOUSE	JOB							
RESTAURANT	JOB							
INTERPRETIVE CENTER	JOB							
STAIRS	JOB							
	CONSTRUCTION COST			898,180.00				
	CONTINGENCIES 15%			134,900.00				
	ENG. & DESIGN 9%			80,800.00				
	SUP. & ADMIN. 6%			53,850.00				
	TOTAL DEVELOPMENT COST			1,167,730.00				

AXTEL
SITE 4

AXTEL
SITE 4

COST ESTIMATE FOR FACILITIES DEVELOPMENT

DESCRIPTION OF WORK	UNIT OF WORK	UNIT COST	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976 QUANTITY	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976 COST	FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976 QUANTITY	FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976 COST	HIRED LABOR COST UNIT COST	HIRED LABOR COST COST
BRIDGE	JOB							
BOAT LAUNCHING RAMP (CONCRETE)	SQ.YD.	20.00						
ROAD 20 BITUMINOUS	LIN. FT.	17.00	500	10,000.00				
ROAD 18 BITUMINOUS	LIN. FT.	14.00						
ROAD 12 BITUMINOUS	LIN. FT.	10.00						
ROAD (18 GRAVEL)	LIN. FT.	12.00						
ROAD (12 GRAVEL)	LIN. FT.	9.00						
PARKING (BITUMINOUS PAVING)	SQ. YD.	7.00						
WATER SUPPLY (GAL/DAY)	G.P.D.	2.00	6,720	13,440.00				
WATER DISTRIBUTION LINES	LIN. FT.	3.30	3,420	11,302.00				
COMFORT STATION (FLUSH)	EACH	20,000.00	3	60,000.00				
WASH BUILDING (CAMP AREA)	EACH	60,000.00	2	120,000.00				
SEWAGE TREATMENT PLANT	G.P.D.	4.00	57,000	228,000.00				
SEWAGE LIFT STATIONS	EACH	10,000.00	2	20,000.00				
SEWAGE FORCE MAINS	LIN. FT.	8.50	180	1,530.00				
SEWAGE LINES	LIN. FT.	7.50	3,830	28,725.00				
SEWAGE SEPTIC SYSTEM	G.P.D.	4.00						
SANITARY DUMP STATION	EACH	1,700.00	1	1,700.00				
CAMPING FACILITIES (DRIVE IN)	EACH	300.00	38	11,400.00				
CAMPING FACILITIES (WALK IN)	EACH	200.00						
PICNIC FACILITIES	EACH	100.00	5	500.00				
PICNIC SHELTER	EACH	7,000.00						
PICNIC SHELTER WITH TOILET	EACH	25,000.00						
MOTEL & LODGE COMPLEX	JOB							
MARINA DEVELOPMENT	JOB							
BOAT LOADING DOCKS	EACH	2,300.00						
ENTRANCE CONTROL STATION	EACH	15,000.00	1	15,000.00				
OVERLOOK	EACH	10,000.00						
FOOT TRAILS	LIN. FT.	2.00						
ELECTRICAL DISTRIBUTION	LIN. FT.	5.00	2,320	11,600.00				
TREE PLANTING (SEEDLINGS)	ACRE	200.00	20	4,000.00				
SIGNS	SQ. FT.	2.50	20	5,000.00				
FOOTBRIDGE	JOB							
FISHING PIER	JOB							
DRINKING FOUNTAINS	EACH	700.00	1	700.00				
ROAD RELOCATION	JOB							
BEACH & DIVING AREA	JOB							
BEACH BATH HOUSE	JOB							
RESTAURANT	JOB							
INTERPRETIVE CENTER	JOB							
FAUCETS	JOB	150.00	7	1,050.00				
	CONSTRUCTION COST			603,947.00				
	CONTINGENCIES 15%			90,600.00				
	ENG. & DESIGN 9%			54,350.00				
	SUP. & ADMIN. 6%			36,250.00				
	TOTAL DEVELOPMENT COST			785,147.00				

NORTH FORK
SITE 5

NORTH FORK
SITE 5

COST ESTIMATE FOR FACILITIES DEVELOPMENT

DESCRIPTION OF WORK	UNIT OF WORK	UNIT COST	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976 QUANTITY	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976 COST	FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976 QUANTITY	FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976 COST	HIRED LABOR COST UNIT COST	HIRED LABOR COST COST
BRIDGE	JOB							
BOAT LAUNCHING RAMP (CONCRETE)	SQ.YD.	20.00						
ROAD 20 BITUMINOUS	LIN. FT.	17.00						
ROAD 18 BITUMINOUS	LIN. FT.	14.00						
ROAD 12 BITUMINOUS	LIN. FT.	10.00						
ROAD (18 GRAVEL)	LIN. FT.	12.00						
ROAD (12 GRAVEL)	LIN. FT.	9.00						
PARKING (BITUMINOUS PAVING)	SQ. YD.	7.00						
WATER SUPPLY (GAL/DAY)	G.P.D.							
WATER DISTRIBUTION LINES	LIN. FT.							
COMFORT STATION (FLUSH)	EACH	28,000.00						
WASH BUILDING (CAMP AREA)	EACH	60,000.00						
SEWAGE TREATMENT PLANT	G.P.D.							
SEWAGE LIFT STATIONS	EACH	10,000.00						
SEWAGE FORCE MAINS	LIN. FT.							
SEWAGE LINES	LIN. FT.							
SEWAGE SEPTIC SYSTEM	G.P.D.							
SANITARY DUMP STATION	EACH	1,700.00						
CAMPING FACILITIES (DRIVE IN)	EACH	300.00						
CAMPING FACILITIES (WALK IN)	EACH	200.00						
PICNIC FACILITIES	EACH	100.00						
PICNIC SHELTER	EACH	7,000.00						
PICNIC SHELTER WITH TOILET	EACH	25,000.00						
MOTEL & LODGE COMPLEX	JOB							
MARINA DEVELOPMENT	JOB							
BOAT LOADING DOCKS	EACH	2,500.00						
ENTRANCE CONTROL STATION	EACH	15,000.00						
OVERLOOK	EACH	10,000.00						
FOOT TRAILS	LIN. FT.	2.00						
ELECTRICAL DISTRIBUTION	LIN. FT.	5.00			850	4,250.00		
TREE PLANTING (SEEDLINGS)	ACRE	200.00						
SIGNS	SQ. FT.	2.50						
FOOTBRIDGE	JOB							
FISHING PIER	JOB							
DRINKING FOUNTAINS	EACH							
ROAD RELOCATION	JOB							
BEACH & DIVING AREA	JOB							
BEACH BATH HOUSE	JOB							
RESTAURANT	JOB							
INTERPRETIVE CENTER	JOB							
STAIRS	JOB							
CONSTRUCTION COST						4,250.00		
CONTINGENCIES 15%						637.00		
ENG. & DESIGN 9%						440.00		
SUP. & ADMIN. 6%						319.00		
TOTAL DEVELOPMENT COST						5,646.00		

EVERLEIGH
SITE 6

EVERLEIGH
SITE 6

COST ESTIMATE FOR FACILITIES DEVELOPMENT

DESCRIPTION OF WORK	UNIT OF WORK	UNIT COST	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976 QUANTITY	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976 COST	FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976 QUANTITY	FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976 COST	HIRED LABOR COST UNIT COST	HIRED LABOR COST COST
BRIDGE	JOB							
BOAT LAUNCHING RAMP (CONCRETE)	SQ.YD.	20.00			222	40,000.00		
ROAD 20 BITUMINOUS	LIN. FT.	17.00			1,000	17,000.00		
ROAD 18 BITUMINOUS	LIN. FT.	14.00						
ROAD 12 BITUMINOUS	LIN. FT.	10.00						
ROAD (18 GRAVEL)	LIN. FT.	12.00						
ROAD (12 GRAVEL)	LIN. FT.	9.00						
PARKING (BITUMINOUS PAVING)	SQ. YD.	7.00			9,333	65,330.00		
WATER SUPPLY (GAL/DAY)	G.P.D.							
WATER DISTRIBUTION LINES	LIN. FT.							
COMFORT STATION (FLUSH)	EACH	20,000.00			1	20,000.00		
WASH BUILDING (CAMP AREA)	EACH	60,000.00						
SEWAGE TREATMENT PLANT	G.P.D.							
SEWAGE LIFT STATIONS	EACH	10,000.00			1	10,000.00		
SEWAGE FORCE MAINS	LIN. FT.							
SEWAGE LINES	LIN. FT.							
SEWAGE SEPTIC SYSTEM	G.P.D.							
SANITARY DUMP STATION	EACH	1,700.00						
CAMPING FACILITIES (DRIVE IN)	EACH	300.00						
CAMPING FACILITIES (WALK IN)	EACH	200.00						
PICNIC FACILITIES	EACH	100.00			10	1,000.00		
PICNIC SHELTER	EACH	7,000.00						
PICNIC SHELTER WITH TOILET	EACH	25,000.00						
MOTEL & LODGE COMPLEX	JOB							
MARINA DEVELOPMENT	JOB							
BOAT LOADING DOCKS	EACH	2,500.00			1	2,500.00		
ENTRANCE CONTROL STATION	EACH	15,000.00						
OVERLOOK	EACH	10,000.00						
FOOT TRAILS	LIN. FT.	2.00						
ELECTRICAL DISTRIBUTION	LIN. FT.	5.00			1,000	2,000.00		
TREE PLANTING (SEEDLINGS)	ACRE	200.00						
SIGNS	SQ. FT.	2.50			10	25.00		
FOOTBRIDGE	JOB							
FISHING PIER	JOB							
DRINKING FOUNTAINS	EACH							
ROAD RELOCATION	JOB							
BEACH & DIVING AREA	JOB							
BEACH BATH HOUSE	JOB							
RESTAURANT	JOB							
INTERPRETIVE CENTER	JOB							
STAIRS	JOB							
	CONSTRUCTION COST					157,855.00		
	CONTINGENCIES 15%					22,678.00		
	ENG. & DESIGN 9%					16,338.00		
	SUP. & ADMIN. 6%					11,872.00		
	TOTAL DEVELOPMENT COST					209,743.00		

CALVERT SITE 7

COST ESTIMATE FOR FACILITIES DEVELOPMENT

DESCRIPTION OF WORK	UNIT OF WORK	UNIT COST	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976		FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976		HIRED LABOR COST	
			QUANTITY	COST	QUANTITY	COST	UNIT COST	COST
BRIDGE	JOB							
BOAT LAUNCHING RAMP (CONCRETE)	SQ.YD.	20.00	3,600	72,000.00				
ROAD 20 BITUMINOUS	LIN. FT.	17.00	4,800	81,600.00				
ROAD 18 BITUMINOUS	LIN. FT.	14.00	6,600	92,400.00				
ROAD 12 BITUMINOUS	LIN. FT.	10.00	2,400	24,000.00				
ROAD (18 GRAVEL)	LIN. FT.	12.00						
ROAD (12 GRAVEL)	LIN. FT.	9.00						
PARKING (BITUMINOUS PAVING)	SQ. YD.	7.00	1,260	8,820.00				
WATER SUPPLY (GAL/DAY)	G.P.D.	2.00	10,000	20,000.00				
WATER DISTRIBUTION LINES	LIN. FT.	3.30	5,350	17,600.00				
COMFORT STATION (FLUSH)	EACH	20,000.00	5	100,000.00				
WASH BUILDING (CAMP AREA)	EACH	60,000.00	2	120,000.00				
SEWAGE TREATMENT PLANT	G.P.D.	4.00	47,000	188,000.00				
SEWAGE LIFT STATIONS	EACH	10,000.00	2	20,000.00				
SEWAGE FORCE MAINS	LIN. FT.	6.75	1,530	10,327.00				
SEWAGE LINES	LIN. FT.	5.75	3,740	21,505.00				
SEWAGE SEPTIC SYSTEM	G.P.D.	4.00						
SANITARY DUMP STATION	EACH	1,700.00	1	1,700.00				
CAMPING FACILITIES (DRIVE IN)	EACH	300.00	124	37,200.00				
CAMPING FACILITIES (WALK IN)	EACH	200.00						
PICNIC FACILITIES	EACH	100.00						
PICNIC SHELTER	EACH	7,000.00						
PICNIC SHELTER WITH TOILET	EACH	25,000.00						
MOTEL & LODGE COMPLEX	JOB							
MARINA DEVELOPMENT	JOB							
BOAT LOADING DOCKS	EACH	2,500.00	1	2,500.00				
ENTRANCE CONTROL STATION	EACH	15,000.00	1	15,000.00				
OVERLOOK	EACH	10,000.00						
FOOT TRAILS	LIN. FT.	2.00	12,400	24,800.00				
ELECTRICAL DISTRIBUTION	LIN. FT.	5.00	3,040	15,200.00				
TREE PLANTING (SEEDLINGS)	ACRE	200.00	3	600.00				
SIGNS	SQ. FT.	2.50	40	100.00				
FOOTBRIDGE	JOB							
FISHING PIER	JOB							
DRINKING FOUNTAINS	EACH	700.00	1	700.00				
ROAD RELOCATION	JOB							
BEACH & DIVING AREA	JOB							
BEACH BATH HOUSE	JOB							
RESTAURANT	JOB							
INTERPRETIVE CENTER	JOB							
FAUCETS	JOB	150.00	10	1,500.00				
	CONSTRUCTION COST			875,552.00				
	CONTINGENCIES 15%			131,333.00				
	ENG. & DESIGN 9%			90,620.00				
	SUP. & ADMIN. 6%			65,850.00				
	TOTAL DEVELOPMENT COST			1,163,355.00				

PANTHER CREEK SITE 9

PANTHER CREEK SITE

COST ESTIMATE FOR FACILITIES DEVELOPMENT

DESCRIPTION OF WORK	UNIT OF WORK	UNIT COST	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976 QUANTITY	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976 COST	FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976 QUANTITY	FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976 COST	HIRED LABOR COST UNIT COST	HIRED LABOR COST COST
BRIDGE	JOB							
BOAT LAUNCHING RAMP (CONCRETE)	SQ.YD.	20.00						
ROAD 20 BITUMINOUS	LIN. FT.	17.00	1,900	32,300.00				
ROAD 18 BITUMINOUS	LIN. FT.	14.00	400	5,600.00				
ROAD 12 BITUMINOUS	LIN. FT.	10.00						
ROAD (18 GRAVEL)	LIN. FT.	12.00						
ROAD (12 GRAVEL)	LIN. FT.	9.00						
PARKING (BITUMINOUS PAVING)	SQ. YD.	7.00	7,500	52,500.00				
1/ WATER SUPPLY (GAL/DAY)	G.P.D.	2.00	19,000	38,000.00				
1/ WATER DISTRIBUTION LINES	LIN. FT.	5.00	5,240	19,562.00				
COMFORT STATION (FLUSH)	EACH	20,000.00						
WASH BUILDING (CAMP AREA)	EACH	60,000.00	2	120,000.00				
1/ SEWAGE TREATMENT PLANT	G.P.D.	4.00	5,900	41,300.00				
1/ SEWAGE LIFT STATIONS	EACH	10,000.00						
1/ SEWAGE FORCE MAINS	LIN. FT.	7.60	2,290	17,400.00				
1/ SEWAGE LINES	LIN. FT.	6.50	3,380	21,970.00				
SEWAGE SEPTIC SYSTEM	G.P.D.	4.00						
SANITARY DUMP STATION	EACH	1,700.00						
CAMPING FACILITIES (GROUP)	EACH GROUP	3,000.00	4	12,000.00				
CAMPING FACILITIES	EACH	200.00						
PICNIC FACILITIES	EACH	100.00						
PICNIC SHELTER	EACH	7,000.00						
PICNIC SHELTER WITH TOILET	EACH	25,000.00						
MOTEL & LODGE COMPLEX	JOB							
MARINA DEVELOPMENT	JOB							
BOAT LOADING DOCKS	EACH	2,500.00	1	2,500.00				
ENTRANCE CONTROL STATION	EACH	15,000.00						
OVERLOOK	EACH	10,000.00						
FOOT TRAILS	LIN. FT.	2.00	3,600	7,200.00				
ELECTRICAL DISTRIBUTION	LIN. FT.	5.00	2,590	12,536.00				
TREE PLANTING (SEEDLINGS)	ACRE	200.00	18	3,600.00				
SIGNS	SQ. FT.	2.50	20	50.00				
FOOTBRIDGE	JOB							
FISHING PIER	JOB							
DRINKING FOUNTAINS	EACH	700.00						
CAMP RANGER'S QUARTERS	JOB		1	20,000.00				
SWIMMING AREA	JOB		1	8,000.00				
HEALTH & SUPPLY CENTER	JOB		1	15,000.00				
DINING HALL	JOB		1	35,000.00				
INTERPRETIVE CENTER & ADMIN. BUILDING	JOB		1	40,000.00				
STAIRS	JOB							
	CONSTRUCTION COST			504,518.00				
	CONTINGENCIES 15%			75,677.00				
	ENG. & DESIGN 9%			52,218.00				
	SUP. & ADMIN. 6%			37,945.00				
	TOTAL DEVELOPMENT COST			670,358.00				

1/ Prices on these facilities are for this site & Calvert

LITTLE CLIFTY SITE 10

COST ESTIMATE FOR FACILITIES DEVELOPMENT

DESCRIPTION OF WORK	UNIT OF WORK	UNIT COST	FACILITIES TO BE PROVIDED UNDER 711 OR 712 FUND PROGRAM THRU FISCAL YEAR 1976 QUANTITY		FACILITIES TO BE PROVIDED AFTER FISCAL YEAR 1976 QUANTITY		HIRED LABOR COST UNIT COST	
				COST		COST		COST
BRIDGE	JOB							
BOAT LAUNCHING RAMP (CONCRETE)	SQ.YD.	20.00						
ROAD 20 BITUMINOUS	LIN. FT.	17.00						
ROAD 18 BITUMINOUS	LIN. FT.	14.00						
ROAD 12 BITUMINOUS	LIN. FT.	10.00						
ROAD (18 GRAVEL)	LIN. FT.	12.00						
ROAD (12 GRAVEL)	LIN. FT.	9.00						
PARKING (BITUMINOUS PAVING)	SQ. YD.	7.00						
WATER SUPPLY (GAL/DAY)	G.P.D.	2.00						
WATER DISTRIBUTION LINES	LIN. FT.	3.70			4,660	17,350.00		
COMFORT STATION (FLUSH)	EACH	20,000.00			2	40,000.00		
WASH BUILDING (CAMP AREA)	EACH	60,000.00						
SEWAGE TREATMENT PLANT	G.P.D.	4.00			30,000	120,000.00		
SEWAGE LIFT STATIONS	EACH	10,000.00			1	10,000.00		
SEWAGE FORCE MAINS	LIN. FT.	6.00						
SEWAGE LINES	LIN. FT.	7.25			1,430	10,400.00		
SEWAGE SEPTIC SYSTEM	G.P.D.	4.00						
SANITARY DUMP STATION	EACH	1,700.00			1	1,700.00		
CAMPING FACILITIES (DRIVE IN)	EACH	300.00						
CAMPING FACILITIES (WALK IN)	EACH	200.00						
PICNIC FACILITIES	EACH	100.00			50	5,000.00		
PICNIC SHELTER	EACH	7,000.00						
PICNIC SHELTER WITH TOILET	EACH	25,000.00						
MOTEL & LODGE COMPLEX	JOB							
MARINA DEVELOPMENT	JOB							
BOAT LOADING DOCKS	EACH	2,500.00						
ENTRANCE CONTROL STATION	EACH	15,000.00						
OVERLOOK	EACH	10,000.00						
FOOT TRAILS	LIN. FT.	2.00						
ELECTRICAL DISTRIBUTION	LIN. FT.	5.00			2,100	10,500.00		
TREE PLANTING (SEEDLINGS)	ACRE	200.00			10	2,000.00		
SIGNS	SQ. FT.	2.50						
FOOTBRIDGE	JOB							
FISHING PIER	JOB							
DRINKING FOUNTAINS	EACH	700.00						
ROAD RELOCATION	JOB				1	700.00		
BEACH & DIVING AREA	JOB							
BEACH BATH HOUSE	JOB							
RESTAURANT	JOB							
INTERPRETIVE CENTER	JOB							
STAIRS	JOB							
	CONSTRUCTION COST					217,650.00		
	CONTINGENCIES 15%					32,647.00		
	ENG. & DESIGN 9%					22,527.00		
	SUP. & ADMIN. 6%					16,363.00		
	TOTAL DEVELOPMENT COST					289,152.00		

PETER CAVE
SITE 11

PETER CAVE
SITE 11

SEWAGE AND WATER DESIGN CALCULATIONS

Appendix C

WATER USAGE TABLE

Appendix D

SITES	BOATING & FISHING PARKING	MOTEL & LODGE	RESTAURANT	MARINA	PICNICKERS	CAMPING PRIMITIVE	CAMPING DEVELOPED	CAMPING DELUXE	TRANSIENTS OVERLOOK	TOTAL
LAUREL BRANCH										
EXISTING	2250				800			6600		9650
FUTURE								62,400		62,400
ULTIMATE	2,250				1,800			69,000		72,050
CAVE CREEK										
EXISTING	2,250									2,250
FUTURE	300				1,280			40,000		41,580
ULTIMATE	2,550				1,280			40,000		43,830
AXTEL										
EXISTING	2,250				640			17,400		20,290
FUTURE					160			16,600		16,760
ULTIMATE	2,250				800			34,000		37,050
NORTH FORK										
EXISTING	2,160				560			9,800		12,520
FUTURE					160			7,600		7,760
ULTIMATE	2,160				720			17,400		20,280
EVERLEIGH										
EXISTING	600									
FUTURE										
ULTIMATE	600									
CALVERT										
EXISTING										
FUTURE	450				800					1,250
ULTIMATE	450				800					1,250
PANTHER CREEK										
EXISTING										
FUTURE	300							49,600		49,900
ULTIMATE	300							49,600		49,900
LITTLE CLIFTY										
EXISTING										
FUTURE		500	2,000				2,500		1,200	6,200
ULTIMATE		500	2,000				2,500		1,200	6,200
PETER CAVE CREEK										
EXISTING	2,250				800					3,050
FUTURE					3,200					3,200
ULTIMATE	2,250				4,000					6,250

WATER USAGE TABLE

WATER USAGE TABLE
APPENDIX D

EXHIBITS
A - D

A - FISH AND WILDLIFE

B - FEDERAL CODE OF REGULATIONS

C - DISTRICT REGULATION 405-2-1, 31 JULY 1967

D - APPLICATION PROCEDURE FOR BOAT LAUNCHING RAMP LICENCE

DEPARTMENT OF THE ARMY

Contract No.
DACW-27-3-71-35

LICENSE

FOR FISH AND WILDLIFE MANAGEMENT PURPOSES IN THE ROUGH RIVER RESERVOIR AREA, KENTUCKY.

THE SECRETARY OF THE ARMY, under authority of Section 4 of the Act of Congress approved 22 December 1944, as amended (76 Stat. 1195; 16 U.S.C. 460d; 78 Stat. 899), hereby grants to the COMMONWEALTH OF KENTUCKY, acting by and through the Department of Fish and Wildlife Resources, whose address is Frankfort, Kentucky, hereinafter referred to as the licensee, a license for a period of twenty-five (25) years commencing on 1 April 1970 and ending on 31 March 1995, to use and occupy approximately 8,525 acres of land and water areas under the primary jurisdiction of the Department of the Army in the Rough River Reservoir area for the purpose of implementing, operating, and managing a fish and wildlife program in accordance with Exhibit "B", Wildlife Management Plan, attached hereto and made a part hereof, except, however, as this plan may be modified by this license and more particularly described as follows:

> Approximately 8,335 acres of land and water on Rough River Reservoir Project as outlined in green on Exhibit "A", attached hereto and made a part hereof, and
>
> Approximately 190 acres of land on Rough River Reservoir Project as crosshatched in red on Exhibit "A", attached hereto and made a part hereof, which represents potential public use areas subject to withdrawal of all or any part of the area for recreational purposes upon 30 days' notice by the District Engineer.

THIS LICENSE is granted subject to the following conditions:

1. That the licensee, in the exercise of the privileges hereby granted, shall conform to such rules and regulations as may be prescribed by the Secretary of the Army to govern the public use of the said project area, and with the provisions of Section 4 of the Act of Congress approved 22 December 1944, as amended (76 Stat. 1195; 16 U.S.C. 460d).

2. That the licensee may construct upon said land such buildings, improvements, facilities, accommodations, fences, signs and other structures as may be necessary for the purposes of this license, and may plant seeds, shrubs and trees, provided that all such structures shall be constructed and the landscaping accomplished in accordance with plans approved by the District Engineer, U.S. Army Corps of Engineers, in charge of the administration of the property.

3. That the licensee shall administer and maintain the said property, for the purposes of this license, in accordance with the master plan for the said

project area and with an annual management program to be mutually agreed upon between the licensee and the said District Engineer, which may be amended from time to time as may be necessary. Such annual management program shall include, but is not limited to, the following:

a. Plans for management and development activities to be undertaken by the licensee or jointly by the Corps of Engineers and the licensee.

b. Budget of the licensee for carrying out the management and development activities.

c. Personnel to be used in the management of the area.

d. Plans for supervising, patrolling and policing the licensed areas, including the water areas.

4. That the licensee within its legal authority shall protect the property from fire, vandalism, and soil erosion, and may make and enforce such rules and regulations as are necessary in exercising the privileges granted in this license, provided that such rules and regulations are not inconsistent with those prescribed by the Secretary of the Army to govern the public use of the area.

5. That the licensee, in exercising its governmental or proprietary functions, may plant and harvest crops, either directly or by service contract or under sharecrop agreements with local farmers to provide: (a) food for wildlife and (b) necessary compensation to farmers under any sharecrop agreement. Recognizing that a poor crop season may result in a lack of food for wildlife in a given future year, the licensee will be allowed to provide a reasonable surplus which will be held in reserve against a future poor crop season or may be disposed of by the State and the proceeds from the sale held in reserve against a future poor crop season. In any event, the lands will not be used by the State for the production of crops or any other purpose soley to produce revenue to defray costs of management of the wildlife area. Lands within the licensed area, available for lease for agricultural or grazing purposes, will be leased by the District Engineer. Monies collected by the State and not used to provide food for wildlife in a poor crop season shall be paid to the District Engineer at five-year intervals. The licensee will establish and maintain adequate records and accounts and render periodic statements of receipts and expenditures in furtherance of its wildlife feeding program, as may be required by said District Engineer. The District Engineer shall have the right to perform audits of the licensee's records and accounts.

6. That the licensee may take, trap, remove, stock or otherwise control all forms of fish and wildlife within the said area, and may place therein such additional forms of fish and wildlife as it may desire from time to time,

and shall have the right to close the area, or any parts thereof from time to time to fishing, hunting or trapping, provided that the closing of any area to such use for fishing, hunting or trapping shall be consistent with the State laws for the protection of fish and wildlife; also, the licensee shall enforce the fish and game laws and such regulations as may be issued by the Department of Fish and Wildlife Resources and/or its Commissioner, which laws, orders and regulations are consistent with its state-wide program.

7. That the water areas of the project shall be open to public use generally, without charge, for boating, swimming, bathing, fishing and other recreational purposes, and that ready access to and exist from such water areas along the shores of the project shall be maintained for general public use when such use is determined by the Secretary of the Army not to be contrary to the public interest. However, no use of any area shall be permitted which is inconsistent with the State laws for the protection of fish and game.

8. That this license is subject to all existing and future easements, leases, licenses and permits heretofore granted or to be hereafter granted, by the United States concerning said lands; provided, however, that upon appropriate notification by the licensee to said District Engineer, the United States, insofar as may be consistent with other uses and purposes of the project, will not enter into any new easements, leases, licenses or permits, or renewals thereof, which will, in the opinion of the District Engineer, adversely affect the current operations of the licensee under the provisions of the license or which will conflict with the definitely scheduled program of the licensee for the expansion of its activities under the provisions of this license.

9. That the licensee shall not discriminate against any person or persons because of race, creed, color or national origin in the conduct of its operations hereunder. The grantee furnishes as part of this contract an assurance (Exhibit C) that he will comply with Title VI of the Civil Rights Act of 1964 (78 Stat. 24) and Department of Defense Directive 5500.11 issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations.

10. That no cuts or fills along the shore line shall be made by the licensee without the prior approval of the said District Engineer.

11. That the licensee shall comply promptly with any regulations, conditions, or instructions affecting the work hereby authorized if and when issued by the Federal Water Pollution Control Administration and/or the State water pollution control agency having jurisdiction to abate or prevent water pollution. Such regulations, conditions or instructions in effect or prescribed by the Federal Water Pollution Control Administration or State agency are hereby made a condition of this license.

12. That ingress to and egress from the project area shall be afforded the licensee over existing access roads, such interior roads as may be constructed, and at such additional places over Government-owned land as may be approved by said District Engineer. The licensee shall provide appropriate markings at its own expense.

13. That the right is hereby expressly reserved to the United States, its officers, agents, and employees, to enter upon the said land and water areas, at any time and for any purpose necessary or convenient in connection with river and harbor and flood control work, and to remove therefrom timber, or other material required or necessary for such work; to flood said premises when necessary, and/or to make any other use of said land as may be necessary in connection with public navigation and flood control, and the licensee shall have no claim for damages of any character on account thereof against the United States or any agent, officer or employee thereof.

14. That any property of the United States damaged or destroyed by the licensee incident to the exercise of the privileges herein granted shall be promptly repaired or replaced by the licensee to the satisfaction of the said District Engineer.

15. That the United States shall not be responsible for damages to property or injuries to persons which may arise from, or be incident to, the exercise of the privileges herein granted, or for damages to the property of the licensee, or for damages to the property or injuries to the person of the licensee's officers, agents, servants or employees, or others who may be on said premises at their invitation or the invitation of any one of them, arising from or incident to the flooding of said premises by the Government or flooding from any other cause, or arising from or incident to any other governmental activities on the said premises.

16. That this license may be relinquished by the licensee at any time by giving to the Secretary of the Army, through the said District Engineer, at least thirty (30) days' notice in writing.

17. That this license may be revoked by the Secretary of the Army in the event the licensee violates any of the terms and conditions of this license and continues and persists therein for a period of thirty (30) days after notice thereof, in writing, by the said District Engineer.

18. That on or before the date of expiration of this license or its relinquishment by the licensee, the licensee shall vacate the said Government premises, remove all property of the licensee therefrom, and restore the premises to a condition satisfactory to the said District Engineer. If, however, this license is revoked, the licensee shall vacate the premises, remove said property therefrom, and restore the premises as aforesaid within such time as the Secretary of the Army may designate. In either event, if the licensee shall fail or neglect to remove said property and so restore the premises, then said property shall become the property of the United States, without compensation therefor, and no claim for damages against the United States, or its officers, or agents shall be created by or made on account thereof.

19. If and when a General Plan is approved pursuant to Section 3 of the Fish and Wildlife Coordination Act, as amended (72 Stat. 566; 16 U. S.C. 663), this license will be amended to the extent necessary to conform to such General Plan.

IN WITNESS WHEREOF I have hereunto set my hand this 11 day of September 1970, by the direction of the Assistant Secretary of the Army.

SHERRY B. MYERS
Assistant for Real Property
OASA (I&L)

The above instrument, together with the provisions and conditions thereof, is hereby accepted this ____ day of _____ 1970.

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF FISH AND WILDLIFE RESOURCES

BY _____
Commissioner

WILDLIFE MANAGEMENT PLAN

FOR

ROUGH RIVER RESERVOIR

Purpose. Increased hunting activity and a decrease in available private lands has resulted in a greater demand for the multiple use of publicly owned lands. Corps of Engineers' lands adjacent to reservoirs are growing in importance in helping to alleviate the growing scarcity of private hunting areas. The Kentucky Department of Fish and Wildlife Resources is prepared to assume responsibility for managing lands adjacent to Rough River Reservoir for the benefit of wildlife species.

Area. All reservoir properties belonging to the U. S. Army Corps of Engineers adjoining Rough River Reservoir, except those used for primary project purposes, access sites or leased or permitted for other uses. These lands would vary from approximately 2,999 acres above the seasonal pool (elv. 495') to 6,399 acres above the minimum pool (elv. 465'). Approximately 2,000 acres are available for agricultural and/or grazing purposes.

Present Wildlife on Area. Squirrels and quail are moderately abundant with fair rabbit populations. Deer have been stocked in the vicinity and the adjacent counties are open to hunting. Migratory waterfowl use the reservoir in moderate numbers. The native wood duck nests along the upper reaches of the lake. Raccoon are abundant along the lake perimeter.

Present Wildlife Habitat and Proposed Management: Forest Game. Approximately 50% of the land available above summer pool is in second growth oak-hickory timber. It is moderately good squirrel habitat at present and only fair for deer. Since the forest resources are of a low commercial value, no timber harvesting is planned or

EXHIBIT "B"

recommended. The forest resources are presently protected from fire by the State ivision of Forestry.

Upland Game. Approximately 2,000 acres of the available lands are suitable for cropping or hay production. Only a small acreage of the area is reverting to brushy growth because the Corps has leased land suitable for crop production and grazing. The area in its present state and use is considered moderately good quail and rabbit habitat, but, it has a greater potential under proper management. In order to benefit upland game species, the Department of Fish and Wildlife Resources intends to enter into a sharecropping lease arrangement with local farmers with the concurrence of the District Engineer on the location and type of agricultural practices. These lands will be farmed in accordance with land use capabilities so as to reduce siltation into the reservoir to a minimum. Possible crop rotation on suitable bottomlands would include the production of corn and small grains with the state portion remaining in the field for feeding and attracting wildlife. Hillsides not suitable for crop production will be maintained in a hay crop. No grazing is planned.

Waterfowl. The present schedule of water level control does not promote shoreline exposures that are wholly conducive to satisfactory waterfowl plantings. Providing feeding areas for migrating waterfowl would hold some of them for possible harvest. A few islands and large flat areas lend themselves to the establishment of millet, milo, rye grass or buckwheat. The possibilities of utilizing sub-impoundments to create feeding areas will be investigated.

Personnel. The reservoir lands will be under the supervision of the area Wildlife Biologist for management and research and the Regional Supervisor for enforcing general wildlife laws and regulations.

Equipment. The Department of Fish and Wildlife Resources will furnish all equipment necessary or will finance by price contract to perform the habitat development.

Timber and Minerals. It is understood that the Department of Fish and Wildlife Resources makes no claim on the sale of timber or minerals. The Department does request that all timber sales be marked in such a manner as to preserve and maintain optimum habitat for wildlife and provided that the Corps of Engineers allows the exploration and exploitation for minerals, that rigid specifications be adhered to in order that pollution of the reservoir be avoided.

Posting. Portions of the reservoir property along entrance roads will be posted in order to identify the area for public use as a hunting grounds.

Access. The Department of Fish and Wildlife Resources shall cooperate with the Corps in road maintenance that is necessary for access to the public hunting areas.

Stocking of Wildlife Species. The Department of Fish and Wildlife Resources has no immediate plans to stock game species. Deer have already been stocked in the immediate vicinity. Exotic game birds or native grouse will be stocked on an experimental basis if such are found suitable for the available habitat.

Hunting. Statewide regulations shall prevail on reservoir properties unless special regulations appear desirable at specific times or places. License requirements shall remain the same as for all public lands. No special permit will be required. The Department will confer with the Corps on any regulations needed for safety.

Fire Control. A fire control system administered by the State Division of Forestry is established in each of the counties in which the lands are located.

Game Inventories. A system of wildlife inventories has been established for the entire state, including counties in which these reservoir lands are located. Year to year ammendments to the management plan will be based upon these inventories and special research studies that are applicable.

Prepared by:
Joe Bruna, Biologist
February, 1967

ASSURANCE OF COMPLIANCE WITH THE DEPARTMENT OF DEFENSE DIRECTIVE
UNDER TITLE VI OF THE CIVIL RIGHTS ACT OF 1964

The Dept. of Fish and Wildlife Resources, Commonwealth of Kentucky, Applicant-Recipient, hereinafter called the Grantee, HEREBY AGREES THAT it will comply with title VI of the Civil Rights Act of 1964 (P.L. 88-352) and all requirements imposed by or pursuant to the Directive of the Department of Defense (32 CFR Part 300, issued as Department of Defense Directive 5500.11, December 28, 1964) issued pursuant to that title, to the end that, in accordance with title VI of that Act and the Directive, no person in the United States shall, on the ground of race, color or national origin be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Grantee receives Federal financial assistance from the Secretary of the Army, hereinafter called the Grantor and HEREBY GIVES ASSURANCE THAT it will immediately take any measures necessary to effectuate this agreement.

If any real property or structure thereon is provided or improved with the aid of Federal financial assistance extended to the Grantee by the Grantor, assurance shall obligate the Grantee, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits. If any personal property is so provided, this assurance shall obligate the Grantee for the period during which it retains ownership or possession of the property. In all other cases, this assurance shall obligate the Grantee for the period during which the Federal financial assistance is extended to it by the Grantor.

THIS ASSURANCE is given in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts, property, discounts or other Federal financial assistance extended after the date hereof to the Grantee by the Grantor, including installment payments after such date on account of arrangements for Federal financial assistance which were approved before such date. The Grantee recognizes and agrees that such Federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Grantee, its successors, transferees, and assignees, and the person or persons whose signatures appear below are authorized to sign this assurance on behalf of the Grantee.

Dated June 23 1970

Commonwealth of Kentucky
Department of Fish and Wildlife
Grantee

By Marion Clark
Commissioner

Frankfort, Kentucky
Mailing Address

EXHIBIT "C"

CHAPTER III

PART 311—PUBLIC USE OF CERTAIN RESERVOIR AREAS

§ 311.1 Areas covered.

The regulations contained in this part shall be applicable to:

KENTUCKY

Green River Reservoir
Barren River Reservoir
Buckhorn Reservoir
Nolin River Reservoir
Rough River Reservoir

INDIANA

Salamonie Reservoir
Mississinewa Reservoir
Mansfield Reservoir
Monroe Reservoir
Huntington Reservoir

§ 311.2 Boats, commercial.

No boat, barge or other vessel shall be placed upon or operated upon any water of the reservoir for a fee or profit, either as a direct charge to a second party or as an incident to other services provided to the second party, except as specifically authorized by lease, license, or concession contract with the Department of the Army.

§ 311.3 Boats and other vessels, private.

(a) The operation of boats, houseboats, cabin cruisers and other vessels on the reservoir for fishing and recreational use is permitted except in prohibited areas designated by the District Engineer in charge of the reservoir area and subject to the regulations contained in this part.

(b) A permit shall be obtained from the District Engineer or his authorized representative for placing and operating a boat or other vessel on the reservoir for any one period longer than three days. No charge will be made for this permit. The permit shall be kept aboard the vessel at all times that the vessel is in operation on the reservoir. The District Engineer in charge of the area or his authorized representative shall have authority to revoke the permit and to require removal of the vessel upon failure of the permittee to comply with the terms and conditions of the permit or with the regulations in this part.

(c) Unsafe boats or other vessels will not be permitted on the reservoir. The District Engineer may require the applicant for a permit to furnish the construction plans and other information pertaining to the construction and equipment of the boat or other vessel prior to issuing a permit for its operation on the reservoir. All boats permitted on the reservoir shall be equipped for safe operation and operated in a safe manner in accordance with instructions issued by the District Engineer. These instructions may provide that the operation of speed boats and water skiing activities shall be confined to areas of water designated by the District Engineer for such activities.

(d) Boathouses, houseboats, cabin cruisers and other vessels may be placed and operated on the reservoirs, except that such facility shall not be utilized for human habitation at a fixed or permanent mooring point and if equipped with toilets and galleys shall not be placed on reservoirs with small permanent pools. Such vessels may be barred from other reservoirs by the District Engineer with the concurrence of the Chief of Engineers in those reservoirs in which the waters thereof are used for domestic water supply when the District Engineer determines that such use is contrary to the public health and safety.

§ 311.4 Mooring, care and sanitation of boats and floating facilities.

(a) All boats or other vessels when not in actual use must be either removed from the reservoir, securely moored at authorized docks or boathouses where supervision by the owner or his representative is provided on a 24-hour-day basis, or placed in the care of a marina concessionaire, State or local managing agency or other party authorized to care for floating equipment on a 24-hour-day basis.

(b) All boats, barges and other vessels or floating facilities will be moored only in locations designated by the District Engineer or his designated representative. All floating or stationary mooring facilities will be constructed in accordance with plans and a permit approved by the District Engineer or his designated representative. He shall have authority to revoke such permit and require removal of the facility for failure of the permittee to comply with the terms and conditions of the permit or with the regulations in this part.

(c) The discharge of sewage, garbage or other pollutant in the waters of the reservoir from any boat, barge or other vessel on the reservoir is prohibited except in accordance with regulations of the State and local health agencies permitting such discharge when underway in deep waters other than embayments. All such pollutants shall be deposited ashore at places designated for such deposit and disposal.

§ 311.5 Swimming and bathing.

Swimming and bathing are permitted except in prohibited areas designated by the District Engineer.

§ 311.6 Hunting and fishing.

(a) Hunting and fishing are permitted in accordance with all applicable Federal, State and local laws for the protection of fish and game except in prohibited areas including the following:

(1) Public access, park and recreation areas in which all hunting is prohibited.

(2) Prohibited areas designated by the District Engineer in which hunting or fishing or both are prohibited.

(3) Prohibited areas designated by Federal or State managing agencies under applicable laws administered by such agencies.

(b) Hunting is restricted to the use of bow and arrow or shotgun loaded with shot in any reservoir area listed in § 311.1, except in managed game areas where the special hunting regulations of the managing agency with the prior approval of the District Engineer will apply

and except for reservoir areas where hunting of deer, with rifles, is permitted by State or local laws or regulations, and where prior permission for such hunting has been given by the District Engineer.

§ 311.7 Camping.

(a) Camping is permitted only at areas designated by the District Engineer in charge of the reservoir area or his authorized representative.

(b) Approval of the District Engineer, or his authorized representative, is required to camp in the reservoir area for any one period of two weeks or longer.

(c) Camping equipment shall not be abandoned or left unattended for 48 hours or more.

(d) The installation of any permanent facility at any public camp ground is permitted only on written authorization of the District Engineer or his authorized representative.

(e) Campers shall keep their camp grounds clean and dispose of combustibles and refuse in accordance with instructions posted by the District Engineer at each camp ground.

(f) Due diligence shall be exercised in building and putting out camp fires to prevent damages to trees and vegetation and to prevent forest and grass fires.

(g) Camps must be completely razed and the sites cleaned before the departure of the campers.

§ 311.8 Picnicking.

(a) Picnicking is permitted, except in prohibited areas designated by the District Engineer or his authorized representative, in any reservoir area listed in § 311.1

EXHIBIT B

§ 311.9 Access to water areas.

(a) Pedestrian access is permitted along the shores of the reservoir except in areas designated by the District Engineer or his authorized representative.

(b) Automobile access is permitted only over open public and reservoir roads.

(c) Access for the general public to launch boats is permitted only at the public launching sites designated by the District Engineer.

§ 311.10 Destruction of public property.

The destruction, injury, defacement, or removal of public property or of vegetation, rock, or minerals, except as authorized, is prohibited.

§ 311.11 Firearms and explosives.

Loaded rifles, loaded shotguns, loaded pistols and explosives of any kind are prohibited in the area, except when in the possession of a law enforcement officer or Government employee on official duty, when shotguns or rifles are being used for hunting during the hunting season as permitted under § 311.6 and when specifically authorized by the District Engineer.

§ 311.12 Gasoline and oil storage.

Gasoline and other inflammable or combustible liquids shall not be stored in, upon, or about the reservoir or shores thereof without the written permission of the District Engineer or his authorized representative.

§ 311.13 Sanitation.

Refuse, garbage, rubbish or waste of any kind shall not be thrown on or along roads, picnicking or camping areas, in the reservoir waters or on any of the lands around the reservoir, but shall be burned or buried, or disposed of at designated points or places designed for the sanitary disposal thereof.

§ 311.14 Advertisements.

Private notices and advertisements shall not be posted, distributed, or displayed in the reservoir area except such as the District Engineer or his authorized representative may deem necessary for the convenience and guidance of the public using the area for recreational purposes.

§ 311.15 Unauthorized solicitations and business activities.

No person, firm, or corporation, or their representatives shall engage in or solicit any business on the reservoir area without permission in writing from the District Engineer or in accordance with terms of a lease, license, or concession contract with the Department of the Army.

§ 311.16 Commercial operations.

All commercial operations or activities on the waters of the reservoir or on the lands under the control of the Department of the Army around the reservoir shall be in accordance with lease, license, or other agreements with the Department of the Army.

§ 311.17 Dogs.

(a) Dogs are not permitted in any of the ~~following~~ reservoir areas unless on a leash, in a pen, or under complete control of the owner or manager.

§ 311.18 Recreational activity programs.

(a) Special events such as water carnivals, boat regattas, music festivals, dramatic presentations, or other special recreational programs of interest to the general public are permitted in areas designated by the District Engineer or his authorized representative.

(b) A permit shall be obtained from the District Engineer or his authorized representative by the governmental or legally responsible private agency proposing to hold a special recreation program as indicated in this section. No charge will be made for this permit.

(c) The District Engineer in charge of the area shall have authority to revoke any permit granted under this section and to require the removal of any equipment upon failure of the permittee to comply with the terms and conditions of the permit or with the regulations in this part.

§ 311.19 Abandonment of personal property.

Abandonment of personal property on the land or waters of the reservoir area is prohibited. Personal property shall not be left unattended upon the lands and waters of the reservoir area except in accordance with the regulations prescribed in this part or under permits issued therefor. The Government assumes no responsibility for personal property and if such property is abandoned or left unattended in other than places designated in a permit issued therefor or under a regulation for a period in excess of 48 hours it will be impounded, and if not reclaimed by the owners thereof within ninety days will be sold, destroyed, converted to Government use, or otherwise disposed of as determined by the District Engineer or his designated representative.

311.20 Discriminatory Practices Prohibited

All project land and water areas which are open to the public shall be available for use and enjoyment of the public without regard to race, creed, color or national origin. No lessee or licensee of a project area under lease or license providing for a public or quasi-public use, in cluding group camp activities, and no concessionaire of a lessee or licensee providing a service to the public, including facilities and accommodations, shall discriminate against any person or persons because of race, creed, color or national origin in the conduct of its operations under the lease, license or concession agreement.

EXHIBIT B

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, LOUISVILLE
P. O. Box 59, 830 West Broadway
Louisville, Kentucky 40201

ORLDC-M

*DR 405-2-1
31 July 1967

DISTRICT REGULATION
NO. 405-2-1

EXPIRES 31 JULY 1970

REAL ESTATE

Planning and Administration of Reservoir Project Lands

1. Purpose and Scope. This regulation prescribes policies and responsibilities for the planning and administration of reservoir lands and waters on completed and uncompleted civil projects.

2. References.

a. ER 10-1-3

b. ER 405-2-835

c. EM 1130-2-302

d. DR 1130-2-1

3. Policy. District personnel will execute the responsibilities assigned in references in the most economical and effective manner possible consistent with the land use policies stated in paragraph 2 of ref. 2b.

4. Organizational Responsibility. The assignment of organizational responsibility for planning and for the administration of civil project lands is contained in Appendix I.

5. Effective planning and administration of reservoir project lands require a high degree of coordination and cooperation among the organizational elements involved. This is particularly applicable to maximum utilization of project site personnel in accomplishment of the various functional requirements. Once the reservoir manager is on the project site, he logically becomes the initial District contact for the majority of outside agencies or individuals interested in utilizing reservoir project facilities. This situation results in his involvement to a certain degree in Real Estate Division activities even though he is assigned organizationally to the Operations Division. It is important that this condition

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*This regulation supersedes District Regulation 405-2-1, 23 Jun 64.

EXHIBIT C

be recognized and that all units and individuals concerned take appropriate action to insure the necessary coordination and cooperation in this area.

FOR THE DISTRICT ENGINEER:

A. F. HUBER
Executive Assistant

1 Appendix
Orgn Resp in Plan &
Adm of Project Lands

DISTRIBUTION
A less WPAO and Ft Knox AO;
Pittsburgh Real Est Proj Ofc

EXHIBIT C

EXHIBIT C

ORGANIZATIONAL RESPONSIBILITIES IN PLANNING AND ADMINISTRATION OF RESERVOIR PROJECT LANDS

FUNCTION	REFERENCE	RESPONSIBLE ELEMENT* CONSTR.	ENGRG.	R.E.	OPER.
I. Interim Management and Use Prior to Master Plan					
a. Care & Custody during acquisition		C	C	P(1)	C
b. Interim use by former owners or others	ER 405-2-835, para. 6	C	C	P	C
c. Care & Custody after acquisition completed	EM 1130-2-302, para. 15b(2) ER 10-1-3, App. XVI, para. 10	C	C	C	P
II. Master Plan					
a. Preparation and submission of preliminary master plan for review	EM 1130-2-302, para. 15b(1) ER 405-2-835, para. 3a		P	C-R	C
b. Preparation and submission of preliminary land use plan	EM 1130-2-302, para. 15b(1)		P	C-R	C
c. Preparation and review of site layout and development plans	EM 1130-2-302, para. 15b(1)		P	C	C
d. Adaptation of construction standards to requirements for public use areas	EM 1130-2-302, para. 15b(1)		P	C	C
e. General plan for fish & wildlife	ER 405-2-835, para. 3c		P	C	C
f. Preparation and submission of final master plan for approval	EM 1130-2-302, para. 15b(1) ER 405-2-835, para. 3a		P	C-R	C
g. Revisions to master plan	EM 1130-2-302, para. 15b(1) ER 405-2-835, para. 3a		P	C-R	C
h. Coordination with interested agencies	ER 405-2-835, para. 4a		P	C	C

FUNCTION	REFERENCE	RESPONSIBLE ELEMENT*			
		CONSTR.	ENGRG.	R.E.	OPER.
III. Administration of Water Area & Priority 1 Lands (except Outgrants)					
a. Project development construction	EM 1130-2-302, para. 15b(2)	C	C	C	P
b. Fire protection, debris removal, erosion and mosquito control	ER 10-1-3, App. XVI, para. 10		C	C	P
c. Reports & statistics on public use	EM 1130-2-302, para. 15b(2)		C	C	P
d. Provide adequate safety & security controls on project lands, using technical guidance of Safety & Security Officers	EM 1130-2-302, para. 15b(2)		C	C	P
e. Permits for underbrush clearing & docks	EM 1130-2-302, para. 15b(2) ER 405-2-835, para. 9		C	C	P
f. Coordination with interested agencies			C	C	P(2)
IV. Outgrants					
a. Priority 1:					
(1) Planning	EM 1130-2-302, para. 15b(1) ER 405-2-835, para. 3a		P(3)	C	C
(2) Preparation of instruments, including land descriptions & maps	ER 405-2-835, para. 3d		C	P	C
(3) Advertising or negotiation and closing transactions	ER 405-2-835, para. 3d			P	

EXHIBIT C

FUNCTION	REFERENCE	RESPONSIBLE ELEMENT* CONSTR.	ENGRG.	R.E.	OPER.
b. Priorities 2, 3 & 4 & excess:					
(1) Land use plan	ER 405-2-835, para. 5d		C-R	P	C
(2) Negotiation, preparation of instrument & closing	ER 405-2-835, para. 3d		C	P	C
(3) Administration	ER 405-2-835, para. 3b		C	P(4)	C
c. Coordination with interested agencies, organizations or individuals	ER 405-2-835, para. 5d		C	P	C
V. Compliance Inspections	ER 10-1-3,App.XVII,para. 2m ER 405-2-835, para. 3e			P(4)	C
VI. Utilization Report on All Project Lands	ER 10-1-3, App.XVII,para.2m ER 405-2-835, para. 10b			P	C
VII. Management of Forest Resources					
a. Commercial	EM 1130-2-302, para. 12 ER 405-2-835, para. 8		C	P	C
b. Other(scenic,wildlife,etc.)	EM 1130-2-302, para. 12 ER 405-2-835, para. 8		C	C	P
VIII. Trespass or Unauthorized Use					
a. Government structures or other restricted areas	ER 10-1-3, App. XVI, para. 10				P
b. Land encroachments, including timber cutting:					
(1) Discovery, maximum effort for appropriate correction at field level & if unable to accomplish, make report	EM 1130-2-302, para. 18g ER 405-2-835, para. 3e			C	P

FUNCTION	REFERENCE	RESPONSIBLE ELEMENTS*			
		CONSTR.	ENGRG.	R.E.	OPER.
(2) Final actions:	ER 405-2-835, para. 3e				
(a) Floating facilities					P
(b) Grazing			C	P(4)	C
(c) Undergrowth clearing					P
(d) Minor construction (Steps & water lines)			C	P(4)	C
(e) Building construction			C	P(4)	C
(f) Dispute of boundary			C	P(4)	C
(g) Timber cutting			C	P(4)	C
IX. Disposal of Excess Lands	ER 405-2-835, para. 3b		R	P	C

*Definition of P, C and R responsibilities:

P - Primary: Answerable for accomplishment of the function.

C - Coordination: Involves elements indicated by P & C. Element with primary responsibility must coordinate appropriate activities of C elements to assure effective accomplishment of the function. Elements indicated by C must participate fully in the coordinating actions initiated by the P element.

R - Review: Element with primary responsibility must insure that R elements review functional data prior to submission to higher authority.

NOTES: (1) Secures assistance as appropriate from Construction or Operations field personnel in area.
(2) Other Federal, state or local government agencies.
(3) Real Estate Divn. will be represented in planning studies with Federal, State & local government agencies.
(4) Utilizes project personnel at site to maximum extent possible.

EXHIBIT C

APPLICATION PROCEDURE

FOR

BOAT LAUNCHING RAMP LICENSE

1. Application for boat launching ramp will be submitted to the Reservoir Manager in charge of the project, except where lands upon which the proposed launching ramp is to be constructed have been licensed or leased to another agency. In this case applications should be forwarded thru such agency to the reservoir manager.

2. Applications for boat launching ramps should include the following information:

a. A site map showing exact location of the proposed installation including the Government Tract Number and a sketch showing a plan view and construction details of the facilities. Each of the above shall be submitted on an 8 inch by 10-1/2 inch sheet of paper.

b. Name and/or number of public road connecting to the ramp.

c. Name of group and responsible agent.

d. Location of proposed parking facilities and number of parking spaces.

3. Minimum requirements for installation of a boat launching ramp are:

a. Ramp shall be constructed of suitable road material to provide a minimum thickness of 8 inches.

b. Minimum width of ramp to be 12 feet.

c. The portions of the ramp to be used for launching boats shall have a minimum slope of 10% and a maximum of 14%. Ramp shall be constructed to extend 3 feet below the winter pool elevation.

d. Turnaround shall have a minimum radius of 40 feet measured from the centerline of the road.

e. No trees shall be cut in construction of the ramp, turnaround or parking area, except by special permission of the Reservoir Manager.

f. No commercial operations will be conducted thereat and free access and use thereof will not be denied the general public.

EXHIBIT D

g. Use thereof will be subject to provisions of Part 311, Title 36, Code of Federal Regulations, copy of which will be furnished upon request.

h. Periodic inspections will be made to insure compliance with above requirements. Violations shall be cause for cancellation of license.

i. Authority to construct and operate the ramp will be granted by a five year revocable license, reserving to the Government the fair market rental for the period, as determined by competent appraisers.

4. The information requested above is necessary for consideration of your application. It is important that the exact location of the proposed installation be given so it can be considered in relation to the Master Plan for development of the reservoir area. It should be understood that if the location you have chosen interferes with development under provisions of the Master Plan, permission cannot be granted.

EXHIBIT D

United States Army Corps of Engineers
Louisville District

Rough River Lake
Master Plan

2023

Appendix E
Compliance Table

ER 1130-2-540 Appendix A

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 compliance	
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 compliance	
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	