Exhibit E
Environmental Report

R.L. Harris Hydroelectric Project
FERC No. 2628

Prepared by:

Alabama Power Company

and

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December 2022

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1.0 INTRODUCTION

Alabama Power Company (Alabama Power) owns and operates the R.L. Harris Project, (Harris Project) licensed by the Federal Energy Regulatory Commission (FERC), Project No. 2628. Alabama Power is relicensing the 135-megawatt (MW) Harris Project; the existing license expires in 2023.

This Exhibit E presents the operational and environmental resources of the Harris Project. The purpose of this Exhibit E is to provide information pursuant to FERC regulations in 18 Code of Federal Regulations (C.F.R.) Section 5.18 (b) and to present this information according to FERC's "Preparing Environmental Assessments: Guidelines for Applicants, Contractors, and Staff". The Exhibit E references the resources listed in the Harris Project Pre-Application Document (PAD),0F[1] results of the relicensing process studies and analyses, and consultation with Harris Project stakeholders to describe the effects of the proposed Harris Project operation and protection, mitigation, and enhancement (PME) measures for the developmental and non-developmental resources of the Harris Project. The content requirements of 18 C.F.R. Section 5.18 (b) include the following.

- General description of the river basin(s)
- Consultation and study results
- Applicable laws – compliance with or consultation under specific laws in 18 C.F.R. Section 3 (i)-(vii)
- A description of project facilities and operations
- Proposed action and action alternatives and alternatives considered but eliminated
- Affected environment and environmental analysis
- Proposed environmental measures, including those measures not adopted by Alabama Power
- Unavoidable adverse impacts
- Cumulative effects, based on FERC's scoping document

[1] Pursuant to 18 C.F.R. Section 5.6

- Economic analysis
- Consistency with comprehensive plans
- Consultation documentation
- Literature cited

The Harris Project Integrated Licensing Process (ILP) milestone documents, including study plans, study reports, Initial and Updated Study Reports, and the Preliminary Licensing Proposal (PLP), among other relicensing documents are listed chronologically with file date and accession numbers in Table 1-1 through the filing of the FLA. Note that Alabama Power filed the *Final Operating Curve Change Feasibility Analysis Phase 2 Report* (revised June 2022) and the *Final Downstream Release Alternatives Phase 2 Report* (revised June 2022) with the June 2022 revised Exhibit E[2].

[2] Accession Number 20220615-5192

Table 1-1 Harris Project Milestone Documents

DOCUMENT	FILE DATE	ACCESSION NO.
Pre-Application Document (PAD)	June 1, 2018	20180601-5125 (Public) 20180601-5126 (Privileged)
FERC Scoping Document 1	July 31, 2018	20180731-3035
FERC Project Scoping Meetings	August 28 and 29, 2018	20181010-4002 and 20181010-4003
10 Proposed Study Plans	November 13, 2018	20181113-5213
Alabama Power's Response to AIR	November 13, 2018	20181113-0016 20181113-4002
FERC Scoping Document 2	November 16, 2018	20181116-3065
Revised Study Plans	March 13, 2019	20190313-5060
Corrected Study Plan	March 21, 2019	20190321-5144
Study Plan Determination (SPD)	April 12, 2019	20190412-3000
Final Study Plans	May 13, 2019	20190513-5093
Progress Update	October 30, 2019	20191030-5053
Traditional Cultural Properties and Inadvertent Discovery Plan	April 10, 2020	20200410-5067 (Public) 20200410-5068 (Privileged)
Draft Downstream Release Alternatives Phase 1 Study Report	April 10, 2020	20200410-5069
Initial Study Report (ISR)	April 10, 2020	20200410-5084
Draft Operating Curve Change Feasibility Analysis Phase 1 Study Report	April 10, 2020	20200410-5086
Draft Erosion & Sedimentation Study Report	April 10, 2020	20200410-5091
Draft Phase 1 Project Lands Study Report	April 10, 2020	20200410-5092
Draft Threatened and Endangered Species Study Report	April 10, 2020	20200410-5094
Draft Water Quality Study Report	April 10, 2020	20200410-5095
ISR Meeting Summary	May 12, 2020	20200512-5083
FERC comments on ISR Meeting Summary	June 10, 2020	20200610-3059
Final Harris Area of Potential Effects (APE) Report	June 29, 2020	20200629-5328
Draft Downstream Aquatic Habitat Study Report	June 30, 2020	20200630-5200
Alabama Power's Response to Questions/Comments on ISR and Additional Studies/Study Modifications	July 10, 2020	20200710-5122

Document	**File Date**	**Accession No.**
Final Downstream Release Alternatives Phase 1 Study Report	July 27, 2020	20200727-5088
Draft *Aquatic Resources Study Report*	July 28, 2020	20200728-5120
FERC Determination on Requests for Study Modifications	August 10, 2020	20200810-3007
FERC Determination of APE	August 11, 2020	20200811-3007
Draft Recreation Evaluation Report	August 24, 2020	20200824-5241
Final Operating Curve Phase 1 Study Report	August 31, 2020	20200831-5339
Final Phase 1 Project Lands Study Report	October 2, 2020	20201002-5139
Progress Update	October 30, 2020	20201030-5215
Final Recreation Evaluation Report	November 24, 2020	20201124-5182
Final Threatened & Endangered Species Study Report	January 29, 2021	20210129-5393
Updated Study Report (USR)	April 12, 2021	20210412-5737
Final Aquatic Resources Study Report	April 12, 2021	20210412-5745
Botanical Inventory of a 35 Acre Parcel at Flat Rock Park, Blake's Ferry, Alabama	April 12, 2021	20210412-5746
Draft Battery Energy Storage System Report	April 12, 2021	20210412-5747
Draft Downstream Release Alternatives Phase 2 Study Report	April 12, 2021	20210412-5748
Draft Operating Curve Change Feasibility Analysis Phase 2 Study Report	April 12, 2021	20210412-5750
Final Erosion & Sedimentation Study Report	April 12, 2021	20210412-5752
Final Water Quality Study Report	April 12, 2021	20210412-5760
Final Downstream Aquatic Habitat Study Report	April 12, 2021	20210412-5785
Updated Study Report Meeting Summary	May 12, 2021	20210512-5067
Preliminary Licensing Proposal (PLP)	June 29, 2021	20210629-5068 (Public) 20210629-5069 (Privileged)
Draft Historic Properties Management Plan	June 29, 2021	20210629-5086 (Public) 20210629-5087 (Privileged)
Letter of Information concerning the models used in relicensing studies	June 29, 2021	20210629-5073
Update on Phase 2 of Project Lands Evaluation (WMP/SMP/GIS)	June 29, 2021	20210629-5089
Response to USR Meeting Summary & Study Dispute	July 12, 2021	20210712-5085

DOCUMENT	FILE DATE	ACCESSION NO.
FERC Letter Providing Additional Comments on Updated Study Report	August 10, 2021	20210810-3043
Corrected Temperature Data	August 16, 2021	20210816-5246
FERC Comments on the Preliminary Licensing Proposal for Harris Project	October 1, 2021	20211001-3009
Final Battery Energy Storage System Report	November 19, 2021	20211119-5039
Final Downstream Release Alternatives Phase 2 Study Report	November 19, 2021	20211119-5041
Final Operating Curve Change Feasibility Analysis Phase 2 Study Report	November 19, 2021	20211119-5043

Harris Exhibit E appendices include the following information:

- Appendix A - Acronyms and Abbreviations—provides a list of commonly used abbreviations and acronyms for the Harris Project
- Appendix B - PLP Stakeholder Comments—provides a list of stakeholders who commented on the June 2021 PLP
- Appendix C - Geology and Soils—provides additional existing information related to geology and soils, including physiography and soil types for the Harris Project
- Appendix D - Terrestrial and Wildlife—provides additional existing information related to terrestrial and wildlife, including representative wildlife and botanical species, and Birds of Conservation Concern for the Harris Project
- Appendix E - Threatened and Endangered—provides additional existing information related to threatened and endangered species, including the Alabama State Protected Species List
- Appendix F – Recreation—provides background information related to Recreation for the Harris Project
- Appendix G – Project Lands—provides maps depicting Alabama Power's lands proposal by parcel
- Appendix H – Aquatic Resources – provides the Desktop Fish Entrainment & Turbine Mortality Assessment for Proposed Minimum Flow Unit (Kleinschmidt 2022)

Concurrent with filing the Exhibit E as part of the Harris Project Final License Application (FLA), Alabama Power filed Exhibits A, B, C, D, F, G, and H, and the relicensing consultation record from 2018 through date filing of the FLA. The FERC requested geographic information system (GIS) shapefiles in their October 1, 2021 letter1F[3] commenting on the PLP. Due to the large number and size of these files, Alabama Power filed GIS data layers in a separate filing concurrent with the FLA.

On December 23, 2021 and February 15, 2022, FERC issued a License Application Deficiencies and Additional Information Request and an Additional Information Request (AIR), respectively, requiring Alabama Power to clarify or edit information and to analyze continuous minimum flows of 350 cfs, 400 cfs, and 450 cfs and provide potential effects of the three additional minimum flows on downstream resources (e.g., erosion and sedimentation, water use, water quality, aquatic habitat, terrestrial and botanical resources, recreation, and cultural). Responses to the AIRs resulted in minor edits to Exhibit E, which were filed on June 15, 2022.

On August 29, 2022, FERC issued a third AIR, requiring Alabama Power to file additional information based on the responses to the previous AIRs and FERC's ongoing review of the associated filings[4]. Responses to the August 29, 2022 AIR resulted in minor edits to Exhibit E, which are included herein.

[3] Accession Number 20211001-3009

[4] Accession Number 20220829-3050

2.0 HARRIS PROJECT DESCRIPTION

The Harris Project consists of a dam, spillway, powerhouse, and those lands and waters necessary for the operation of the Harris Project and enhancement, mitigation, and protection of environmental resources. These structures, lands, and waters are enclosed within the FERC Project Boundary. Under the existing Harris Project license, the FERC Project Boundary encloses two distinct geographic areas, described below.

Harris Reservoir is the 9,870-acre reservoir created by the Harris Dam. Harris Reservoir is located on the Tallapoosa River, near Lineville, Alabama. The lands adjoining the reservoir total approximately 7,371 acres and are included in the FERC Project Boundary. This includes land to 795.0-feet mean sea level (msl)[5], as well as natural undeveloped areas, hunting lands, prohibited access areas, recreational areas, and all islands.

The Harris Project also contains 15,063 acres of land within the James D. Martin-Skyline Wildlife Management Area (Skyline WMA)[6] located in Jackson County, Alabama. These lands are located approximately 110 miles north of Harris Reservoir and were acquired and incorporated into the FERC Project Boundary as part of the FERC-approved Harris Project Wildlife Mitigation Plan[7]. These lands are leased to, and managed by, the state of Alabama for wildlife management and public hunting and are part of the Skyline WMA as outlined in the Skyline Wildlife Management Plan (WMP)[8].

[5] Includes a scenic easement to 800-feet msl or 50-horizontal feet from 793-feet msl, whichever is less, but never less than 795-feet msl.

[6] Skyline WMA is a wildlife management area managed by the Alabama Department of Conservation and Natural Resources (ADCNR) currently totaling approximately 60,000 acres.

[7] The Harris Project Wildlife Mitigation Plan was developed as part of the original license and was approved by FERC on July 29, 1988; See Accession No. 20181113-4002.

[8] The Harris Project Wildlife Mitigation Plan was developed as part of the original license and was approved by FERC on July 29, 1988; the Skyline WMP was approved by FERC on June 29, 1990. See Accession No. 20181113-4002.

The following Harris Project references have been applied throughout this document:

- Lake Harris or Lake Harris Project Boundary refers to the 9,870-acre reservoir, the adjacent 7,371 acres of Harris Project land, and the dam, spillway, and powerhouse
- Skyline or Skyline Project Boundary refers to the 15,063 acres of Harris Project land within the Skyline WMA in Jackson County, Alabama
- Harris Project refers to all the lands, waters, and structures enclosed within the FERC Project Boundary, which includes both Lake Harris and Skyline
- Harris Reservoir refers to the 9,870-acre reservoir only
- Harris Dam refers to the dam, spillway, and powerhouse
- The Harris Project Area refers to the land and water in the Harris Project Boundary and the immediate geographic area adjacent to the Harris Project Boundary
- The Harris Project occupies 4.90 acres of land administered by the Bureau of Land Management (BLM)

2.1 Project Lands and Waters

FERC defines a project boundary as the area enclosing the land and waters necessary to operate a FERC-licensed hydroelectric project. Alabama Power is responsible for managing only those activities within the FERC Harris Project Boundary (Figure 2-1 and Figure 2-2). Due to the influence of the Harris Project operations, the geographic scope of some of the Harris Project relicensing studies included approximately 44 river miles (RMs) of the Tallapoosa River downstream of Harris Dam through Horseshoe Bend. This geographic scope was developed for study purposes and associated analyses only; this area is not included in the Harris Project Boundary. Skyline, Lake Harris, and the Tallapoosa River downstream of Harris Dam are located in two river basins: Skyline is in the Tennessee River Basin, and Lake Harris and the Tallapoosa River downstream of Harris Dam are in the Tallapoosa River Basin. Only portions of the Tallapoosa River Basin are managed by Alabama Power as part of its FERC license for the Harris Project.

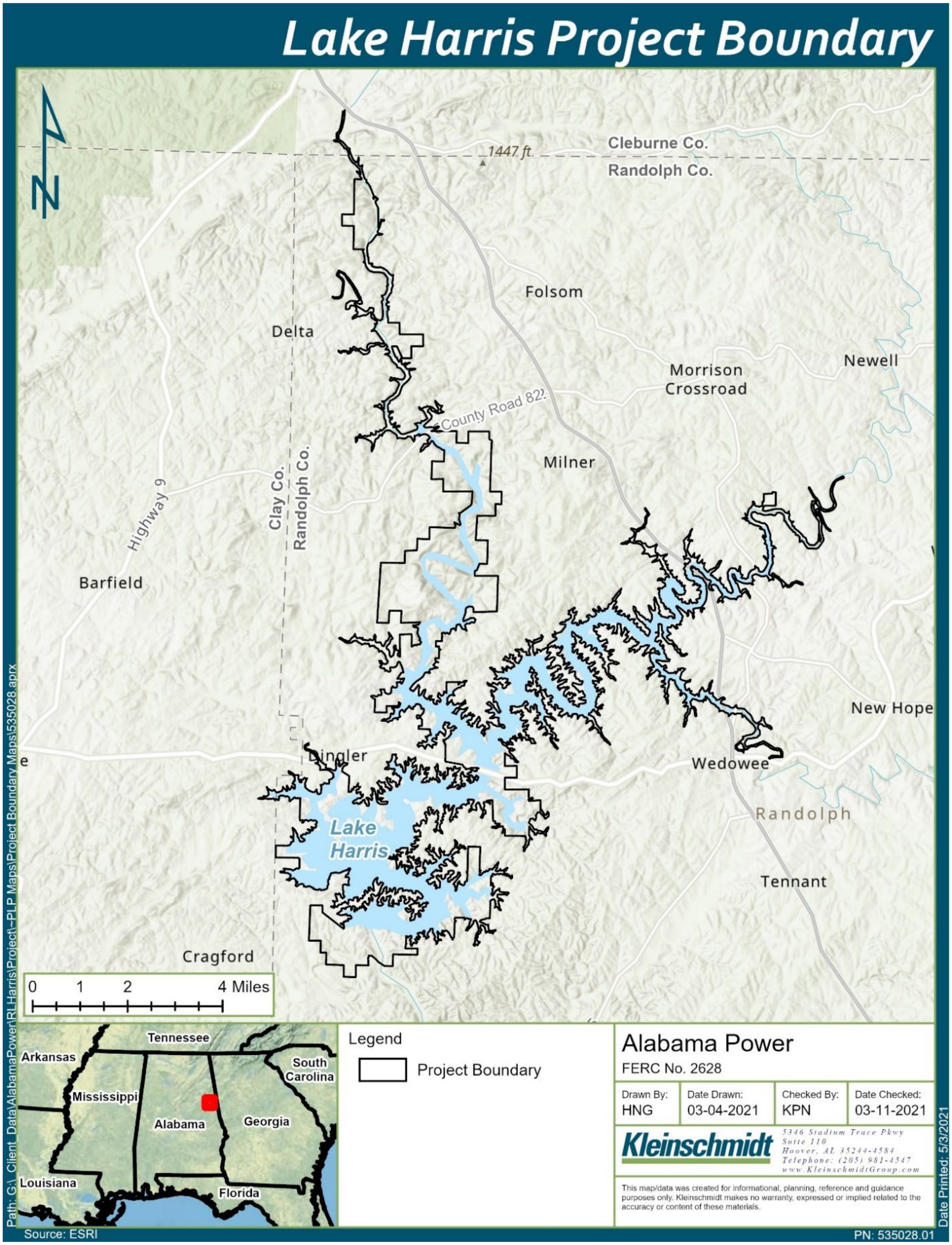


Figure 2-1 Lake Harris Project Boundary (Baseline)

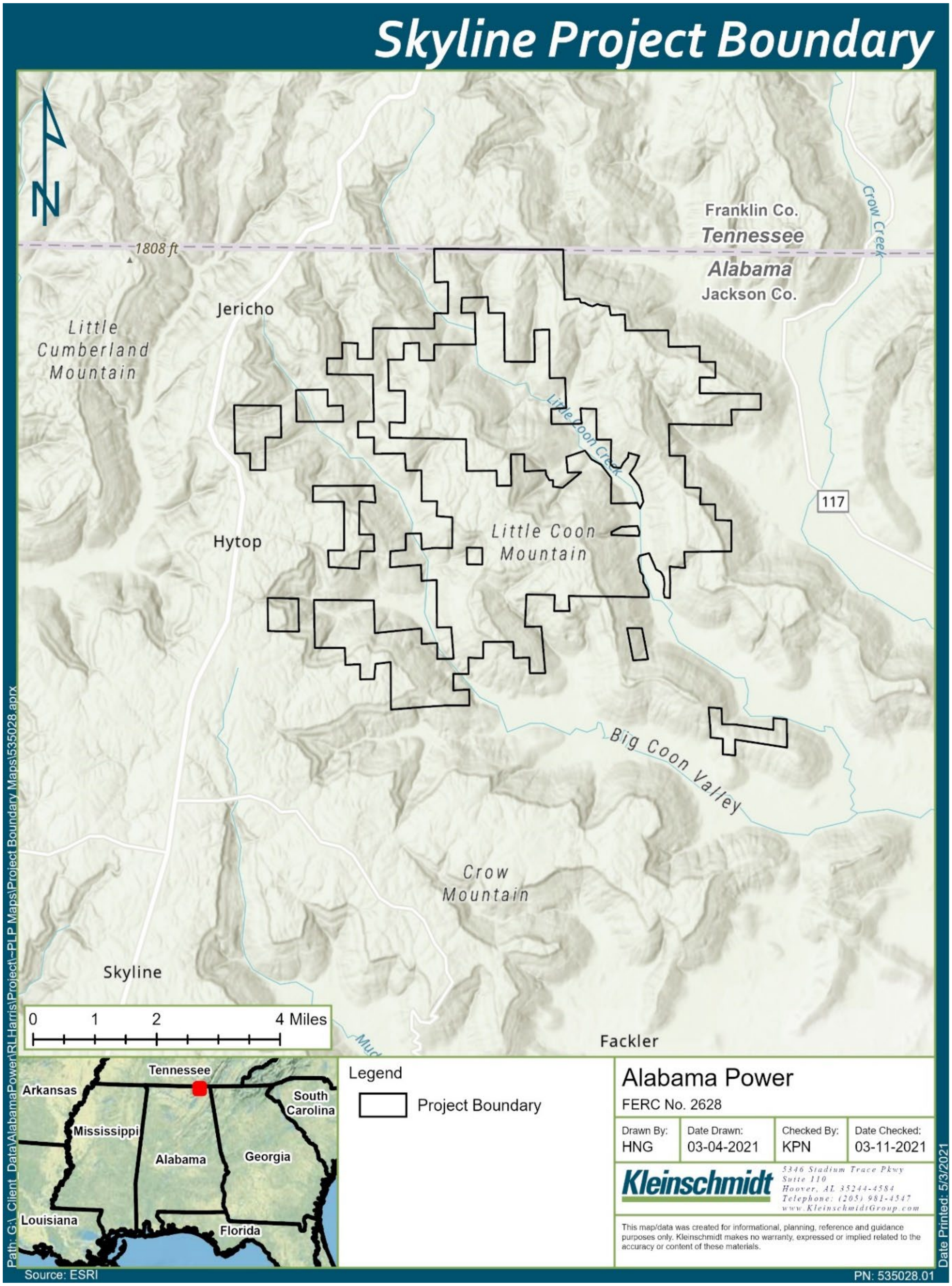


Figure 2-2 Skyline Project Boundary

2.2 General Description of the River Basins

2.2.1 Tennessee River Basin

Skyline is located near Scottsboro, Alabama, in the Tennessee River Basin (Figure 2-3). The Tennessee River flows 652 miles from the confluence of the French Broad and Holston rivers in Knoxville, Tennessee. The Tennessee River Basin is a sub-basin of the Ohio River Basin that begins in Pittsburgh, Pennsylvania and flows westward to Cairo, Illinois (Alabama Power and Kleinschmidt 2018).

The headwaters of the Tennessee River begin at RM 652 where the French Broad River meets the Holston River in Knox County, east of Knoxville, Tennessee, at an approximate source elevation of 813.0-feet msl (USGS 1955). The Tennessee River enters Alabama in Jackson County northeast of Bridgeport, Alabama, passing Skyline on the east. From this point, the Tennessee River meanders southwesterly to Guntersville, Alabama, and then proceeds northwesterly through Decatur to Florence, Alabama (Alabama Power and Kleinschmidt 2018). The Tennessee River hosts 29 power-generating dams that power the Tennessee Valley Authority's (TVA) hydroelectric fleet before ending at the Ohio River in Livingston/McCracken counties near Paducah, Kentucky, at an approximate source elevation of 302.0-feet msl (USDOI 1968). The portion of the Tennessee River Basin in Alabama drains approximately 6,826 square miles, which represents 13 percent of the land area in northern Alabama (Clean Water Partnership 2003). The drainage area covers all 15 of the northern counties in Alabama.

The largest cities in northern Alabama within the Tennessee River Basin include Decatur, Florence, and Huntsville, each having a population of more than 40,000 residents. The closest large city to Skyline is Huntsville, which lies approximately 37 miles west, with an estimated population of 200,574. Huntsville is the largest city within the Tennessee River Basin in Alabama (U.S. Census Bureau 2019a). Decatur, Alabama is approximately 60 miles west of Skyline; Florence, Alabama is approximately 95 miles west of Skyline (Alabama Power and Kleinschmidt 2018).

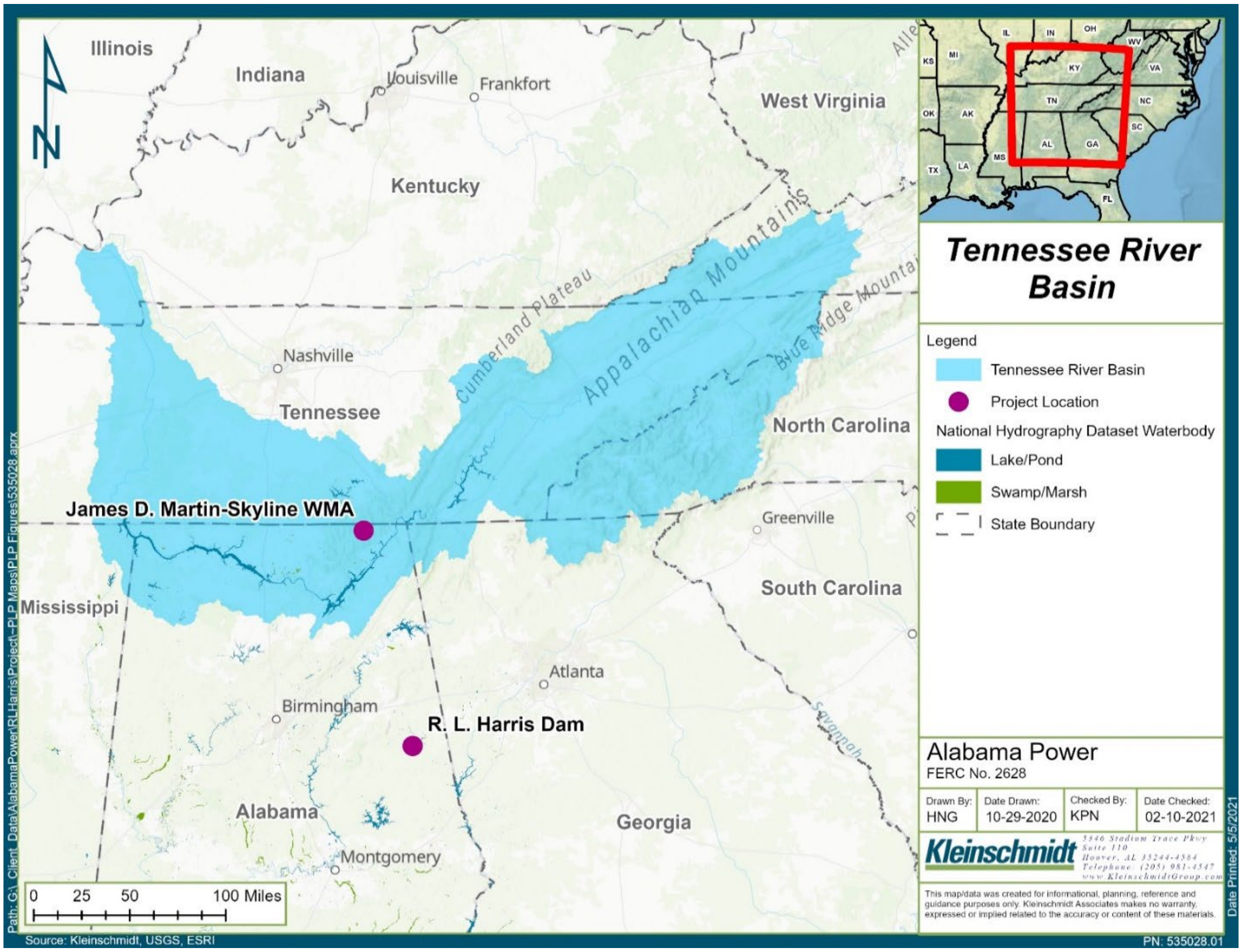


Figure 2-3 Tennessee River Basin

2.2.1.1 Dams

The main stem of the Tennessee River is highly regulated with few free-flowing stream reaches (USGS 1998). There are 30 dams, 29 hydroelectric, and 1 non-power dam on the Tennessee River: Appalachia, Blue Ridge, Boone, Chatuge, Cherokee, Chickamauga, Douglas, Fontana, Fort Loudoun, Fort Patrick Henry, Great Falls, Guntersville, Hiwassee, Kentucky, Melton Hill, Nickajack, Norris, Nottely, Ocoee Dam 1, Ocoee Dam 2, Ocoee Dam 3, Pickwick Landing, Raccoon Mountain, South Holston, Tims Ford, Watauga, Watts Bar, General Joe Wheeler, Wilbur, and Wilson. All 29 of these hydroelectric generating dams are owned and operated by TVA . Of these 29 dams, 3 are located in Alabama: Guntersville (RM 349.0), General Joe Wheeler (RM 274.9), and Wilson (RM 259.4) dams (USACE 2013a).

2.2.1.2 Major Land and Water Uses

The Tennessee River Basin is predominantly woodland and agricultural land. Urban/suburban and bare areas used as mine lands and construction are common (Clean Water Partnership 2003). The closest rural towns to Skyline are Hytop and Stevenson, Alabama and Sherwood, Tennessee, with an estimated combined total population of approximately 2,931 residents (City-Data 2007, Census Bureau 2019b, 2019c). Current uses of the Tennessee River Basin include surface water withdrawals for all purposes (domestic, industrial, agricultural). Approximately 87 percent of water withdrawn annually is used for agricultural (irrigation) purposes; 8 percent for industrial use; and the remaining 5 percent for domestic use (Alabama Power and Kleinschmidt 2018).

Water demands include consumptive and non-consumptive uses. Consumptive uses or "out-of-stream" uses are water withdrawals that return only a portion or none of the withdrawn water back to the Tennessee River Basin. Consumptive uses include municipal, industrial (M&I), and agricultural water supplies. M&I water demands are both publicly supplied and self-supplied and include residential, commercial, governmental/institutional, industrial, manufacturing, and other demands such as unaccounted-for water use (system losses and firefighting) (CH2MHILL 2005). Estimated water withdrawals in the Tennessee River Basin during 2005 averaged approximately 12,437 million gallons per day (mgd) of freshwater for out-of-stream uses and is projected to decrease to 11,551 mgd by 2030 (TVA 2008). The reuse potential of water from the Tennessee River is high because most of the water withdrawn for out-of-stream use is returned to the river system (Hutson et al. 2004). Non-consumptive water demands in the Tennessee River Basin include hydroelectric generation and boating and /or fishing where the water is available for other uses at the same site (Alabama Power and Kleinschmidt 2018).

Four major reservoirs are located on the Tennessee River and are operated and managed by the TVA for a variety of purposes that include flood control, navigation, water supply, recreation, hydroelectric power, and economic development. Recreational use of the reservoirs includes fishing and swimming (Clean Water Partnership 2003). Peak water demands are during the summer months when TVA's generating load increases (USGS 2004).

2.2.1.3 Tributaries

The principal tributary streams are the Holston River and the French Broad River, both of which are in Tennessee. The French Broad River has a drainage area of 5,124 square miles in North Carolina and Tennessee. The Holston River has a drainage area of 3,776 square miles in Virginia and Tennessee (USGS 2000).

2.2.1.4 Climate

The Lower Tennessee River Basin is approximately 19,500 square miles, of which 57 percent is in Tennessee, 35 percent in Alabama, and 1 percent in Georgia. This area consists of three physiographic regions: Coastal Plain Province, Cumberland Plateau Section of the Appalachian Plateaus Province, and Interior Low Plateaus. Annual precipitation varies from 47 inches in the Coastal Plain to 63 inches in the Cumberland Plateau. The general area has a temperate climate with an average annual temperature of approximately 58 degrees Fahrenheit (°F) (USGS 1998). Skyline is located within the Cumberland Plateau section of the Appalachian Plateaus Province in the northeastern corner of Alabama. Rainfall in the drainage area varies annually with much of the rainfall occurring in the mountainous areas along the headwaters of the tributaries where mean annual rainfall can be as high as 90 inches (USGS 2004). The Tennessee River Basin is conducive to agriculture, outdoor leisure and recreation activities, and industries that require year-round outdoor work (Alabama Power and Kleinschmidt 2018).

2.2.2 Tallapoosa River Basin

Harris Reservoir is located on the Tallapoosa River, near the towns of Lineville and Wedowee in east central Alabama. The Tallapoosa River flows 265 miles from the southern end of the Appalachian Mountains in Georgia, southward and westward into Alabama and is formed by the confluence of McClendon and Mud creeks in Paulding County, Georgia. The Tallapoosa River Basin is a sub-basin of the Mobile River Basin that begins in western Georgia and flows southwesterly through east central Alabama. The Tallapoosa River Basin is approximately 4,687 square miles with approximately 15 percent of this basin's drainage area in Georgia (CH2MHILL 2005).

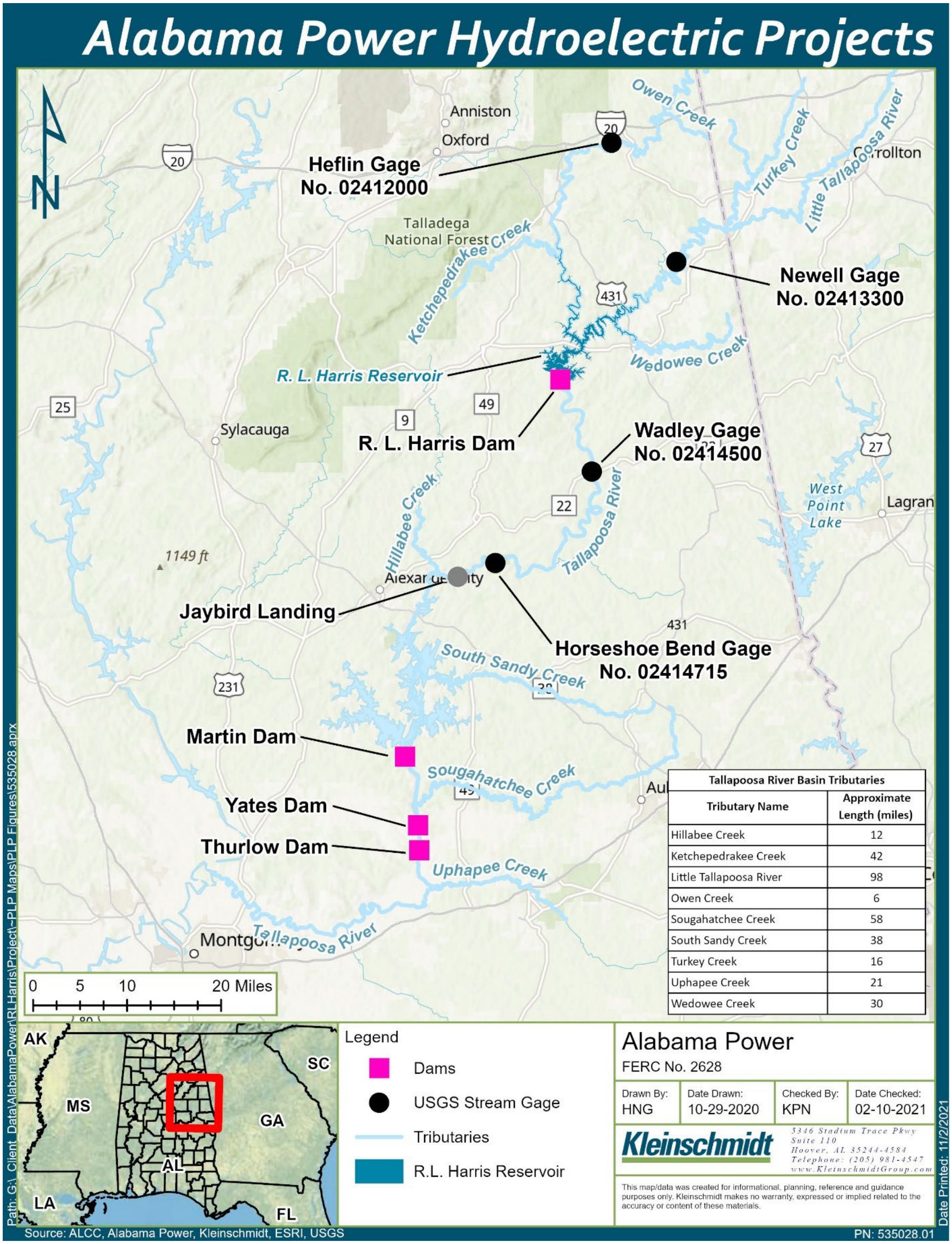
The headwaters of the Tallapoosa River and the Little Tallapoosa River begin in the Georgia counties of Paulding and Carroll, respectively, and converge in Randolph County, Alabama, to form the main stem of the Tallapoosa River. From this point, the Tallapoosa River meanders southwesterly through four Alabama Power hydroelectric developments

(Harris Dam, Martin Dam, Yates Dam, and Thurlow Dam) before joining the Coosa River to form the Alabama River (Figure 2-4) (Alabama Power and Kleinschmidt 2018). The Newell, Heflin, Wadley, and Horseshoe Bend U.S. Geological Survey (USGS) gages are depicted in Figure 2-4 and Figure 2-5 because these gages represent the unregulated flows above, and below, the Harris Project respectively, and are referenced throughout the Exhibit E analysis.

Harris Reservoir, located in Clay, Cleburne, and Randolph counties on the Tallapoosa River, has approximately 367 miles of shoreline. Figure 2-5 provides the location of the Harris Reservoir within the Tallapoosa River Basin. The principal tributaries to Lake Harris are the Tallapoosa River, Little Tallapoosa River, Wedowee Creek, and Ketchepedrakee Creek (Alabama Power and Kleinschmidt 2018). The city of Wedowee flanks the eastern and southeastern shores of Harris Reservoir. The city of Heflin, the largest city in Cleburne County, is roughly 30 miles north of Harris Reservoir, while the city of Lineville in Clay County is approximately 10 miles west of the reservoir. Heflin and Lineville are the only cities with populations of 1,000 or more, the watershed is located just south of Interstate 20 (I-20) and is only 65 miles east of downtown Birmingham, Alabama, and 65 miles west of downtown Atlanta, Georgia. Anniston, Alabama is located approximately 42 miles from Harris Reservoir, and Montgomery and Auburn, Alabama are located within 100 miles of Harris Reservoir (Alabama Power and Kleinschmidt 2018).

2.2.2.1 Dams

All four hydroelectric generating dams on the Tallapoosa River are owned and operated by Alabama Power and include the Harris Dam located at RM 139.1; Martin Dam at RM 60.6; Yates Dam at RM 52.7; and Thurlow Dam at RM 49.7.



Tallapoosa River Basin Tributaries	
Tributary Name	Approximate Length (miles)
Hillabee Creek	12
Ketchepedrakee Creek	42
Little Tallapoosa River	98
Owen Creek	6
Sougahatchee Creek	58
South Sandy Creek	38
Turkey Creek	16
Uphapee Creek	21
Wedowee Creek	30

Figure 2-4 Alabama Power Tallapoosa River Hydroelectric Projects

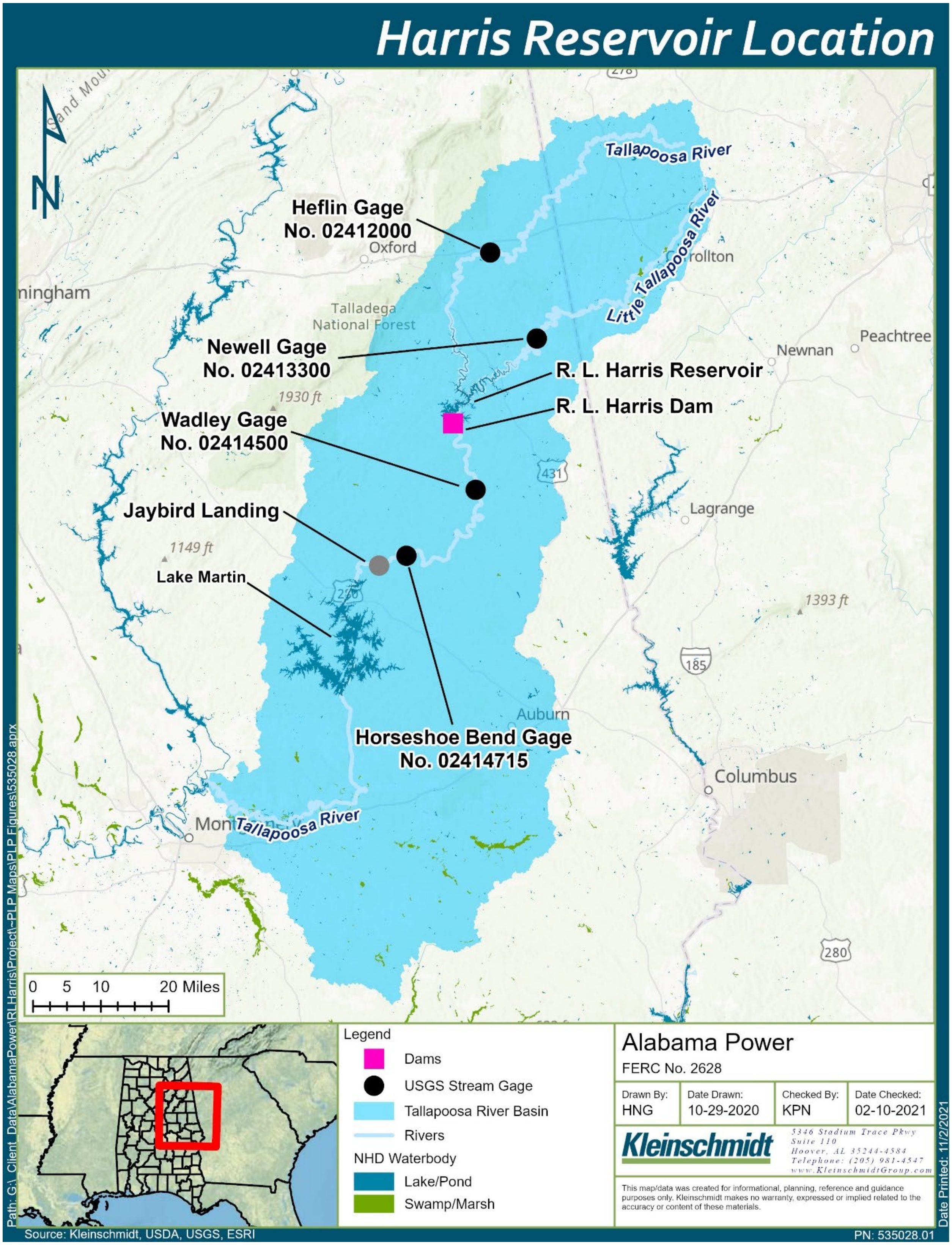


Figure 2-5 Location of Harris Reservoir in the Tallapoosa River Basin

2.2.2.2 Major Land and Water Uses

Most of the land in the Tallapoosa River Basin is undeveloped. Approximately 84 percent of the basin is forested, and 13 percent is agricultural. Less than 1 percent of the Tallapoosa River Basin is urban (CH2MHILL 2005). The closest population centers to Lake Harris are Wedowee, Lineville, and Wadley, Alabama with populations of 794; 2,249; and 714 respectively (Census Bureau 2019a).

Riparian water doctrine serves as the legal basis for water use in the eastern United States and is the foundation for the state's water resources management policy. Current uses include water supply for M&I, agricultural, hydropower, navigation (downstream flow augmentation for the Alabama River), water quality (e.g., assimilative capacity for wastewater discharges), flood control, fish and wildlife habitat, and recreation (CH2MHILL 2005).

Water use generally follows a seasonal pattern. Peak water demands are from June through September, when irrigation and residential water demand peaks with the warm temperatures (Davis et al. 1996). Seasonal demands on surface water affect management of Alabama Power's hydroelectric operations in the Tallapoosa River Basin (Alabama Power and Kleinschmidt 2018).

Nearly half of the surface water withdrawals in the Tallapoosa River Basin are from reservoirs, with Lake Martin, downstream of Lake Harris, being the main source. Drinking water supplies for livestock, irrigation of crops and orchards, and aquaculture account for most of the agricultural water demand in the Tallapoosa River Basin (CH2MHILL 2005).

Although the downstream Alabama River provides for navigation for commercial barge traffic, the Tallapoosa River does not contain any locks. There are no large metropolitan centers within the Tallapoosa River Basin however, Birmingham is located 65 miles west of Harris Reservoir. The Upper, Middle, and Lower Tallapoosa River areas are dominated by forest/woodland, at 83.8 percent, 84.4 percent, and 64.1 percent, respectively, and agriculture, at 13.1 percent, 8.4 percent, and 19.6 percent, respectively (CH2MHILL 2005).

2.2.2.3 Tributaries

The principal tributary streams in the Tallapoosa River Basin are the Little Tallapoosa River, which has a drainage area of 464.7 square miles in Georgia and Alabama and the

Sougahatchee, South Sandy, Uphapee, and Hillabee creeks in Alabama. Other tributaries include the Wedowee, Owen, and Turkey creeks in Alabama (ADEM 2017).

2.2.2.4 Climate

The general climate in the Tallapoosa River Basin is conducive to agriculture, outdoor leisure and recreation activities, and industries that require year-round outdoor work. This basin generally has a moist yet temperate climate. Precipitation is usually in the form of rain with rare snowfalls. Rainfall is not evenly distributed throughout the Tallapoosa River Basin. Annual rainfall amounts typically range from 46 to 64 inches, with the higher amounts occurring in the Upper and Lower Tallapoosa River Basin segments, respectively. Insufficient rainfall may occur every 10 to 15 years.

Average normal daily temperatures range from a high of 58 °F to a low of 35 °F in January. During the month of July, temperatures vary from 92 °F to 67 °F. Although the monthly average highs in June, July, and August exceed 90 °F, this temperature range generally occurs, on average, only 87 days per year. Historic records confirm that freezing temperatures occur an average of only 51 days per year (Alabama Power and Kleinschmidt 2018).

3.0 STATUTORY AND REGULATORY REQUIREMENTS

3.1 Section 401 of the Clean Water Act

Section 401 of the Clean Water Act (CWA) requires that any applicant for a federal license, to conduct any activity which may result in any discharge into the navigable waters, provide to the licensing agency a certification from the state in which the discharge originates that the discharge will comply with state water quality standards adopted under the CWA. U.S. Environmental Protection Agency (EPA) regulations implementing Section 401 require that the certification issued by the state certifying agency contain a statement that there is “reasonable assurance that the activity will be conducted in a manner which will not violate applicable water quality standards”.

Therefore, pursuant to Section 401 and 18 C.F.R. § 5.23 (b), Alabama Power will file an Application for a 401 Water Quality Certification (WQC) to the Alabama Department of Environmental Management (ADEM) within 60 days following FERC’s notification of its acceptance of the license application being ready for environmental analysis. Alabama Power has consulted with ADEM throughout the relicensing process concerning monitoring locations and frequency of monitoring relative to preparing the application for water quality certification.

3.2 Endangered Species Act

Section 7 of the Endangered Species Act (ESA), 16 United States Code (U.S.C.) Section 1536(a), requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened or endangered (T&E) species, or result in the destruction or adverse modification of the critical habitat of such species. Federal agencies are required to consult with the U.S. Fish and Wildlife Service (USFWS) when a proposed action may adversely affect listed species. By letter dated August 10, 2018, FERC designated Alabama Power as FERC’s non-federal representative to execute the informal consultation, pursuant to Section 7 of the ESA. By letter dated September 27, 2021, USFWS provided a list of T&E species that may occur near the “affected area” and concurred with Alabama Power’s list of T&E species not likely to occur within the Harris Project Area. The USFWS also provided a list of four mussel species known to occur in the Tallapoosa River and discussed measures that may benefit these petitioned species. On

September 28, 2021, FERC provided an updated list of T&E, candidate, and proposed species generated by ECOS-IPaC.[9] Alabama Power continues to consult with USFWS relative to federally listed species. The Threatened and Endangered Species section of Exhibit E provides additional information related to federally listed T&E and candidate species.

3.3 Magnuson-Stevens Fishery Conservation and Management Act

The purpose of the Magnuson-Stevens Fishery Conservation and Management Act is to provide for the conservation and management of the marine fisheries. The National Marine Fisheries Service (NMFS) is the primary manager of activities covered under this Act. FERC's 18 C.F.R. Section 5.18 (3) (iii) regulations require a licensee to document any essential fish habitat (EFH) that may be affected by the project. To date, EFH has not been documented at the Harris Project and the issue of EFH has not been raised by any stakeholder.

3.4 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972, as amended, requires review of the project's consistency with the state's coastal management program. The state of Alabama's Coastal Area Management Program (ACAMP) applies to the coastal lands and waters seaward of the continuous 10-foot contour in Baldwin and Mobile counties, Alabama. Implementation of the ACAMP is shared by the Alabama Department of Conservation and Natural Resources (ADCNR) and the ADEM. Due to the location of the Harris Project, the CZMA does not apply. By electronic mail dated June 2, 2021, ADEM noted that "given the geographic location and nature of Alabama Power's Harris Project, there would be no reasonably foreseeable effects on uses or resources in Alabama's coastal zone resulting from the proposed action." This letter is found in the Consultation Documentation provided with the Harris FLA.

3.5 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties include districts, sites, buildings, structures,

[9] Accession Number 20210928-3028

traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are listed in, or eligible for, inclusion in the National Register of Historic Places (NRHP). By letter dated August 10, 2018, FERC designated Alabama Power as FERC's non-federal representative for executing consultation, pursuant 54 U.S.C. 306108; hereinafter, 'Section 106'. Alabama Power has consulted with appropriate agencies and applicable tribes during relicensing, which culminated in the development of a Historic Properties Management Plan (HPMP) filed in conjunction with this license application and, if needed a Programmatic Agreement (PA) that will be developed by FERC. The Cultural Resources Section of this Exhibit E provides additional information related to cultural resources and a discussion of the measures contained in the HPMP.

3.6 Wild and Scenic Rivers and Wilderness Acts

There are no river segments designated as Wild and Scenic under the Wild and Scenic Rivers Act within the Harris Project Boundary. Per letter dated September 29, 2021[10], the National Park Service (NPS) noted that 24 miles of the Tallapoosa River downstream of the Harris Project, from Bibby's Ferry to Jaybird Landing, are listed in the Nationwide Rivers Inventory (NRI) (NPS 2021a).

There are no National Trail Systems or Wilderness Areas within the Harris Project Boundary and no lands within the Harris Project Boundary under study for inclusion in the National Trails System or designation as a Wilderness Area. In a letter dated September 29, 2021, the NPS noted that a portion of the Trail of Tears National Historic Trail is located approximately 10 miles from the Skyline Project Boundary (NPS 2021b).

[10] Accession No. 20210929-5090

4.0 HARRIS PROJECT FACILITIES AND OPERATION

FERC issued a preliminary permit to Alabama Power for the Harris Project on July 7, 1967, and on November 1, 1968, Alabama Power submitted to FERC an application for an original license. FERC granted an Order Issuing a Major License for the Harris Project on December 27, 1973, for a 50-year period, effective December 1, 1973[11]. Alabama Power began construction on the Harris Project in 1974; however, for various reasons, construction was delayed (Alabama Power and Kleinschmidt 2018). Alabama Power began service at the Harris Project on April 20, 1983. The Harris Project consists of:

- A 29-mile-long reservoir with a surface area of 9,870 acres at normal full pool elevation of 793.0-feet msl
- A concrete gravity dam, including a gated spillway, a powerhouse integral with the dam, and non-overflow sections
- Earth embankments extending from each abutment of the dam
- Transmission lines and appurtenant facilities

Harris Reservoir extends up the Tallapoosa River approximately 29 RM from Harris Dam. With an approximate 367 miles of shoreline, the Harris Reservoir surface area is approximately 9,870 acres at normal full pool elevation of 793.0-feet msl with a mandatory 8-foot drawdown to 785.0-feet msl from December to April. The gross storage capacity of Harris Reservoir is approximately 425,721 acre-feet, and the usable storage capacity is approximately 207,317 acre-feet.

Harris Dam is located 139.1 RMs upstream of the mouth of the Tallapoosa River, and approximately 78 RMs upstream from the Martin Dam, 86 RMs upstream from the Yates Dam, and 89 RMs from the Thurlow Dam (Alabama Power and Kleinschmidt 2018). Water retaining structures total approximately 3,243 feet with a maximum height of 163 feet and consist of:

[11] The preliminary permit was issued by the Federal Power Commission, which was established in 1920 and became the Federal Energy Regulatory Commission in 1977. In addition, the R.L. Harris Project, which was originally named the Crooked Creek Project, became the official project name on November 6, 1974.

- 310-foot-long, 163-foot-high gated concrete gravity spillway, which has six radial gates 40.5-feet-high by 40-feet-wide for passing floodwaters in excess of turbine capacity, one of which serves a dual role as a trash gate
- 186-foot-long, 150-foot-high concrete gravity powerhouse integral with the dam
- 400-foot-long and 95-foot-high west embankment
- 600-foot-long and 95-foot-high east embankment
- 331-foot-long, 112-foot-high concrete gravity west non-overflow section
- 315.5-foot-long, 150-foot-high concrete gravity east non-overflow section
- Earth embankments in topographic saddles east of the river, including:
    - 800-foot-long, 40-foot-high west saddle dike
    - 300-foot-long, 30-foot, high east saddle dike

The Harris Project powerhouse is a 186-foot-long, 150-foot-high, 95-foot-wide concrete structure integral with the dam that houses two vertical flow units totaling 135 MW. There are two vertical generators each rated at 71,740 kilovolt-amps (kVA) and two vertical Francis turbines each rated at 95,000 horsepower (hp) under a net head of 121 feet and each with a maximum hydraulic capacity of 8,000 cubic feet per second (cfs). The normal tailwater elevation with only one unit operating is 666.0-feet msl; with two units operating it is 669.0-feet msl. The Harris Project intake structure consists of six intake gates, each equipped with trash racks, and a penstock. The invert elevation of the intake structure is located at 746.0-feet msl. The intake is equipped with a skimmer weir that can incrementally raise the effective intake elevation approximately 18 feet to a maximum of approximately 764.0-feet msl, thus pulling water from higher in the water column. In other words, the invert elevation of the intake structure is located at 746.0-feet msl when the skimmer weir is fully lowered, and it is at 764.0-feet msl when it is fully raised. The intake structures are 47-feet below full pool elevation and 39-feet below the winter pool elevation (Alabama Power and Kleinschmidt 2018).

Alabama Power supplies electric power throughout a large part of Alabama and exchanges electric power with other operating subsidiaries of Southern Company, and with the TVA by means of physical connections of the transmission systems. The Harris

Project includes two - 115 kilovolt (kV) transmission lines that extend parallel to each other for approximately 1.5 miles to the northwest from Harris Dam to the Crooked Creek Transmission Substation[12] (Alabama Power and Kleinschmidt 2018).

4.1 Existing Project Operations

Before describing the Harris Project operations, it is important to discuss the relationship between Alabama Power and U.S. Army Corps of Engineers (USACE) in the Alabama-Coosa-Tallapoosa (ACT) River Basin. The ACT basin originates just north of the Tennessee-Georgia border, extends into central north Georgia, crosses the Georgia-Alabama state line into north Alabama, and continues across central and southern Alabama before terminating in Mobile Bay. The basin covers 32 counties in Alabama, 18 counties in Georgia, and 2 counties in Tennessee. The basin drains 22,800 square miles, extending approximately 320 miles. The USACE owns and maintains five projects in the ACT basin, and Alabama Power owns and maintains 11 developments (Figure 4-1) (Alabama Power and Kleinschmidt 2018). The USACE Master Water Control Manual (WCM) provides a general reference for day-to-day, real-time water management decision making for the six federal projects operated by USACE and the four non-federal storage developments operated by Alabama Power in the ACT basin. Projects in the ACT basin are operated in a coordinated manner to manage the often competing uses, meet all authorized uses, ensure that enough water is available to minimally satisfy project purposes during droughts, and to maintain a balanced use of storage (USACE 2022). The Master WCM contains nine appendices that describe specific regulations for individual projects in the ACT basin. Article 13(c) of the existing Harris license requires Alabama Power to operate Harris Reservoir for flood control in accordance with the Agreement between the USACE and Alabama Power dated September 27, 1972 (USACE and Alabama Power 1972). Appendix I of the Master WCM issued May 2015, which is the Harris Water Control Manual (Harris WCM), describes these flood management regulations, and includes navigation support plans, and drought contingency operations for the Harris Project (USACE 2022). The Harris WCM is an appendix to Exhibit B, provided in the Harris FLA.

For a presentation on Harris Project operations, see: https://players.brightcove.net/18122129001/default_default/index.html?videoId=5726420019001.

[12] The Crooked Creek transmission substation is the point at which electrical power from the Harris Project is distributed to the grid. Therefore, the Crooked Creek transmission substation is not a Harris Project facility.

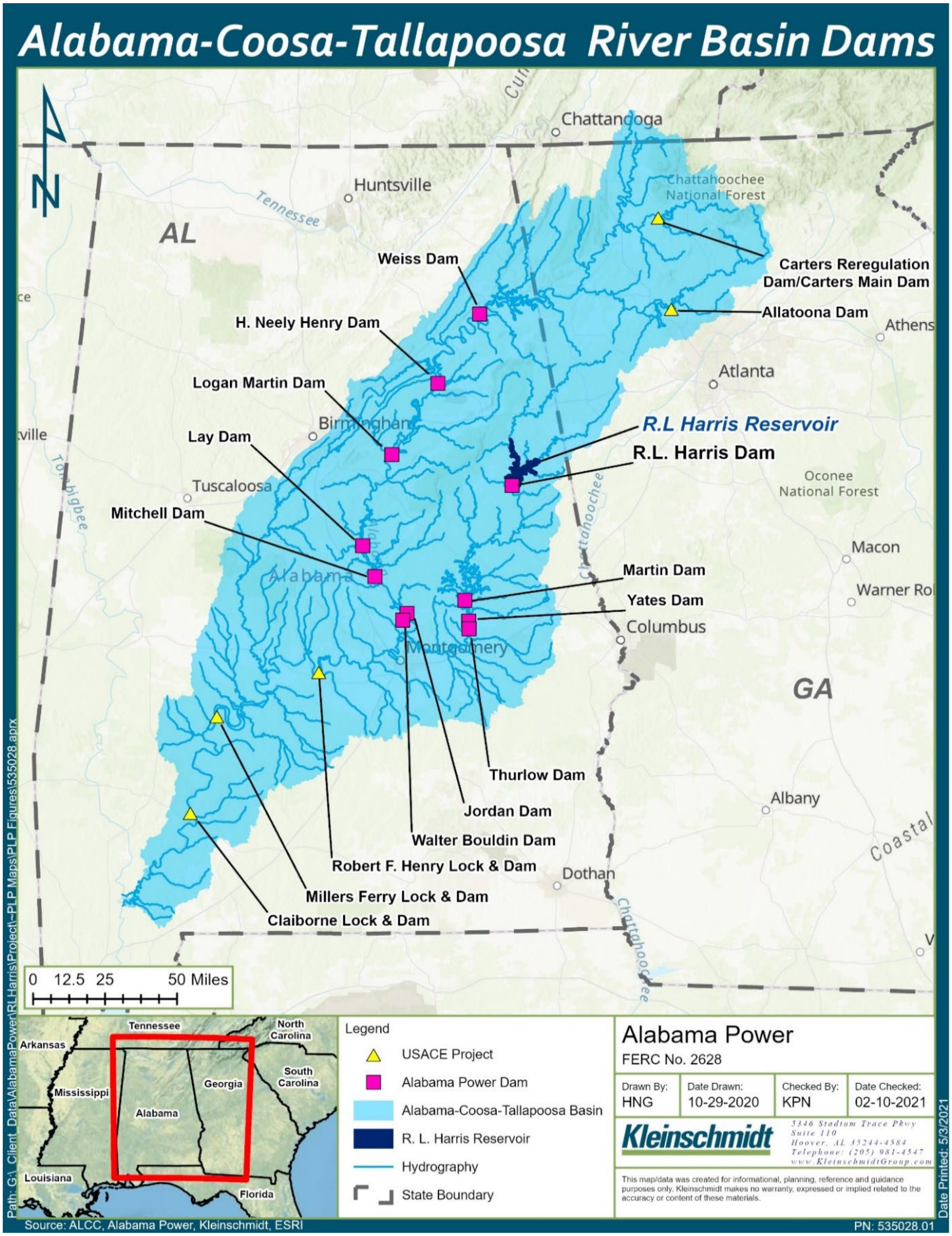


Figure 4-1 Alabama, Coosa, Tallapoosa River Basin Dams

4.1.1 Normal Operations

Harris Reservoir is a multi-purpose storage reservoir with water levels that fluctuate seasonally; there are negligible daily reservoir fluctuations during normal operations. The Harris Project was built to support various upstream and downstream uses and hydroelectric power, directly affecting many people throughout the state. The Harris Project also provides flood control and navigation support. Harris Reservoir waters are used for public water supply, fish and wildlife habitat, recreational fishing and boating, and various other outdoor recreation activities. Under normal conditions, Alabama Power operates the Harris Project during daily peak-load periods to maintain reservoir levels according to the operating curve (Alabama Power and Kleinschmidt 2018).

The Harris Operating Curve, depicted as the black line in Figure 4-2, depicts the targeted normal daily lake levels. Harris Reservoir is maintained at or below the elevations specified by the Harris Operating Curve except when storing floodwater. From May 1 through October 1, Harris Reservoir is maintained at or below elevation 793.0-feet msl, depending on inflow conditions. Between October 1 and December 1, the operating curve elevation drops to elevation 785.0-feet msl. The pool level remains at or below elevation 785.0-feet msl until April 1. From April 1 to May 1, the operating curve elevation rises to full pool at elevation 793.0-feet msl. During high flow conditions, the USACE-approved flood control procedures in the Harris WCM (USACE 2022) are implemented. During low flow conditions, the drought contingency curve (the red line in Figure 4-2) is intended to be used as one of several factors in evaluating drought reservoir operations consistent with approved drought plans.

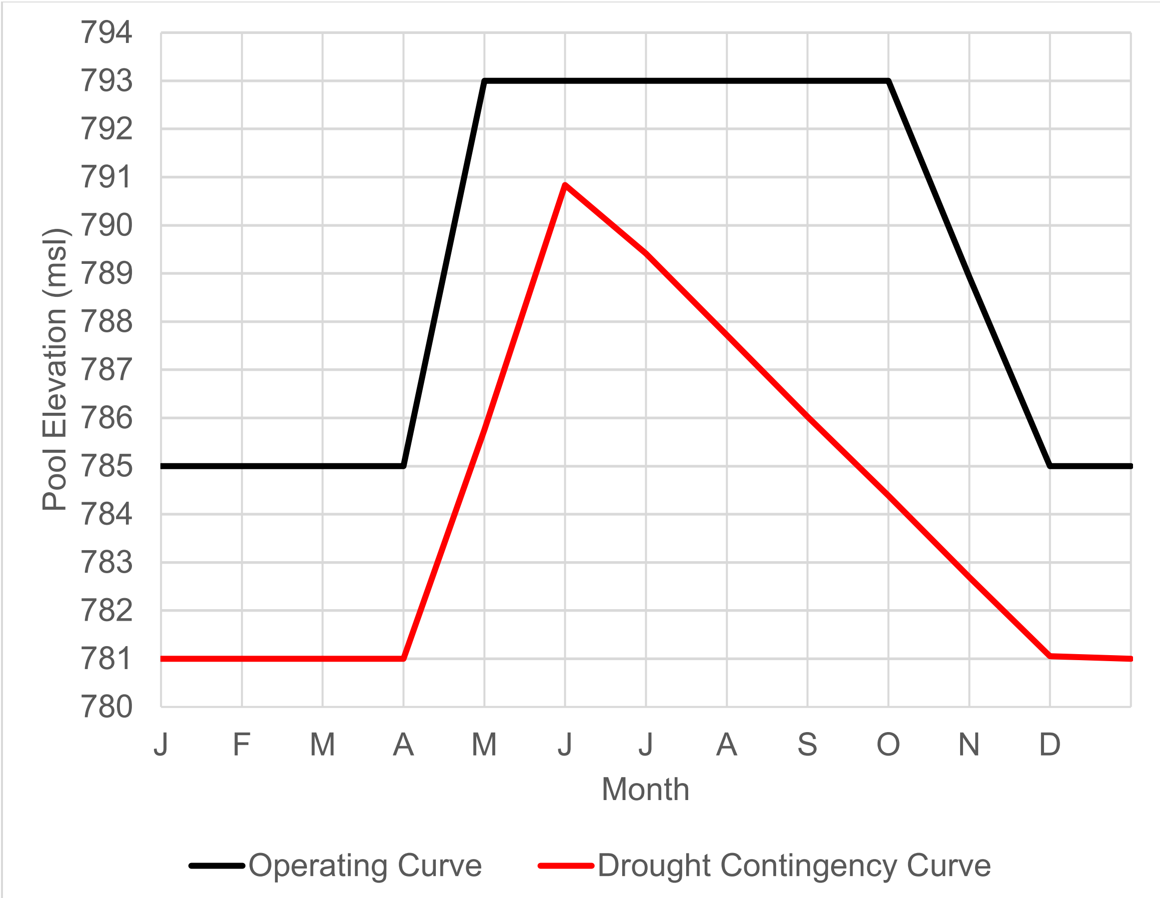


Figure 4-2 Harris Operating Curve

4.1.1.1 Minimum Flow

Article 13 of the existing Harris Project FERC license requires Alabama Power to release water from the Harris Project to provide a minimum flow of 45 cfs, as measured at the downstream Wadley gage near Wadley, Alabama (FERC 1973). The 45 cfs as measured at the Wadley gage is met through Harris releases in addition to other intervening flows. It is not a continuous 45-cfs minimum release from the Harris Dam.

4.1.1.2 Green Plan Operations

In the 1990s, resource agencies and other stakeholders expressed concern about impacts to aquatic resources associated with peaking operations and minimum flows at Harris Dam. Alabama Power worked with stakeholders including, ADCNR, USFWS, FERC, the Alabama Cooperative Fish and Wildlife Research Unit (ACFWRU) at Auburn University, and others to address those concerns. Following a 2003 adaptive management workshop, a core group of stakeholders worked with Alabama Power to explore potential solutions that maximized benefits to biological, economic, and recreation resources.

Alabama Power evaluated several methods to provide continuous flows or re-regulation of peaking flows from Harris Dam, including geotubes, a re-regulation dam, and structural modification to Harris Dam. Alabama Power performed numerous hydraulic modeling runs of various flow scenarios in evaluating potential re-regulation structures. Many of the methods evaluated were deemed unfeasible at that time due to engineering (structural), cost, and/or ecological considerations.

After eliminating potential physical modifications to the dam and river downstream, the stakeholder group and Alabama Power devised a plan for specific pulsing releases from Harris Dam, which was deemed the “Green Plan” (Green Plan or GP). The Green Plan operations plan is provided in Exhibit B of the Harris FLA. Generally, the Green Plan specifies short (10 to 30 minute) pulses from Harris Dam, with the pulse duration determined by conditions at a gage on an unregulated section of the Tallapoosa River upstream of Harris Reservoir. The Green Plan outlines specific daily and hourly release schedules from Harris Dam based on the previous day’s flow at the USGS gage near Heflin (Station. No. 02412000). The daily volume releases are suspended during flood operations, and specific drought release criteria are also outlined.

In 2005, Alabama Power began implementing the Green Plan. Although Green Plan operations are not required by the existing license, Alabama Power has operated Harris Dam according to the Green Plan release criteria since 2005, and, along with ADCNR, began funding research by ACFWRU to determine the response of the aquatic community in the Tallapoosa River downstream of Harris Dam. Alabama Power continued to support those research efforts through 2017. In 2018, to support the relicensing process and provide baseline information for the PAD, the history of the development of the Green Plan and the research conducted from 2005-2017 as part of monitoring efforts in the Tallapoosa River below Harris Dam were summarized in a report entitled “*Summary of R.L. Harris Downstream Flow Adaptive Management History and Research*” (Kleinschmidt 2018a).

4.1.2 Navigation

Alabama Power operates the Harris Project, along with other hydroelectric projects on the Coosa and Tallapoosa rivers, to support a predictable minimum navigable channel (i.e., a minimum water depth) in the Alabama River.

As outlined in the Master WCM for the ACT basin (USACE 2022), Alabama Power's Coosa River and Tallapoosa River projects are operated to provide a minimum 7-day average flow of 4,640 cfs (32,480 day-second-feet [dsf] /7-day average) to the Alabama River at Montgomery. The ACT Master WCM includes a template for Alabama River navigation support, subject to development of a "navigational Memorandum of Understanding (MOU)," or navigation memorandum of understanding, between Alabama Power and the USACE. This template provides for the use of specified amounts of storage from Alabama Power's reservoirs to support navigation during the June-December period, under certain conditions, including adequate basin inflow. Also, navigation is not supported during drought conditions, as defined by the ACT Basin Drought Contingency Plan (USACE 2022).

4.1.3 Flood Control Operations

The objective of flood control at Harris Dam is to minimize impacts downstream of Harris Dam by storing excess water during high flow events. The Harris WCM (USACE 2022) includes procedures used by Alabama Power to execute the operation of the Harris Project during floods (Alabama Power and Kleinschmidt 2018).

During floods, the Harris Project will operate to pass the inflow up to approximately 16,000 cfs by releasing water through the powerhouse to maintain the reservoir near the operating curve (USACE 2022). If the reservoir rises above the operating curve but is below elevation 790-feet msl, the Harris Project will operate to discharge 13,000 cfs or an amount that will not cause the USGS stream gage at Wadley, Alabama (gage No. 02414500), to exceed a stage of 13.0 feet, unless greater discharge amounts are required by the induced surcharge curves. When the reservoir rises above elevation 790-feet msl, the powerhouse discharge will be increased to the larger of approximately 16,000 cfs or the amount indicated by the induced surcharge curves. Once the reservoir level begins to fall, all spillway gate openings and the powerhouse discharge will be maintained at those settings until the Harris Reservoir level returns to the operating guide curve. If a second flood enters the reservoir prior to the complete evacuation of the stored flood waters, the release will be as directed by the induced surcharge curve operation plan outlined in the

Harris WCM (USACE 2022). The WCM is an appendix to Exhibit B provided with the Harris FLA.

The spillway gates at Harris Dam are generally operated in accordance with the gate opening schedule described in the Harris WCM (USACE 2022). The schedule specifies the gate step and gate position based on the induced surcharge curve.

4.1.4 Drought Operations

Droughts vary in duration, magnitude, degree of severity, and geographical extent, and, as a result, are difficult to predict and manage. Significant impacts to hydroelectric projects may occur despite Alabama Power's efforts to conserve water during periods of low rainfall. Effects of drought on hydroelectric operations can be classified into three broad categories: ecological impacts (e.g., changes to water quality and minimum flows), reduced electric generating capacity, and reduced recreational opportunities (Alabama Power and Kleinschmidt 2018). In addition, navigation flows described below may also be affected by drought.

The Alabama-Alabama Coosa Tallapoosa (ACT) Drought Response Operations Plan (ADROP) (Alabama Power 2016) describes the management of Alabama Power's reservoirs within the ACT basin during drought conditions. It was developed by Alabama Power, stakeholders, and state and federal agencies in response to the 2007 drought, which is the drought of record for the ACT basin (Alabama Power 2016). ADROP defines three drought triggers: 1) low basin inflow; 2) low composite conservation storage; and 3) low state line flow. If any one of these triggers is met, navigation support is suspended, and the 4,640 cfs Alabama River flow at Montgomery may be reduced consistent with the plan, depending on the severity of the drought conditions. Under ADROP, the drought triggers are used to define three incremental Drought Intensity Level (DIL) responses. The DIL responses describe a range of operations for the hydroelectric projects within the ACT basin as a function of the DIL and month. Alabama Power, the Alabama Office of Water Resources (OWR), and other relevant state and federal agencies monitor specific precipitation and stream flow indicators within the ACT basin. The precipitation indicator is based on the average of normal monthly rainfall at the following airport rain gages: Rome, Anniston, Shelby County, and Montgomery. The stream flow indicator is based on specific percentile ranges of stream flow from 11 USGS gages in the Coosa River Basin and seven gages in the Tallapoosa River Basin (Alabama Power 2016). Alabama Power evaluates the DIL using the ADROP Decision Tool that was developed by Alabama Power and the USACE Mobile District to implement portions of the Master WCM in real time operations. ADROP was incorporated into the Master WCM and ACT Basin Drought Contingency Plan. A full description of ADROP and associated operational responses for its projects on the Coosa and Tallapoosa rivers during periods of drought is included in Exhibit B of the Harris Project FLA (Alabama Power and Kleinschmidt 2018).

4.1.5 Existing Protection, Mitigation, and Enhancement Measures

In addition to the existing operations, Alabama Power has implemented numerous protection, mitigation, and enhancement (PME) measures, as required by the existing license, or voluntarily:

- Voluntary PME measures are those implemented by Alabama Power during the current license term that are not required by the existing license.
- Completed PME measures are those required by the existing license that have been completed.
- Ongoing PME measures are those required, or voluntary, that Alabama Power is currently implementing.

Table 4-1 summarizes the PME measures implemented at the Harris Project during the current license term. These voluntary, completed, and ongoing PME measures are also described in affected environment section for each resource.

Table 4-1 Existing Protection, Mitigation, and Enhancement Measures

PME Measures at Harris Project			
	Voluntary PMEs	Completed PMEs	On-Going PMEs
❖ In the interest of protecting and developing the downstream aquatic habitat, release water from the Harris Project to provide a minimum flow of 45 cfs, as measured at the Wadley gage.			✓
❖ In the interest of recreation, flood control and other public uses, and consistent with power needs, maintain the Harris Reservoir as reasonably as possible at normal full pool elevation of 793 feet from May 1 to September 30 of each year and maintain the reservoir from October 1 to April 30, of each year at elevations as high as is consistent with flood control and system power needs and in no event lower than elevations of 768 feet.			✓
❖ Operate the reservoir for flood control in accordance with the agreement between USACE and Alabama Power (USACE 1972).			✓
❖ Operate Harris Dam according to Green Plan release criteria (since 2005).	✓		✓
❖ When conditions exist, and upon request from ADCNR, hold Harris Reservoir water levels constant or slightly increasing for a 14-day period for spring spawning.	✓		✓
❖ Consistent with the 1972 Alabama Water Improvement Commission (predecessor to ADEM) certificate pursuant to Section 21(b) of the Federal Water Pollution Control Act and the Revised Exhibit S (approved on September 21, 1984), operate the skimmer weir and turbine aeration system to maintain state water quality standards.			✓

PME Measures at Harris Project			
	Voluntary PMEs	Completed PMEs	On-Going PMEs
❖ Perform vector (mosquitos) control, as necessary as part of Alabama Power's nuisance aquatic and vector control management program for all Alabama Power projects.			✓
❖ Implement a Wildlife Mitigation Plan in consultation with ADCNR and USFWS (approved by FERC in 1988).			✓
• Waterfowl – Wood Duck			
o Identify suitable Wood Duck habitat		✓	
o Install Wood Duck boxes		✓	
o Inspect boxes annually and perform necessary maintenance as needed			✓
• Waterfowl – Canada Goose - Develop and implement a Canada Goose restoration project including releasing Canada geese around Lake Harris			
o Initial release of birds		✓	
o Place floating nests in sheltered coves		✓	
o Clear and strip-crop feeding areas		✓	
• Install Osprey nesting platforms		✓	
• Land Acquisition – Lake Harris - Acquire 779.5 acres of land		✓	
• Timber Management – Lake Harris			✓
• Managed Openings - Lake Harris			
o Establish and manage 105 acres of permanent openings			✓
o Manage 180 acres of right-of-way on project lands10F[13]			
• Additional artificial Nesting Structures – Lake Harris - construct and install			

[13] Alabama Power does not currently manage any rights-of-way on Project lands for the benefit of wildlife; rather, rights-of-way are managed for safety and reliability of the electric system.

PME Measures at Harris Project			
	Voluntary PMEs	Completed PMEs	On-Going PMEs
○ 300 large animal and cavity-nesting bird structures		✓	
○ 300 small animal and cavity-nesting bird structures		✓	
❖ Implement the Skyline Management Plan in (approved by FERC in 1990).			✓
• Purchase and lease to ADCNR, approximately 15,000 acres of land in the Skyline Wildlife Management Area		✓	
• Fund ADCNR to provide wildlife management			✓
• Conduct clearing, construct firebreaks, construct waterholes, add additional campsites as needed			✓
• Conduct annual boundary maintenance, upgrade roads to all-weather status and maintain annually; install and maintain gates; maintain campsites; erect and maintain nest structures			✓
• Develop and maintain herbaceous and shrub plantings; manage wildlife openings; conduct timber management			✓
❖ Encourage the use of alternative bank stabilization techniques other than seawalls.	✓		✓
❖ Implement the Dredge Permit Program.			✓
❖ Implement the Water Withdrawal Policy.	✓		✓
❖ Incorporate a scenic easement for the purpose of protecting scenic and environmental values.			✓
❖ Use of a "sensitive resources" designation on Project lands managed for the protection and enhancement of cultural resources, wetlands, and threatened and endangered species.	✓		✓
❖ Implement a shoreline compliance program and shoreline permitting program.			✓

PME Measures at Harris Project			
	Voluntary PMEs	**Completed PMEs**	**On-Going PMEs**
❖ Encourage the adoption of shoreline best management plans (BMPs), including BMPs to maintain and preserve naturally vegetated shorelines, to preserve and improve the water quality of the Harris Project reservoir, and to control soil erosion and sedimentation.	✓		✓
❖ Operate and maintain Harris Project recreation sites.			✓
❖ Identification of historical structures: cooperate with the appropriate state and local agencies in the identification of historical structures, if any, within the project area and, if necessary, cooperate in developing a plan for protection or relocation of such structures.		✓	
❖ Archaeological Consultation: prior to commencement of construction, Alabama Power will consult with the University of Alabama to determine the extent of any archeological survey and salvage excavations that may be necessary prior to any construction activities and provide funds in a reasonable amount for any needed surveys or salvage excavations to be conducted and completed prior to construction and/or flooding, whichever is applicable.		✓	
❖ State Historic Preservation Officer (SHPO) Consultation: Licensee shall, prior to commencement of any future construction at the project, consult with the Alabama SHPO about the need for any cultural resource survey and salvage work.			✓

5.0 PROPOSED ACTION AND ACTION ALTERNATIVES

This section describes Alabama Power's proposal, or the Proposed Action, including changes to the Harris Project operations, and PME measures proposed by Alabama Power for the term of the new FERC license. Existing measures being implemented as part of the original license that Alabama Power proposes to continue in the new license, as well as new measures developed during the relicensing study and consultation process are provided in the Proposed Environmental Measures Section below. The No Action Alternative and those alternatives Alabama Power considered but eliminated from further analysis are also discussed in Section 5.

5.1 No Action Alternative

Under the No Action Alternative, the Harris Project would continue to operate under the terms and conditions of the existing license, and no new PME measures would be implemented. The No Action Alternative serves as the baseline environmental condition for comparison with other alternatives. Existing operations include: 1) the normal, flood, drought, and navigation operations and 2) the Green Plan operations as described in Existing Project Operations. The Green Plan is not a license requirement, but a voluntary operations procedure that Alabama Power began implementing in 2005 following consultation with FERC, agencies, and stakeholders to address concern about impacts to aquatic resources associated with peaking operations and minimum flows at Harris Dam, and to potentially maximize benefits to biological, economic, and recreation resources. Reference to the Green Plan is synonymous with "baseline," with regard to operations, and is presented hereinafter as "Green Plan (baseline)." Alabama Power would continue the on-going PME measures as listed in Table 4-1 required by the original license, but not those PME measures that were completed.

5.2 Alternatives Considered but Eliminated from Further Analysis

Operational alternatives that were considered but eliminated from further analysis and the reason for their elimination are summarized in Table 5-1[14]. These include alternatives to raise the winter operating curve on Lake Harris, alternatives to extend the summer reservoir elevation on Lake Harris, and the various operational alternatives featuring

[14] Note that continuous minimum flow is used in the text and "CMF" acronym is used in tables and figures.

continuous minimum flows of 150, 350, 400, 450, 600, and 800 cfs, and the combination of the aforementioned continuous minimum flows (and 300 cfs continuous minimum flow) in combination with Green Plan (baseline) pulses. These alternatives were either proposed and approved for analysis by FERC in the Study Plan process or recommended by FERC following the Initial Study Report (ISR). These operational alternatives are analyzed in the *Final Operating Curve Change Feasibility Phase 1 Report* (Alabama Power and Kleinschmidt 2020a), *Final Operating Curve Change Feasibility Phase 2 Report* (Alabama Power and Kleinschmidt 2022a); *and Final Downstream Release Alternatives Phase 1 Report* (Alabama Power and Kleinschmidt 2020b), *Final Downstream Release Alternatives Phase 2 Report* (Alabama Power and Kleinschmidt 2022b).

FERC also recommended that Alabama Power conduct a study to evaluate a Battery Energy Storage System (BESS) at the Harris Project. A summary of the rationale for eliminating BESS as a reasonable alternative is provided in Table 5-1.

On October 1, 2021, FERC requested that Alabama Power include additional qualitative analysis on two reservoir operating curve operational alternatives recommended by stakeholders. A summary of the rationale for eliminating these operations as reasonable alternatives are provided in Table 5-1. A qualitative analysis of the effect of these two alternatives on specific downstream resources is provided in Appendix G to the *Final Operating Curve Change Feasibility Analysis Phase 2 Report* (Alabama Power and Kleinschmidt 2022a).

On February 15, 2022, FERC issued an Additional Information Request (AIR) requesting that Alabama Power analyze continuous minimum flows of 350 cfs, 400 cfs, and 450 cfs and provide potential effects of the three additional minimum flows on downstream resources (e.g., erosion and sedimentation, water use, water quality, aquatic habitat, terrestrial and botanical resources, recreation and cultural). The analysis of effects on operational and environmental resources for the three additional continuous minimum flows are presented in the *Final Downstream Release Alternatives Phase 2 Report* (Alabama Power and Kleinschmidt 2022b).

Table 5-1 Reasons for Eliminating Alternatives from Further Analysis

Description of Alternative	**Reason for Eliminating from Further Analysis**
❖ Raising the winter operating curve on Lake Harris from 785-ft msl to 786, 787, 788, or 789-ft msl	❖ Any increase in the winter operating curve would result in an increase in downstream flooding, including both an increase in downstream acres inundated and an increase in downstream flood depth. Alabama Power determined from the modeled 100-Year Design Flood that increases in downstream flooding were not reasonable; therefore, Alabama Power eliminated these operating alternatives from further consideration. A comprehensive analysis of effects is presented in the *Operating Curve Change Feasibility Analysis Phase 1 and Phase 2 Study Reports*.
❖ PreGP or PGP - Pre-Green Plan (peaking only; no pulsing or continuous minimum flow)	❖ Alabama Power determined that returning to peaking-only operations could potentially eliminate any beneficial effect on aquatic resources from the Green Plan (baseline); therefore, Alabama Power eliminated this alternative from further consideration. A comprehensive analysis of effects is presented in the *Downstream Release Alternatives Phase 1 and Phase 2 Study Reports*.
❖ ModGP - Modified Green Plan (changing the timing of the Green Plan pulses to 2AM, 10 AM, and 6 PM)	❖ The ModGP alternative may have minor beneficial environmental effects but was overall less beneficial compared to other downstream release alternatives; therefore, Alabama Power eliminated this alternative from further consideration. A comprehensive analysis of effects is presented in the *Downstream Release Alternatives Phase 1 and Phase 2 Study Reports*.
❖ 150CMF – 150 cfs continuous minimum flow	❖ Alabama Power determined that 150 CMF doesn't provide as much incremental benefit to aquatic and recreational resources as the proposed 300 CMF and the preliminary turbine design indicates that an approximate 300 CMF is feasible.
❖ 350CMF – 350 cfs continuous minimum flow	❖ The 350CMF alternative would have negligible effects on average reservoir elevations, resulting in a maximum difference approximately 0.1 foot higher than Green Plan (baseline) over the period of record; however, minimum reservoir elevations show that

Description of Alternative	**Reason for Eliminating from Further Analysis**
	for this alternative, the reservoir elevation would be approximately 2 feet lower than Green Plan between mid-May to mid-July, which is the primary recreation season. ❖ Alabama Power determined that there would be little incremental benefit to downstream environmental and recreational resources from providing an additional 50 cfs and substantial capital and O&M investment would be required for a supplemental or new mechanism (other than the proposed minimum flow unit) to provide the additional 50 cfs. For this reason, Alabama Power eliminated this alternative from further consideration because the incremental environmental benefit is disproportionate to the cost.
❖ 400CMF – 400 cfs continuous minimum flow	❖ The 400CMF alternative would have negligible effects on average reservoir elevations, resulting in a maximum difference approximately 0.1 foot higher than Green Plan (baseline) over the period of record; however, minimum reservoir elevations show that for this alternative, the reservoir elevation would be approximately 2.8 feet lower than Green Plan between mid-May through mid-July, which is the primary recreation season. ❖ Alabama Power determined that there would be little incremental benefit to downstream environmental and recreational resources from providing an additional 100 cfs and substantial capital and O&M investment would be required for a supplemental or new mechanism (other than the proposed minimum flow unit) to provide the additional 100 cfs. For this reason, Alabama Power eliminated this alternative from further consideration because the incremental environmental benefit is disproportionate to the cost.
❖ 450CMF – 450 cfs continuous minimum flow	❖ The 450CMF alternative would have negligible effects on average reservoir elevations, resulting in a maximum difference approximately 0.2 feet lower than Green Plan (baseline) over the period of record; however, minimum reservoir elevations show that for this alternative, the reservoir elevation would be approximately 3.6 feet lower than Green Plan between mid-May through mid-July, which is the primary recreation season.

Description of Alternative	Reason for Eliminating from Further Analysis
	❖ Alabama Power determined that there would be little incremental benefit to downstream environmental and recreational resources from providing an additional 150 cfs and substantial capital and O&M investment would be required for a supplemental or new mechanism (other than the proposed minimum flow unit) to provide the additional 150 cfs. For this reason, Alabama Power eliminated this alternative from further consideration because the incremental environmental benefit is disproportionate to the cost.
❖ 600CMF - 600 cfs continuous minimum flow	❖ The 600CMF alternative would adversely affect the summer reservoir elevations[15] of Lake Harris and, consequently, lake recreation access. This alternative would result in average reservoir elevations approximately 0.5 feet lower than the Green Plan (baseline) from May to September, and then approximately 1-foot lower during September; minimum reservoir elevations show that the reservoir elevation would range from approximately 3-feet lower in April to approximately 8- feet lower through October; therefore, Alabama Power eliminated this alternative from further consideration. A comprehensive analysis of effects is presented in the *Downstream Release Alternatives Phase 1 and Phase 2 Study Reports*.
❖ 800CMF - 800 cfs continuous minimum flow	❖ The 800CMF alternative would adversely affect the summer reservoir elevations of Lake Harris and, consequently, lake recreation access. This alternative would result in average reservoir elevations approximately 1-foot lower than the Green Plan (baseline) during May and June, increasing to approximately 4-feet lower during September; minimum reservoir elevations show that the reservoir would be 2-feet lower in April to approximately 8-feet lower through October. Therefore, Alabama Power eliminated this alternative from further consideration. A comprehensive analysis of effects is presented in the *Downstream Release Alternatives Phase 1 and Phase 2 Study Reports*.

[15] Minimum and average elevations generated in the modeling reports used the USACE's unimpaired dataset (1939-2011).

Description of Alternative	**Reason for Eliminating from Further Analysis**
❖ 150CMF+GP - 150 cfs continuous minimum flow + GP (a hybrid Green Plan that incorporates both a base minimum flow of 150 cfs and the pulsing described in the existing Green Plan release criteria)	❖ The 150CMF+GP alternative showed no significant increase in benefits by adding the Green Plan (baseline) pulsing to a 150 cfs continuous minimum flow. Additionally, pulsing could adversely affect recreation as it creates more unpredictable conditions for recreation users in the Tallapoosa River near Harris Dam. Therefore, Alabama Power eliminated this alternative from further consideration. A comprehensive analysis of effects is presented in the *Downstream Release Alternatives Phase 1 and Phase 2 Study Reports*.
❖ 300CMF+GP - 300 cfs continuous minimum flow + GP (a hybrid Green Plan that incorporates both a base minimum flow of 300 cfs and the pulsing described in the existing Green Plan release criteria)	❖ The 300CMF+GP alternative showed little to no significant increase in benefits over the 300 CMF by adding the Green Plan (baseline) pulsing. In addition, 300 continuous minimum flow +GP results in lower average reservoir elevations in the summer months from May – October and during periods of low inflow. A comparison of minimum elevations over the period of record under this alternative to Green Plan (baseline) minimum reservoir elevations show that the reservoir would be 4-feet lower from April through October. The average reservoir elevations are approximately 0.5 feet lower than Green Plan (baseline) from May through October. Additionally, pulsing could adversely affect recreation as it creates more unpredictable conditions for recreation users in the Tallapoosa River below Harris Dam. Therefore, Alabama Power eliminated this alternative from further consideration. A comprehensive analysis of effects is presented in the *Downstream Release Alternatives Phase 1 and Phase 2 Study Reports*.
❖ 600CMF+GP - 600 continuous minimum flow + GP (a hybrid Green Plan that incorporates both a base minimum flow of 600 cfs and the pulsing described in the	❖ The 600CMF+GP would adversely affect the summer reservoir elevations of Lake Harris and, consequently, lake recreation access. This alternative would result in average reservoir elevations approximately 2-feet lower than the Green Plan (baseline) for May and June, increasing to approximately 4-feet lower during September; minimum reservoir elevations show that the reservoir would be 3-feet lower from April to approximately 10 feet lower through October. Additionally, pulsing could also

Description of Alternative	**Reason for Eliminating from Further Analysis**
existing Green Plan release criteria)	adversely affect recreation as it creates more unpredictable conditions for recreation users in the Tallapoosa River near Harris Dam. Therefore, Alabama Power eliminated this alternative from further consideration A comprehensive analysis of effects is presented in the *Downstream Release Alternatives Phase 1 and Phase 2 Study Reports*.
❖ 800CMF+GP - 800 continuous minimum flow + GP (a hybrid Green Plan that incorporates both a base minimum flow of 800 cfs and the pulsing described in the existing Green Plan release criteria)	❖ The 800CMF+GP alternative would adversely affect the summer reservoir elevations of Lake Harris and, consequently, lake recreation access. This alternative would result in average reservoir elevations approximately 4-feet lower than the Green Plan (baseline) during May and June, which increases to approximately 12 feet during September; minimum reservoir elevations show that the reservoir would be 4-feet lower in April to approximately 11-feet lower through October. Additionally, pulsing could adversely affect recreation as it creates more unpredictable conditions for recreation users in the Tallapoosa River near Harris Dam. Therefore, Alabama Power eliminated this alternative from further consideration. A comprehensive analysis of effects is presented in the *Downstream Release Alternatives Phase 1 and Phase 2 Study Reports*.
❖ Battery Energy Storage System	❖ Alabama Power evaluated two alternatives: Option A is a 60 MW battery with 240 megawatt hour (MWh) capacity that can provide the equivalent generation of one unit at best gate for 4 hours per day/every day. Option B is a 20 MW battery with 80 MWh capacity that can provide the equivalent generation of one-third of one unit at best gate for 4 hours per day/every day. The remaining 40 MW needed for 1-unit peaking generation would be produced by a new, upgraded unit. • The cost of integrating a Battery Energy Storage System (BESS) at the Harris Project is substantial, and, therefore, not economical in comparison to

DESCRIPTION OF ALTERNATIVE	REASON FOR ELIMINATING FROM FURTHER ANALYSIS
	potential limited environmental benefits (refer to the *Battery Energy Storage System Report* for details). • Key considerations included the need to charge the BESS from the grid due to insufficient inflows as well the need for greater production of energy to overcome the efficiency losses through the BESS. Moreover, additional costs would be incurred for interconnection, as well as costs associated with replacing an existing hydroelectric unit. • Neither Option A nor Option B retain full system peaking capabilities. Therefore, there would be times throughout the year when higher, peaking flows would continue to be released for both Option A and Option B. • Alabama Power does not consider the integration of a BESS as a reasonable alternative and, therefore, eliminated it from further consideration. A comprehensive analysis is provided in the *Final Battery Energy Storage System Report*.
Extending Summer Reservoir Elevations	❖ FERC requested Alabama Power evaluate two additional alternatives as a result of comments on the PLP: • Modify the operating curve to maintain the summer pool elevation of 793 feet from March 1 through October 31 (7 months) with adjusted winter pool elevation between January 1 and February 28 (2 months) at: (a) 785 feet; (b) 786 feet; (c) 787 feet; (d) 788 feet; and (e) 789 feet; and • Modify the operating curve to maintain the summer pool elevation of 793 feet from April 1 through October 31 (6 months) with adjusted winter pool elevation between January and March 31 (3 months) at: (a) 785 feet; (b) 786 feet; (c) 787 feet; (d) 788 feet; and (e) 789 feet.

Description of Alternative	**Reason for Eliminating from Further Analysis**
	• Filling the Harris Reservoir earlier in the year is problematic for two reasons: increased magnitude of flooding below Harris Dam and decreased ability of the reservoir to accommodate high flow events, resulting in an increase in the frequency of spillway operations and/or operating at plant capacity (i.e., at 16,000 cfs or greater). • For both alternatives, the effects on resources would be the same as those analyzed and described in the *Operating Curve Change Feasibility Analysis Phase 1 and Phase 2 Study Reports*; however, these effects would be more likely to occur more frequently because the reservoir elevation would be higher during the wetter months of the year, resulting in an increase in the frequency of spillway operations and/or operating at plant capacity. A summary of the effects on resources from these extended summer pool alternatives is included in Appendix G of the Final *Operating Curve Change Feasibility Analysis Phase 2* Report. • Because the extended summer pool alternatives have the same (or worse) effects on resources as those alternatives analyzed in the Operating Curve Change Feasibility Study, these alternatives were eliminated from further consideration.

Description of Alternative	**Reason for Eliminating from Further Analysis**
Minimum Flow that Affects Reservoir Elevation	FERC requested that Alabama Power determine the continuous minimum flow (with or without Green Plan pulsing) that initially affects reservoir levels (i.e., what continuous minimum flow between 300 cfs and 600 cfs would lead to a more than negligible impact on reservoir elevation). Alabama Power conducted a preliminary analysis of the effect of continuous minimum flows of 350, 400, and 450 cfs on average and minimum reservoir elevations. The 350, 400, and 450 cfs continuous minimum flows compared to the proposed continuous minimum flow of approximately 300 cfs showed minor effects in average daily reservoir elevations (based on the period of record 1939-2011). However, minimum daily reservoir elevations associated with low inflow and/or droughts present a significant difference in reservoir elevation over baseline conditions, resulting in adverse effects on reservoir levels. When comparing the minimum daily reservoir elevations (based on the period of record 1939-2011), a continuous minimum flow of 350, 400, and 450 cfs resulted in reservoir elevations 0.8 feet, 1.6 feet, and 2.4 feet lower, respectively, compared to the minimum reservoir elevations of the proposed continuous minimum flow of approximately 300 cfs. An analysis of the effect of the 350, 400, and 450 cfs continuous minimum flow releases on developmental and non-developmental resources was completed as a result of the February 15, 2022 AIR is presented in the Final Downstream Release Alternatives Phase 2 Report (revised June 2022[16]). In addition, in response to both the February 15, 2022 and August 29, 2022 AIRs[17], Alabama Power evaluated various mechanisms for providing flows greater than 300 cfs. Because these mechanisms are not reasonable, and because there would be little incremental benefit to downstream environmental

[16] Accession Number 20220615-5192

[17] Accession Number 20220215-3039 and 20220829-3050

DESCRIPTION OF ALTERNATIVE	REASON FOR ELIMINATING FROM FURTHER ANALYSIS
	and recreational resources from providing an additional 50-150 cfs, Alabama Power has eliminated alternatives greater than 300 cfs from further consideration.

5.3 Proposed Action

5.3.1 Project Operations

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods to maintain reservoir levels according to the existing operating curve as described in the Project Facilities and Operation Section. Alabama Power will continue operating in high flow conditions according to the USACE-approved flood control procedures (USACE 2022) in the Harris WCM and will operate in low flow periods according to ADROP (Alabama Power 2016), which has been incorporated into the USACE Master WCM (USACE 2022).

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam and with a generating capacity of approximately 2.5 MW. The final continuous minimum flow, based on peak unit efficiency with the aeration system in operation, would be determined following unit installation and performance testing.

Based on the preliminary design, there are two factors affecting the location and physical size of the minimum flow unit. First, the only suitable location that would accommodate an additional unit is on the outside of Unit 1 (east side) of the powerhouse where the proposed minimum flow unit would be housed in a new reinforced concrete addition Figure 5-1. The new steel-lined penstock would penetrate the existing Unit 1 penstock for source water and discharge below the tailrace water surface (Figure 5-2).

Figure 5-1 Location of Proposed New Minimum Flow Unit

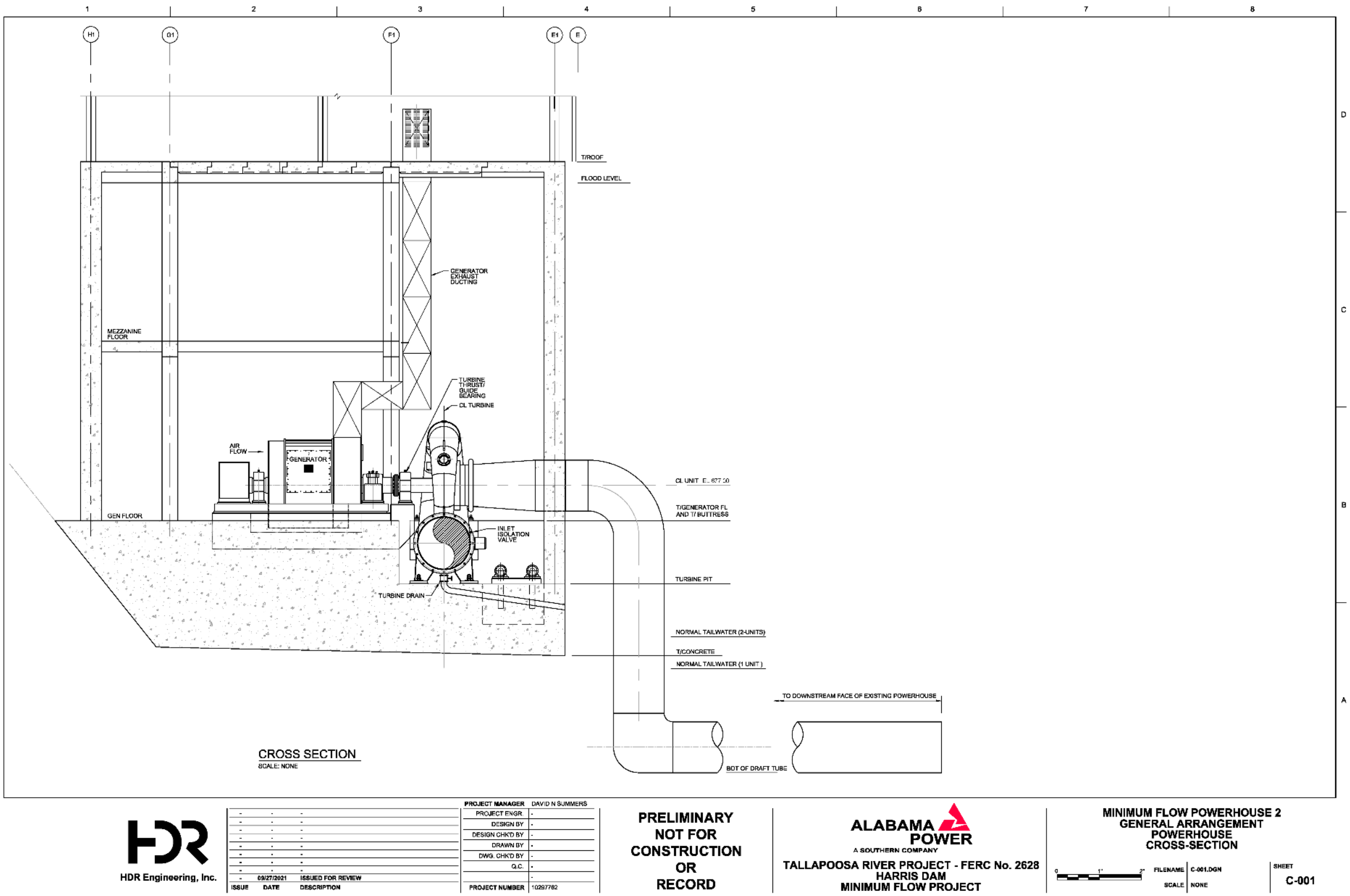


Figure 5-2 Preliminary Drawing of Harris Minimum Flow Turbine

Second, the preliminary design indicates that the physical size of the unit is limited by the space available in the powerhouse addition; therefore, the amount of flow through the unit (hydraulic capacity) would also be limited. The final engineering design would consider the ability to provide a reliable flow, dam safety, and unit accessibility for operation and maintenance. Alabama Power will continue to operate in accordance with the Green Plan (baseline) until the minimum flow unit is installed and operational. The specific operations of the Green Plan (baseline) are provided in Exhibit B of the Harris FLA.

Alabama Power would temporarily suspend operation of the continuous minimum flow system when the minimum flow unit is taken offline for unit outages, or when the head gates for Unit 1 need to be installed for outages. In these cases, Alabama Power would operate in accordance with the Green Plan (baseline), providing pulses by Unit 1 or Unit 2, depending on availability. During flood control, operation of the minimum flow unit would be suspended, and Alabama Power would operate in accordance with the flood control procedures in the Water Control Manual.

Alabama Power proposes to develop low-inflow and drought operations procedures for the minimum flow unit in consultation with resource agencies following unit installation and performance testing. Any such procedures would not be inconsistent with ADROP.

Following license issuance, Alabama Power anticipates the continuous minimum flow project would take approximately 48 months to complete.

5.3.2 Proposed Environmental Measures

In addition to the proposed operations, Alabama Power proposes to implement PME measures to protect and enhance the environmental, recreational, and cultural resources at the Harris Project (Table 5-2). Each measure is described in detail in the following sections. Note that the capital and annual operation and maintenance (O&M) costs are provided in the Economic Analysis of this Exhibit E and in Exhibit D of the Harris FLA. Note that continuous minimum flow in the table is referred to as "CMF."

Table 5-2 Proposed Operations and PME Measures

PROPOSED OPERATIONS AND PME MEASURES
• Continue to operate the Harris Project according to the existing operating curve. • Continue to operate in high flow conditions according to the USACE-approved flood control procedures in the Harris Water Control Manual (USACE 2022). • Continue daily peak-load operations. • Continue operating in accordance with ADROP (Alabama Power Company 2016) to address drought management.
• Install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs with a generating capacity of approximately 2.5 MW. Based on the preliminary design, the continuous minimum flow unit would require a new reinforced concrete addition located on the outside of the Unit 1 side (east side) of the powerhouse. The new steel-lined penstock would penetrate the existing Unit 1 penstock for source water and discharge below the tailrace water surface. • Develop drought operations procedures for the minimum flow. • Operate in accordance with Green Plan (baseline) during CMF unit outages and outages where the water supply to the Unit 1 penstock is affected.
• Develop and implement a Project Operations and Flow Monitoring (POFM) Plan (Alabama Power 2021a) to monitor compliance with: 1) Project Operation and Water Level Management; 2) flood control operations 3) drought management; and 4) flow releases from the Harris Dam. Elements of the POFM Plan would include: ❖ Goals of the monitoring plan. o To establish a framework to periodically confirm that the Harris Project is operated in compliance with the new license. ❖ Variables to be monitored, anticipated methods for monitoring project operation and flow, and general locations of monitoring sites.

PROPOSED OPERATIONS AND PME MEASURES
o Variables to be monitored include, but are not limited to, reservoir levels, tailrace elevation, wicket gate settings, generation data, unit discharge, and spillway gate operation. ❖ Provisions for reporting results. o Provisions for making notification to FERC and appropriate agencies when the proposed minimum flow is not met due to unit outages, O&M, or when modifications are made due to low-inflow/drought. ❖ Schedule for developing and implementing the POFM Plan. o Within 3 months of license issuance, Alabama Power will develop the plan, consult with appropriate agencies, and file with FERC for approval.
• Develop and implement an Aquatic Resources Monitoring (ARM) Plan (Alabama Power 2021b) following implementation of the continuous minimum flow. Elements of the ARM Plan would include: ❖ Goals of the monitoring program. o To quantify the fish community at three sites downstream of Harris Dam and at a reference site upstream. Results will be used to compare the possible effects, if any, of the proposed CMF compared with baseline sampling conducted during relicensing. ❖ Preliminary criteria for determining success. o Patterns in fish community structure will be compared to the baseline established by the Auburn University fish community sampling. It is anticipated that fish community structure will show improvement (total species, total families, CPE, diversity) at downstream sites when compared to an upstream reference site or remain similar to baseline. ❖ Methods for monitoring aquatic resources. o Fish assemblage monitoring similar to the study conducted by Auburn University during relicensing. ❖ Number and general location of monitoring sites. o Three sites located downstream of Harris Dam (tailrace, Wadley, and Horseshoe Bend) and one upstream reference site (approximately 4 miles upstream of Lee's Bridge).

PROPOSED OPERATIONS AND PME MEASURES
❖ Provisions for reporting. ○ Field collections and subsequent analysis will be summarized in a report that will be made available to resource agencies for review and discussed in a meeting the year following each collection cycle. Reports and meeting summaries will be filed with FERC. ❖ Monitoring and reporting frequency. ○ All four sites will be sampled for a total of three sample events. The first sample event will occur following license issuance and will begin 1 year after the minimum flow system is fully operational, with each subsequent event occurring on a 5-year interval. ❖ Schedule for developing and implementing the ARM Plan. ○ Within 9 months of license issuance, Alabama Power will develop the ARM Plan, consult with appropriate agencies, and file for FERC approval.
• Develop and implement a Water Quality Monitoring Plan (Alabama Power 2022a) consistent with the 401 WQC. ❖ Goals of the monitoring. ○ To ensure compliance with applicable water quality standards and the conditions of the 401 WQC to be issued by ADEM. ❖ Anticipated water quality parameters to be monitored and methods for monitoring those parameters. ○ Alabama Power proposes to monitor dissolved oxygen and water temperature year-round in the Harris Project tailrace during periods of discharge associated with generation or minimum flow releases for the term of the new FERC license. ○ Although not a compliance point to determine if the turbine or minimum flow discharge is meeting the state standard, Alabama Power also proposes to monitor dissolved oxygen and water temperature year-round at two United States Geological Survey (USGS) gages on the Tallapoosa River downstream of Harris Dam (Malone USGS Site No. 02414300 and Wadley USGS Site No. 02414500) for the term of the new FERC license.

PROPOSED OPERATIONS AND PME MEASURES
❖ The number and general locations of monitoring sites. o The number and general locations of the monitoring sites will be determined based on the requirements in ADEM's 401 WQC. Based on consultation with ADEM, Alabama Power proposes to monitor in the tailrace at the current site located approximately 800 feet downstream of the Harris Dam on the west bank of the river. Although not a compliance point, Alabama Power will also monitor dissolved oxygen and temperature year-round at the USGS gages on the Tallapoosa River at Malone (USGS Site No. 02414300) and Wadley (USGS Site No. 02414500). ❖ Provisions for reporting results and monitoring and reporting frequency. o Following license issuance and subsequent installation of the minimum flow unit, Alabama Power will provide annual tailrace monitoring data to ADEM and file with FERC following each monitoring year for the first three years. o Following the third full year of monitoring, Alabama Power will provide a Water Quality Assessment within six months, including if additional measures are needed, to ADEM for determination if the conditions of the WQC are being met. The assessment and ADEM consultation will be filed with FERC. o If after the initial three years of year-round monitoring ADEM determines that conditions of the WQC are not being met, Alabama Power will determine, in consultation with ADEM, additional ways to increase DO and file a plan with FERC for approval. In addition, at any point during the term of the license, Alabama Power and ADEM may work together to modify the year-round monitoring requirement. ❖ Schedule for developing and implementing the Water Quality Monitoring Plan. o Within 6 months of license issuance, Alabama Power will develop the Water Quality Monitoring Plan, consult with appropriate resource agencies, and file for FERC approval.
• Continue operating the existing aeration system which was incorporated into the original turbine design.
• Incorporate an aeration system in the design of the new continuous minimum flow unit.

Proposed Operations and PME Measures
• Continue to maintain the skimmer weir that was incorporated into the original design to allow the intake to draw from different layers in water column, providing for warmer releases with the added benefit of higher dissolved oxygen during periods of stratification. The skimmer weir will continue to be operated at the highest setting possible.
• When conditions exist, and upon request from ADCNR, hold Harris Reservoir water levels constant or slightly increasing for a 14-day period for spring spawning.
• Provide fish habitat improvements by adding habitat enhancements to Harris Reservoir, including but not limited to: ❖ Addition of fish attraction devices such as brush piles and other woody debris (recycled Christmas trees, felled trees) and synthetic materials (spider blocks, concrete, and PVC structures) in Harris Reservoir to provide cover for fish and to enhance angling opportunities in Harris Project waters.
• Finalize and implement a Nuisance Aquatic Vegetation and Vector Control Program (Alabama Power 2021c), which includes: ❖ A description of the nuisance aquatic vegetation and vectors covered under this Program. o This program covers mosquitos (vectors) and nuisance aquatic vegetation and is directed toward non-indigenous aquatic vegetation species. ❖ Frequency, timing, and locations of surveys to identify where nuisance aquatic vegetation could create a public health hazard, affect power generation facilities, restrict recreational use, or pose a threat to the ecological balance of Lake Harris. o Perform lake-wide surveys annually to identify areas of aquatic plant infestation. o Monitor the presence and abundance of mosquitos. ❖ Methods for monitoring for increases in nuisance aquatic vegetation. o Increases would be monitored through annual survey and property owner reporting to Alabama Power. o Vectors are monitored through adult resting stations and larval sampling.

Proposed Operations and PME Measures
❖ Methods for controlling nuisance aquatic vegetation and vectors. ○ All aquatic plant control measures are directed by staff biologists certified as commercial aquatic applicators by the State of Alabama, Department of Agriculture and Industries. Only EPA approved aquatic herbicides and algaecides are used in the management of invasive aquatic plants. ❖ Schedule for monitoring. ○ Surveys will occur in the late summer/early fall when vegetation biomass is usually at its peak. ❖ Schedule for finalizing and implementing the program. ○ Although this program is ongoing, within 3 months of license issuance, Alabama Power will revise or update the plan as needed and file with FERC for approval.
• Develop and implement an Erosion Monitoring Plan (EMP) (Alabama Power 2021d) for Downstream of Harris Dam. ❖ Goals of the EMP. ○ To evaluate any change in downstream erosion following implementation of the 300 cfs continuous minimum flow. ❖ Anticipated erosion parameters to be monitored and methods for monitoring those parameters. ○ Perform a High-Definition Stream Survey (HDSS) to collect geo-referenced video (forward, left, and right), water depth, side-scan sonar, and high-resolution global positioning survey (GPS) information downstream of Harris Dam. ❖ Number and general locations of monitoring sites. ○ The HDSS conducted by Trutta (2020) during relicensing, which included a survey of the 44 RMs of the Tallapoosa River between Harris Dam and Horseshoe Bend will be repeated following implementation of the 300 cfs continuous minimum flow. ❖ Monitoring and reporting frequency ○ The three downstream erosion surveys will be conducted concurrently with the three ARM Plan sample events. The first survey will occur 1 year after the minimum flow system is fully operational, with each subsequent survey occurring on a 5-year interval.

Proposed Operations and PME Measures
○ Following each survey, a report will be developed, sent to appropriate resource agencies and filed with FERC. ❖ Schedule for developing and implementing the EMP. ○ Within 9 months of license issuance, Alabama Power will develop the EMP, consult with appropriate agencies and file with FERC for approval.
• Implement the Alabama Power Company Avian Protection Plan (Alabama Power 2022b) within the Harris Project Boundary
• Finalize and implement a WMP (Alabama Power 2021e) for Lake Harris and Skyline. ❖ Consult with USFWS to develop measures protective of federally listed bats. ❖ Incorporate timber management into the WMP. ○ Including maintenance of gates and the construction/maintenance of logging roads. ○ Conduct surveys for Price's Potato-bean at the location of the extant population prior to timbering activities that may affect the extant population. Timbering crews will be notified of the location of any Price's Potato-bean prior to timbering activities. ❖ Maintain pollinator plots at Little Fox Creek. ❖ Continue to provide hunting opportunities to the public. ❖ Continue to manage approximately 105 acres of permanent openings to provide diverse habitat that benefits both game and nongame species. ❖ Continue to conduct property boundary maintenance, such as painting/marking of property lines. ❖ Schedule for revising and implementing the WMP. ○ Within 6 months of license issuance, Alabama Power will revise or update the WMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval.
• Finalize and implement a Shoreline Management Plan (SMP) (Alabama Power 2022c) for Lake Harris. ❖ Incorporate proposed changes in land use classifications (including reclassifying the botanical area at Flat Rock Park from recreation to Natural/Undeveloped). ❖ Continue to encourage the use of alternative bank stabilization techniques other than seawalls. ❖ Continue implementing the Dredge Permit Program (Appendix A to the SMP).

Proposed Operations and PME Measures
❖ Continue implementing the Water Withdrawal Policy (Kleinschmidt 2018b). ❖ Continue implementing a shoreline classification system to guide management and permitting activities (Appendices C and D of the SMP). ❖ Continue the requirements of a scenic easement for the purpose of protecting scenic and environmental values. ❖ Continue the use of a "sensitive resources" designation in conjunction with shoreline classifications on Harris Project lands managed for the protection and enhancement of cultural resources, wetlands, and threatened and endangered species. ❖ Continue implementing a shoreline compliance program and shoreline permitting program. ❖ Continue to encourage the adoption of shoreline best management practices (BMPs), including BMPs to maintain and preserve naturally vegetated shorelines, to preserve and improve the water quality of the Harris Project's reservoir, and to control soil erosion and sedimentation (Appendix E of the SMP). o Plant native trees, shrubs, and flowers for landscaping and gardens in order to reduce watering as well as chemical and pesticide use. o Preserve or establish a naturally managed vegetative filter strip along the shoreline to keep clearing of native trees and vegetation to a minimum. Alabama Power recommends a buffer set back of at least 15 feet measured horizontally from the full pool elevation. o Plant a low maintenance, slow growing grass that is recommended for your soil conditions and climate. o Maintain the grass as high as possible in order to shade out weeds and improve rooting so less fertilizing and watering are required. o Avoid dumping leaves or yard debris on or near the shoreline. ❖ Provide an update to the SMP every 10 years. ❖ Schedule for revising and implementing the SMP. o Within 6 months of license issuance, Alabama Power will revise or update the SMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval.
• Implement proposed land additions to the Harris Project Boundary and incorporate into Exhibit G.
• Implement proposed land removals from the Harris Project Boundary and incorporate into the Exhibit G.

Proposed Operations and PME Measures
• Finalize and implement a Recreation Plan (Alabama Power 2022d). ❖ Continue to operate and maintain 11 Harris Project recreation sites. ❖ Remove Wedowee Marine South as a Harris Project recreation site and request approval of entire facility as non-project use. ❖ Install and maintain recreation (canoe/kayak) access below Harris Dam within the Harris Project Boundary. ❖ Provide an additional recreation site on Lake Harris to include a day use park (swimming, picnicking, and boat ramp). ❖ Implement Barrier-Free Evaluation Program at existing recreation sites. ❖ Provide descriptions of the Project recreation sites including maps. ❖ Provide a Recreation Plan update to FERC every 10 years including monitoring protocols and proposed methodologies for sampling. ❖ Schedule for finalizing and implementing the Recreation Plan. o Within 6 months of license issuance, Alabama Power will revise the Recreation Plan, as needed, in consultation with appropriate resource agencies, and file with FERC for approval.
• Finalize and implement a Historic Properties Management Plan (HPMP) (Alabama Power 2021f). ❖ Include aspects of the Traditional Cultural Properties (TCP) Identification Plan and the Inadvertent Discovery Plan (IDP). ❖ Provisions for training with appropriate Alabama Power personnel regarding looting. In addition, Alabama Power will explore options for training for indications of looting beyond Alabama Power personnel and/or its contactors. ❖ Include strategies for mitigation for potential adverse effects to historic properties within the Harris Project Area of Potential Effects (APE) ❖ Provisions for the NRHP eligibility evaluation of Harris Dam facilities in 2033. ❖ Develop a BMP brochure (printed and online editions) for managing cultural resources on private lands. ❖ Develop mitigation procedures for any adverse effects of Harris Project operations on the Miller Bridge Piers and Abutments, as necessary, after consultation with State Historic Preservation Officer (SHPO) and NPS. ❖ Schedule for revising and implementing the HPMP. o Within 6 months of license issuance, Alabama Power will revise the HPMP, as needed, in consultation with the Alabama Historical Commission (AHC) and applicable tribes, and file with FERC for approval.

6.0 PRESENTATION OF EFFECTS

6.1 Geographic Scope of FERC Approved Studies

The geographic scope of some of the Harris Project relicensing studies included approximately 44 RMs of the Tallapoosa River downstream of Harris Dam through Horseshoe Bend (Figure 6-1). For some studies, the geographic scope is limited to the Harris Project Boundary.

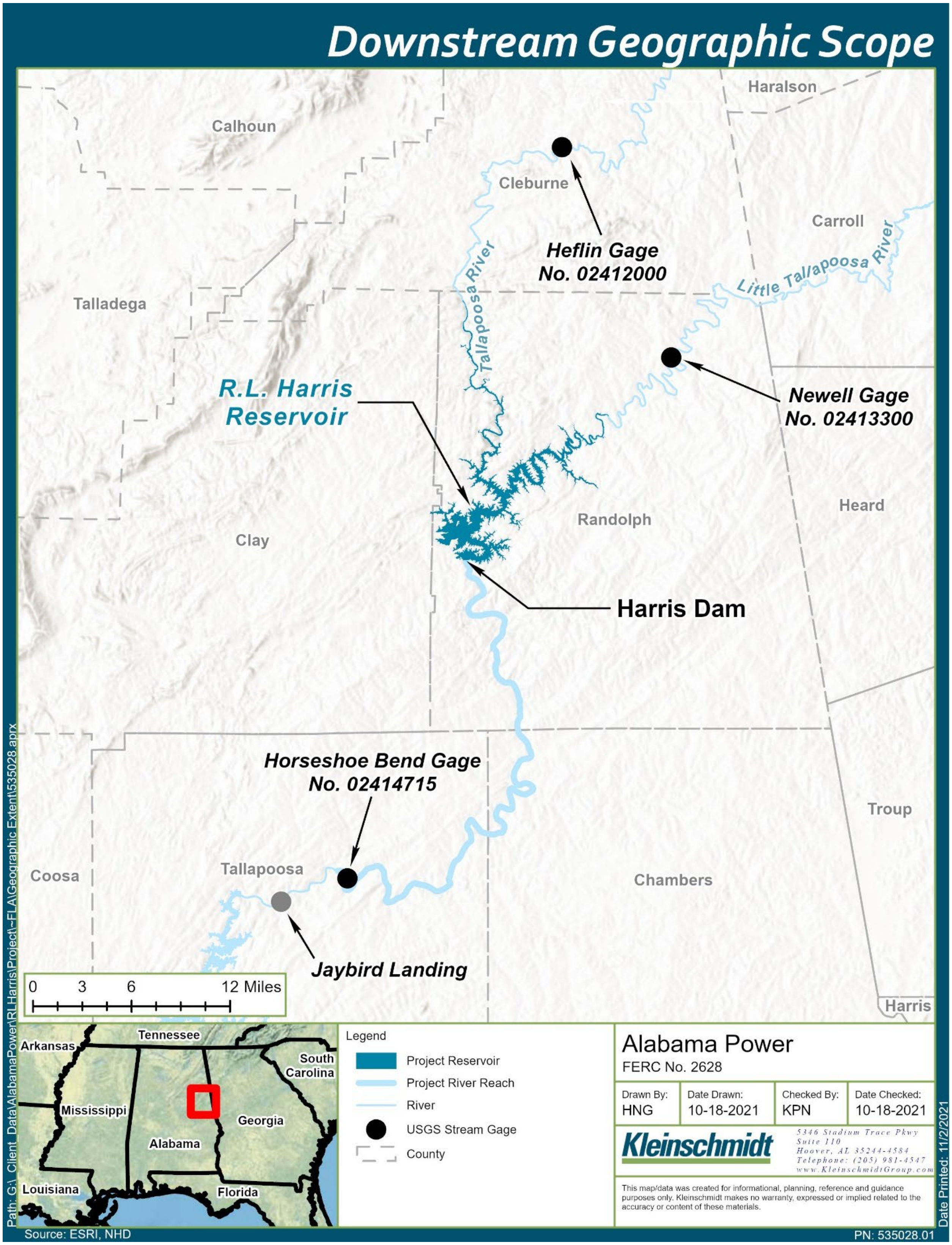


Figure 6-1 Downstream Geographic Scope of Harris Project

6.2 Cumulative Effects

The Council on Environmental Quality (CEQ) issued a final rule on July 15, 2020, revising the regulations under 40 C.F.R. Parts 1500 – 1518 that federal agencies use to implement the National Environmental Policy Act (NEPA) (see Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act, 85 Fed. Reg. 43,304). The Final Rule became effective on September 14, 2020 and applies to any NEPA process that begins after September 14, 2020.

FERC may apply the regulations to ongoing activities and environmental documents that began before September 14, 2020, which includes the Harris Project; therefore, FERC may conduct its NEPA review in accordance with CEQ's new regulations. As part of the new regulations, the CEQ changed the way cumulative effects are to be addressed in NEPA documents. Under the new regulations, NEPA documents will no longer differentiate between direct, indirect, and cumulative effects of a proposed action.

On October 7, 2021, the CEQ published Phase 1 Notice of Proposed Rulemaking, initiating a 45-day comment period. The proposed rule announces a narrow set of proposed changes to generally restore regulatory provisions that were in effect for decades before the 2020 rule modified them for the first time. As noted by CEQ, the proposed changes would better align the NEPA regulations with CEQ and agency expertise, as well as NEPA's statutory goals and purpose to promote sound decisions informed by science.

The majority of FLAs, including Exhibit E, filed by licensees (available on FERC's e-library) within the last 90 days did not contain a cumulative effects analysis in the Exhibit E. Based on the July 15, 2020 CEQ regulations, and current practice of resource effects as presented in Exhibit E, Alabama Power is not providing a cumulative effects analysis.

6.3 Presentation of Effects

In accordance with FERC regulations 18 C.F.R. Section 5.5, the following sections in this Exhibit E are described by resource area: 1) affected environment, which serves as the baseline to compare project alternatives, 2) environmental analysis, and 3) unavoidable adverse impacts. Use of "effects" or "impacts" should be considered synonymous; and effects/impacts are described as "beneficial," "adverse," or "no effect," in accordance with guidance from the CEQ implementing NEPA.[18] The affected environment and environmental analysis are organized and presented by the Harris Project's three geographic areas: Skyline, Lake Harris, and the Tallapoosa River Downstream of Harris Dam, respectively. Unavoidable adverse impacts[19] are those impacts that cannot be avoided if the proposed action were implemented despite proposed PME measures. Unavoidable adverse impacts may include impacts caused by activities outside of the Harris Project Boundary and therefore, outside of FERC's jurisdiction.

Each resource area also includes a section describing PME measures recommended by stakeholders, but not adopted by Alabama Power. These sections are not organized by the three geographic areas of the Harris Project. A list of stakeholders who commented on the PLP is provided in Appendix B.

Alabama Power does not manage any water or hydroelectric infrastructure at Skyline; therefore, this Exhibit E does not contain any effects analysis of proposed operations at Skyline but does include the effects analysis of PME measures on Skyline resources.

[18] Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act; Federal Register / Vol. 85, No. 137 / Thursday, July 16, 2020 /.

[19] Unavoidable Adverse Impacts are required by 40 C.F.R. Section 1502.14

7.0 GEOLOGY AND SOILS

7.1 Affected Environment

7.1.1 Skyline

Skyline falls within the Jackson County Mountains District of the Cumberland Plateau. The Jackson County Mountains District is characterized by a highly irregular surface consisting of isolated, flat-topped remnants of the former plateau cut by steep-sided valleys (Neilson 2013a). Skyline is underlain by Paleozoic sedimentary rocks that range from Mississippian to Pennsylvanian. Figure 7-1 shows the surficial geology of the lands in the Skyline Project Area. Figure 7-2 provides the soils at Skyline. A detailed summary of physiographic regions, including physiographic sections, dominant structural features, and mineral resources is presented in Appendix C.

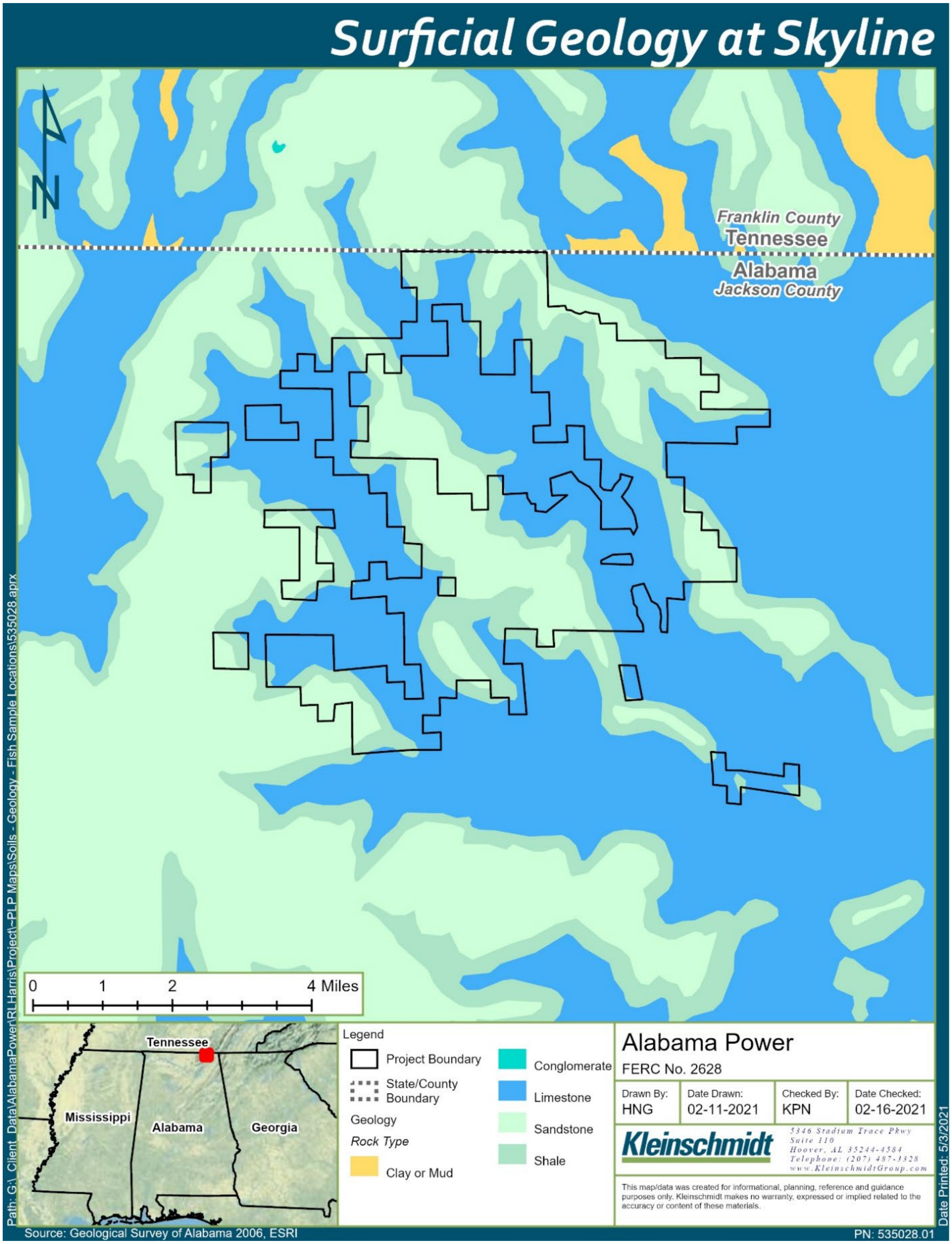


Figure 7-1 Surficial Geology at Skyline

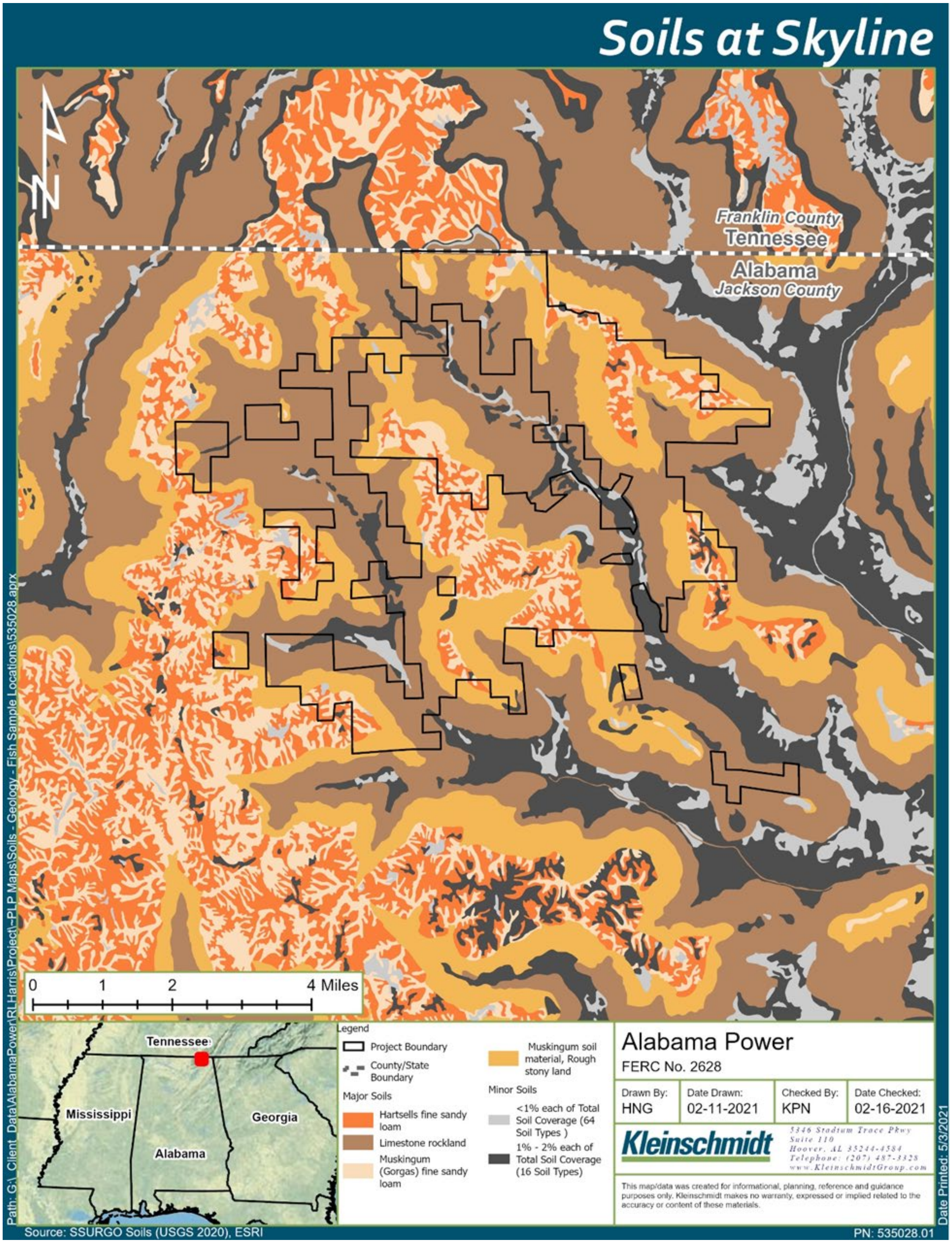


Figure 7-2 Soils at Skyline

7.1.1.1 Existing Erosion and Sedimentation

As part of the Erosion and Sedimentation Study, a GIS analysis of land use classifications was conducted to assess the impact of agriculture on Little Coon Creek. Little Coon Creek is currently included in Alabama's 303(d) Impaired Waters List due to siltation. All states are required to develop a list of waterbodies that do not meet water quality standards. This requirement comes from Section 303 (d) of the CWA. Sources of this impairment include non-irrigated crop production and pasture grazing (ADEM 2020). The GIS analysis confirmed 8.8 percent of land within the watershed is used for agriculture, a 0.8 percent increase from 2001 to 2016. The proximity of these areas to Little Coon Creek more easily allows for soils loosened due to tilling or other agricultural practices to be washed into the creek, resulting in sedimentation of the creek bottom. Additional information is included in the *Final Erosion and Sedimentation Study Report* (Kleinschmidt 2021a).

7.1.2 Lake Harris

Harris Reservoir and surrounding lands are located within the Piedmont Upland Physiographic Section, which consists of the Northern and Southern Piedmont Upland districts. The Brevard Fault Zone, a narrow zone of intensely sheared rocks, separates the Northern and Southern Piedmont Upland districts. Well-dissected uplands developed over metamorphic and igneous rocks characterize the Northern Piedmont Upland district. In the northern portion, elevations generally range from 500 to 1,100-feet msl. Cheaha Mountain, Alabama's highest elevation, 2,407-feet msl, is located on the northeastern end of a prominent northeast-trending ridge that occurs in this district. Tributaries of the Tallapoosa River incise the upland surfaces (Sapp and Emplaincourt 1975, Neilson 2013b). The counties in the Lake Harris Project Area are underlain by igneous and metamorphosed rocks of Precambrian to Paleozoic age (Alabama Power and Kleinschmidt 2018). Figure 7-3 provides the surficial geology of the lands in the Lake Harris Project Area. A detailed summary of physiographic regions, including physiographic sections, dominant structural features, and mineral resources is presented in Appendix C.

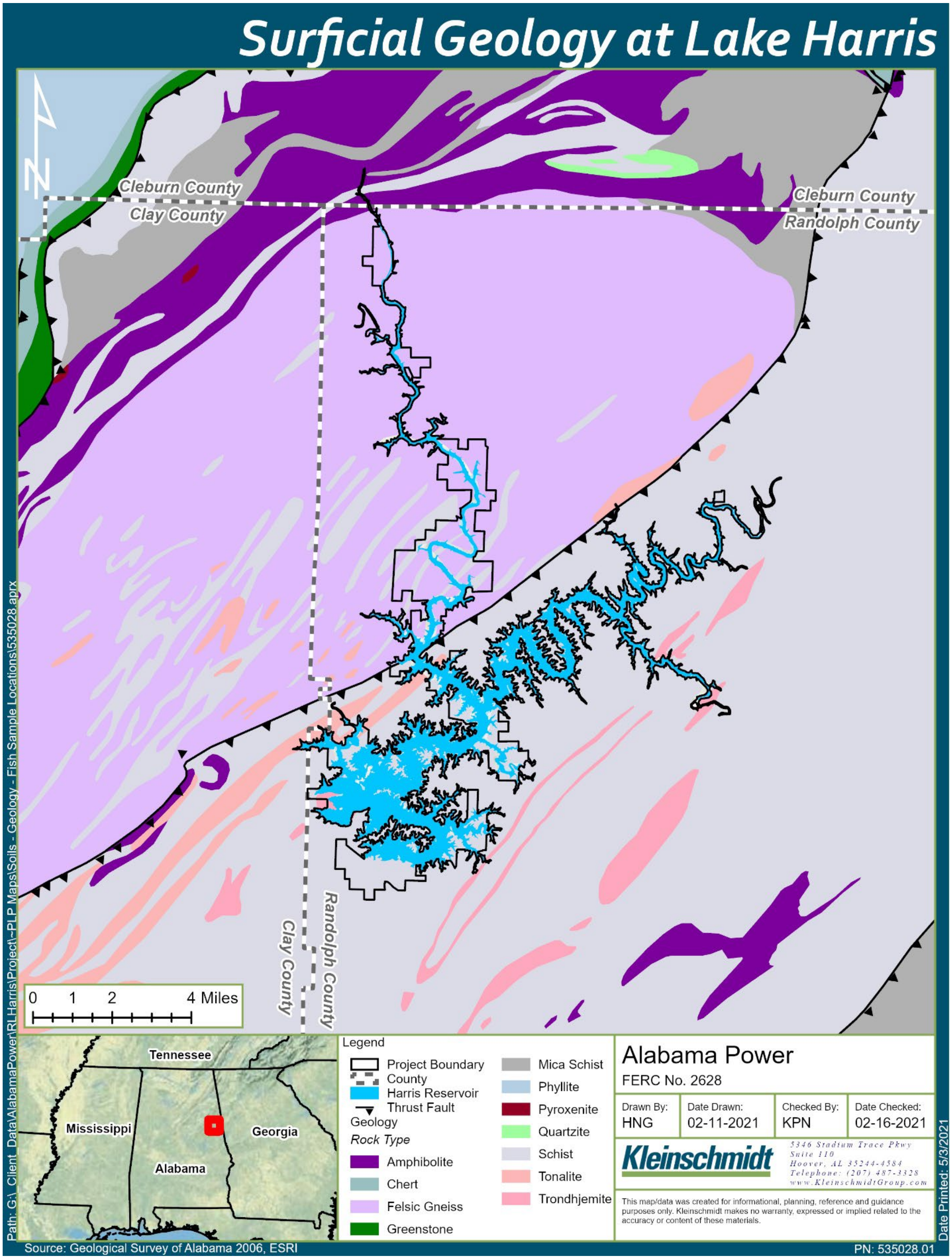


Figure 7-3 Surficial Geology at Lake Harris

Soils in the Lake Harris Project Area were derived from metamorphic, sedimentary, and igneous rock. Soil productivity has greatly decreased over much of the area due to poor farming practices in the 1800s and early 1900s. Many areas of depleted soils have reverted to forest, but productivity is often low. Figure 7-4 provides the soil types in the Lake Harris Project Area, including those soils within the Lake Harris Project Boundary. For additional tables, figures, and more detailed soil descriptions see Appendix C.

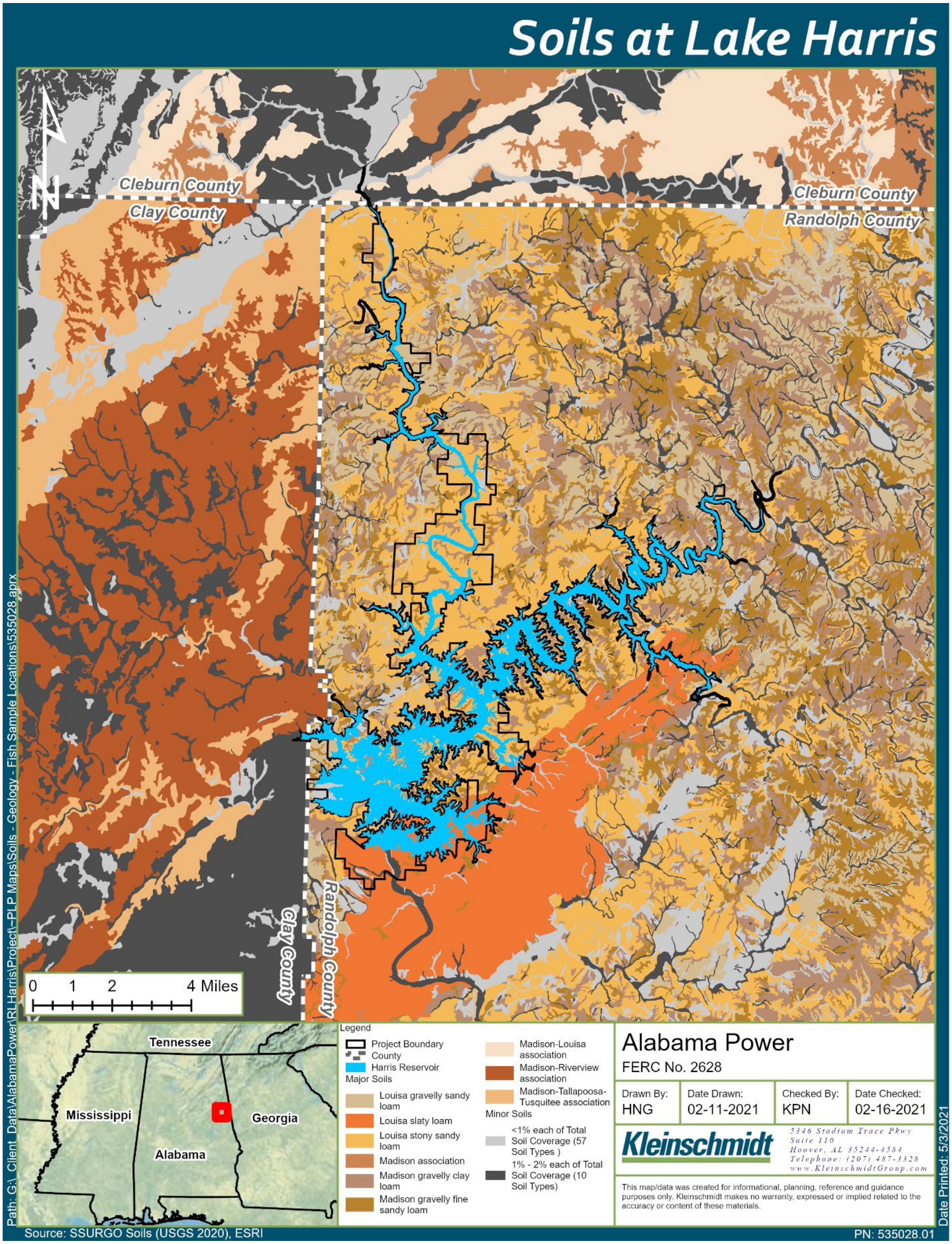


Figure 7-4 Soils at Lake Harris

7.1.2.1 Existing Erosion Sites

As part of the Erosion and Sedimentation Study, erosion sites were identified by stakeholders and investigated in 2019 (Kleinschmidt 2021a). Twenty-four erosion sites (22 on the lake and 2 downstream) were identified for field assessment (Table 7-1). Potential causes of erosion were assessed visually by the inspection team, including a qualified Erosion and Sediment Control Professional, and a soil scientist. To determine potential causes, the inspection team considered the geographic and geomorphic location of the identified location area and compared the area to surrounding banks. In addition, shape and depth of the erosion feature were assessed to help discern potential Project induced or wave action induced erosion. Erosion areas in upper portions of the reservoir were analyzed to determine if predominant erosion patterns were consistent with natural processes observed in those areas.

Table 7-1 Summary of Lake Harris Erosion Site Assessment

Erosion Site	Latitude	Longitude	Potential Cause(s) of Erosion/ Sedimentation	Length (ft)	Width (ft)	Description of Exposed Soils	Adjacent Land Use
E1	33.39649	-85.44412	Natural Factor Independent of Operations, Land Use	100	20	Oc, Ochlockonee fine sandy loam	Agricultural, Exposed Roots or Root Undercutting, Leaning or Fallen Trees
E2	33.39618	-85.44512	Natural Factor Independent of Operations, Land Use	150	20	Oc, Ochlockonee fine sandy loam	Agricultural
E3	33.39448	-85.44763	Land Use	50	30	Oc, Ochlockonee fine sandy loam	Agricultural
E4	33.39253	-85.44797	Land Use	varying	N/A	Oc, Ochlockonee fine sandy loam	Early Successional Vegetation, Developed, Residential
E5	33.38870	-85.44677	Anthropogenic	100	10	Oc, Ochlockonee fine sandy loam	Unvegetated, Exposed Roots or Root Undercutting, Leaning or Fallen Trees, Residential
E6	33.38817	-85.45264	No active erosion	N/A	N/A	Oc, Ochlockonee fine sandy loam	N/A
E7	33.38399	-85.45285	Natural Factor Independent of Operations, Land Use	75	5	Bu, Buncombe loamy sand	Undeveloped Wooded, Exposed Roots or Root Undercutting, Leaning or Fallen Trees
E8	33.37972	-85.45260	Natural Factor Independent of	100	10	Bu, Buncombe loamy sand	Undeveloped Grassy

Erosion Site	Latitude	Longitude	Potential Cause(s) of Erosion/ Sedimentation	Length (ft)	Width (ft)	Description of Exposed Soils	Adjacent Land Use
			Operations, Land Use				
E9	33.37732	-85.45879	Natural Factor Independent of Operations, Land Use	450	5	LtE, Louisa stony sandy loam	Early Successional Vegetation, Exposed Roots or Root Undercutting, Leaning or Fallen Trees, Residential
E10	33.37785	-85.45851	Natural Factor Independent of Operations, Land Use	150	5	Oc, Ochlockonee fine sandy loam	Early Successional Vegetation, Exposed Roots or Root Undercutting, Leaning or Fallen Trees, Residential
E11	33.38727	-85.47761	No active erosion	N/A	N/A	Mantachie fine sandy loam	N/A
E12	33.36759	-85.47331	No active erosion	N/A	N/A	Oc, Ochlockonee fine sandy loam	Developed
E13	33.36509	-85.47680	No active erosion	N/A	N/A	MaD3, Madison gravelly clay loam	Undeveloped Grassy, Roadway Embankment
E14	33.36407	-85.47728	Natural Factor Independent of Operations, Anthropogenic	N/A	N/A	Oc, Ochlockonee fine sandy loam	Undeveloped Wooded, Roadway Embankment
E15	33.37197	-85.49914	No active erosion	N/A	N/A	LgE, Louisa gravelly sandy loam	Developed, Wooded and Grassy, Residential
E16	33.37216	-85.50173	No active erosion	N/A	N/A	LtE, Louisa stony sandy loam	Undeveloped Grassy

Erosion Site	Latitude	Longitude	Potential Cause(s) of Erosion/ Sedimentation	Length (ft)	Width (ft)	Description of Exposed Soils	Adjacent Land Use
E17	33.37371	-85.50122	No active erosion	N/A	N/A	Mt, Mantachie fine sandy loam	Undeveloped Grassy, Exposed Roots or Root Undercutting, Power Line Crossing
E18	33.35833	-85.49693	Land Use, Anthropogenic	300	5	LtE, Louisa stony sandy loam	Developed, Grassy
E19	33.35334	-85.50611	Land Use, Anthropogenic	150	3	LtE, Louisa stony sandy loam	Early Successional Vegetation, Exposed Roots or Root Undercutting, Developed Grassy
E20	33.35544	-85.51280	No active erosion			LtE, Louisa stony sandy loam	Undeveloped Grassy
E21	33.33941	-85.55814	Anthropogenic	100	2	MdC2, Madison gravelly fine sandy loam	Exposed Roots or Root Undercutting, Residential Grass Cutting
E22	33.19603	-85.57649	Natural Factor Independent of Operations, Land Use	30	4	Oc, Ochlockonee fine sandy loam	Developed, Grassy, Early Successional Vegetation, Exposed Roots or Root Undercutting, Leaning or Fallen Trees
E23	33.18490	-85.58503	Land Use	400	10	Oc, Ochlockonee fine sandy loam	Agricultural, Grassy, Early Successional Vegetation, Exposed Roots or Root Undercutting, Leaning or Fallen Trees

Erosion Site	Latitude	Longitude	Potential Cause(s) of Erosion/ Sedimentation	Length (ft)	Width (ft)	Description of Exposed Soils	Adjacent Land Use
E24	33.34779	-85.51483	Anthropogenic	30	5	DaD3, Davidson gravelly clay loam	Undeveloped Wooded, Exposed Roots or Root Undercutting, Leaning or Fallen Trees

Source: Kleinschmidt 2021c

7.1.2.2 Existing Sedimentation Sites

As part of the Erosion and Sedimentation Study, nine sedimentation areas (Table 7-2) were identified by stakeholders and by examining available satellite imagery/aerial photography and light detection and ranging (LiDAR) data. The LiDAR and historical satellite/aerial imagery data were analyzed using GIS to identify elevation or contour changes around the reservoir and thus identify areas of sediment accumulation. The identified sedimentation areas were limited to areas exposed during the winter pool drawdown due to limitations of LiDAR in measuring below water surfaces. Therefore, approximate surface area for each of the identified sedimentation areas was measured using contours 793-feet and 785-feet msl established in a 2015 LiDAR survey of the reservoir during winter drawdown.

The GIS analysis was supported by field observations to verify sedimentation areas. Each of these sedimentation areas was surveyed for nuisance aquatic vegetation during the 2020 growing season (Kleinschmidt 2021a).

Table 7-2 Sedimentation Areas on Lake Harris and Approximate Size (Elevation 793-FT – 785-FT MSL)

SITE NAME	LATITUDE	LONGITUDE	ACREAGE
S1	33.37625	-85.4717	23.83
S2	33.3672	-85.4775	4.96
S3	33.3659	-85.4821	10.51
S4	33.36622	-85.485	5.49
S5	33.36051	-85.4856	6.68
S6	33.37432	-85.5138	13.55
S7	33.32641	-85.4885	26.14
S8	33.45383	-85.6098	10.59
S9	33.30647	-85.6286	18.25

Source: Kleinschmidt 2021c

To assess the change in sedimentation areas over time, LiDAR data collected during 2007 was compared to more recent LiDAR collected in 2015. Surface areas, in acres, were calculated for the regions between the 786-feet and 793-feet msl elevation contours. Because the 785-feet msl contour was not available from the 2007 dataset, sedimentation surface area from 2015 was calculated again using the 786-feet and 793-feet msl contours to allow for a like comparison. All but one of the lake sedimentation sites were larger in 2015 compared to 2007.

Nuisance aquatic vegetation was also surveyed at the nine identified sedimentation areas. American Water-willow (*Justicia americana*), Pickerel Weed (*Pontederia cordata*), Alligator Weed (*Alternathera philoxeroides*), and juncus grass (*Juncus spp.*) were observed. No submerged vegetation species were found at any of the sites. The only non-native species identified was Alligator Weed (Kleinschmidt 2021a).

7.1.3 Tallapoosa River Downstream of Harris Dam

The Tallapoosa River downstream of Harris Dam and surrounding lands are located within the Piedmont Upland Physiographic Section, which consists of the Northern and Southern Piedmont Upland districts. The Southern Piedmont district is sometime further subdivided into the Inner Piedmont and Southern Piedmont. The Brevard Fault Zone, a narrow zone of intensely sheared rocks, separates the Northern and Southern Piedmont Upland districts. Well-dissected uplands developed over metamorphic and igneous rocks characterize the Northern Piedmont Upland district. In the northern portion, elevations generally range from 500 to 1,100-feet msl. Cheaha Mountain, Alabama's highest elevation, 2,407-feet msl, is located on the northeastern end of a prominent northeast-trending ridge that occurs in this district. Tributaries of the Tallapoosa River incise the upland surfaces (Sapp and Emplaincourt 1975, Neilson 2013b). The counties along the Tallapoosa River downstream of Lake Harris are underlain by igneous and metamorphosed rocks of Precambrian to Paleozoic age.

Figure 7-5 shows the surficial geology of the lands along the downstream portion of the Tallapoosa River and Figure 7-6 provides the soils downstream of Harris Dam. A more detailed summary of physiographic regions, including physiographic sections, dominant structural features, and mineral resources is presented in Appendix C.

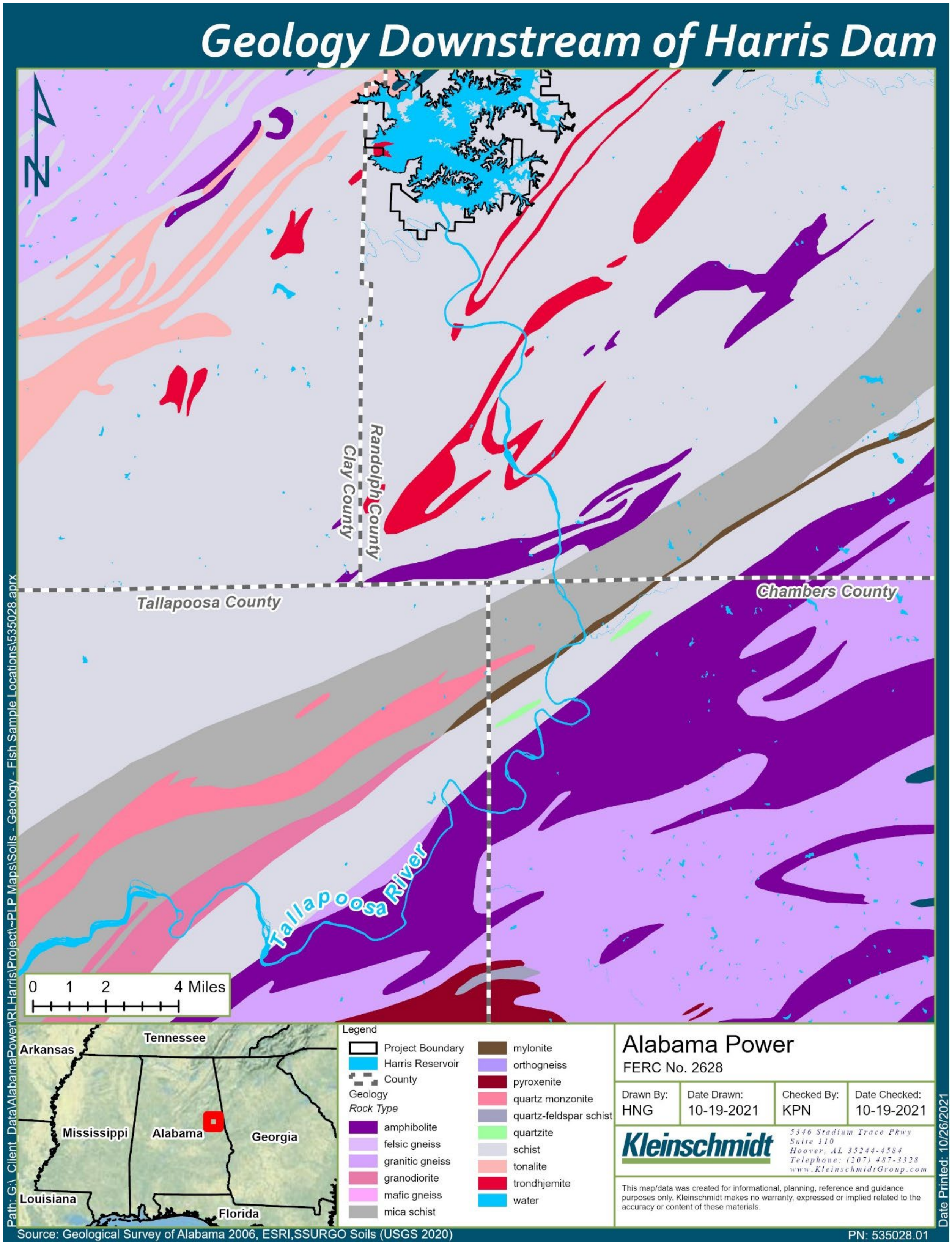


Figure 7-5 Surficial Geology of the Tallapoosa River Downstream of Harris Dam

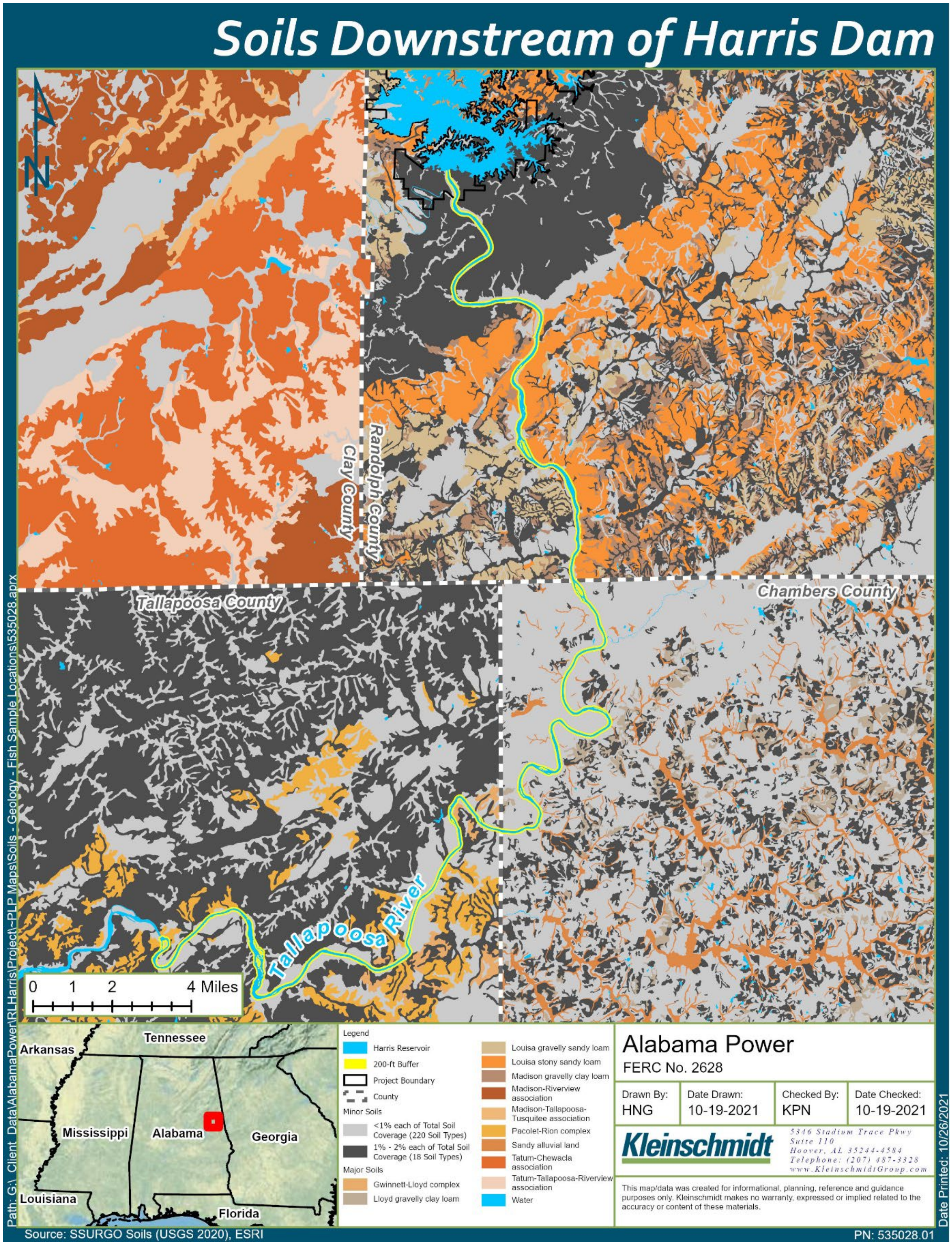


Figure 7-6 Soils Along the Tallapoosa River Downstream of Harris Dam

7.1.3.1 Existing Erosion Sites

As part of the Erosion and Sedimentation Study, a downstream streambank assessment was conducted by Trutta Environmental Solutions (Trutta 2019). Trutta used a High-Definition Stream Survey (HDSS) system to collect geo-referenced video (forward, left, and right), water depth, side-scan sonar, and high-resolution GPS information on 44 RMs of the Tallapoosa River between Harris Dam and Peters Island, located just downstream of Horseshoe Bend before the headwaters of Lake Martin. All data were collected, organized, and classified for analysis by creating GIS layers for depth, and left and right streambank condition. Left and right bank condition was visually assessed using the high-definition video. The Bank Condition score consisted of five bank condition levels ranging from fully functional (1) to non-functional (5) and were continuously assessed for the entire sampling area (Table 7-3) (Trutta 2019).

Table 7-3 Bank Condition Score

<table>
<tr><th>Bank Condition Score</th><th>Bank Condition Class</th><th>Description</th><th>Erosion Potential</th><th>Human Impact</th></tr>
<tr><td>1</td><td>Fully Functional</td><td>Banks with low erosion potential, such as, bedrock outcroppings, heavily wooded areas with low slopes and good access to flood plain.</td><td rowspan="5">Low to High</td><td rowspan="5">Low to High</td></tr>
<tr><td>2</td><td>Functional</td><td>Banks in good condition with minor impacts present, such as, forested with moderate bank angles and adequate access to flood plains.</td></tr>
<tr><td>3</td><td>Slightly Impaired</td><td>Banks showing moderate erosion impact or some impact from human development.</td></tr>
<tr><td>4</td><td>Impaired</td><td>Surrounding area consists of more than 50% exposed soil with low riparian diversity or surface protection. Obvious impacts from cattle, agriculture, industry, and poorly protected streambanks.</td></tr>
<tr><td>5</td><td>Non-functional</td><td>Surrounding area consists of short grass or bare soil and steep bank angles. Evidence of active bank failure with very little stabilization from vegetation. Contribution of sediment likely to be very high in these areas.</td></tr>
</table>

Source: Trutta 2019

Streambank condition point data collected during the Trutta survey were averaged into 0.1-mile segments to help facilitate the assessment of bank stability and erosion susceptibility (RM downstream of Harris Dam illustrated in Figure 7-7). Using these data, Trutta developed a ranking system to understand specific areas of failing streambanks on the Tallapoosa River (Table 7-4). Of the 875 0.1-mile segments downstream of Harris Dam, only 15 segments (1.7 percent) had bank condition scores greater than three (3), i.e., slightly impaired or worse. Notably, only one segment scored as impaired to non-functional. This area was located on the right bank at RM 16.7 (Table 7-4).

Table 7-4 Tallapoosa River Downstream of Harris Dam: 15 Most Impaired Streambank Areas from Harris Dam through Horseshoe Bend

Bank[1]	River Mile Segment Downstream of Harris Dam	Condition Score[2]	Latitude	Longitude
Right Bank	7.7	3.57	33.1919	-85.5791
Left Bank	10	3.22	33.1625	-85.5843
Right Bank	16.3	3.35	33.0859	-85.5483
Right Bank	16.4	3.18	33.0848	-85.5486
Right Bank	16.5	3.55	33.084	-85.5494
Right Bank	16.6	3.96	33.0836	-85.5509
Right Bank	16.7	4.45	33.0833	-85.5526
Right Bank	16.9	3.2	33.0826	-85.5561
Left Bank	17.9	3.09	33.0707	-85.5648
Left Bank	19.2	3.11	33.0612	-85.5551
Left Bank	20.6	3.05	33.0503	-85.5547
Right Bank	34.4	3.07	32.9716	-85.6631
Left Bank	36.5	3.05	32.9568	-85.6914
Left Bank	36.6	3.04	32.956	-85.6928
Right Bank	43.8	3.17	32.9845	-85.7515

Source: Trutta 2019

[1] Left bank or right bank is a reference to the side of the river when looking downstream.

As part of the study scoping process, Harris Action Team (HAT) 2 stakeholders identified two downstream erosion sites for evaluation (erosion sites 22 and 23). These sites, located approximately 16 miles below Harris Dam, were assessed twice: once using the same criteria as the existing erosion sites located within Lake Harris and again using the downstream assessment methods by Trutta as described above. Using methods from the reservoir erosion assessment, both sites were confirmed to have areas of erosion potentially caused by adjacent land use/clearing and riverine processes. The downstream assessment methods found the streambank condition class for both areas were "slightly impaired," and confidence (i.e., clarity of the areas in the HDSS video used to assess streambank condition) was classified as "Good Visibility" (Trutta 2019).

7.2 Environmental Analysis

Alabama Power conducted relicensing studies and associated analyses that pertain to effects on geology and soils. Those analyses are presented in the following reports:

- Final Phase 1 Project Lands Evaluation Study Report
- Final Downstream Release Alternatives Phase 2 Study Report
- Final Operating Curve Change Feasibility Analysis Phase 2 Study Report
- Final Erosion and Sedimentation Study Report

Table 7-5 includes the proposed operations and PME measures that may affect geology and soil resources at Skyline, Lake Harris, and the Tallapoosa River Downstream of Harris Dam. Not all operations or PME measures apply to each geographic area of the Harris Project; therefore, the analysis of beneficial and adverse effects will be presented accordingly. A complete list of Alabama Power's proposed operations and PME measures is located Table 5-2.

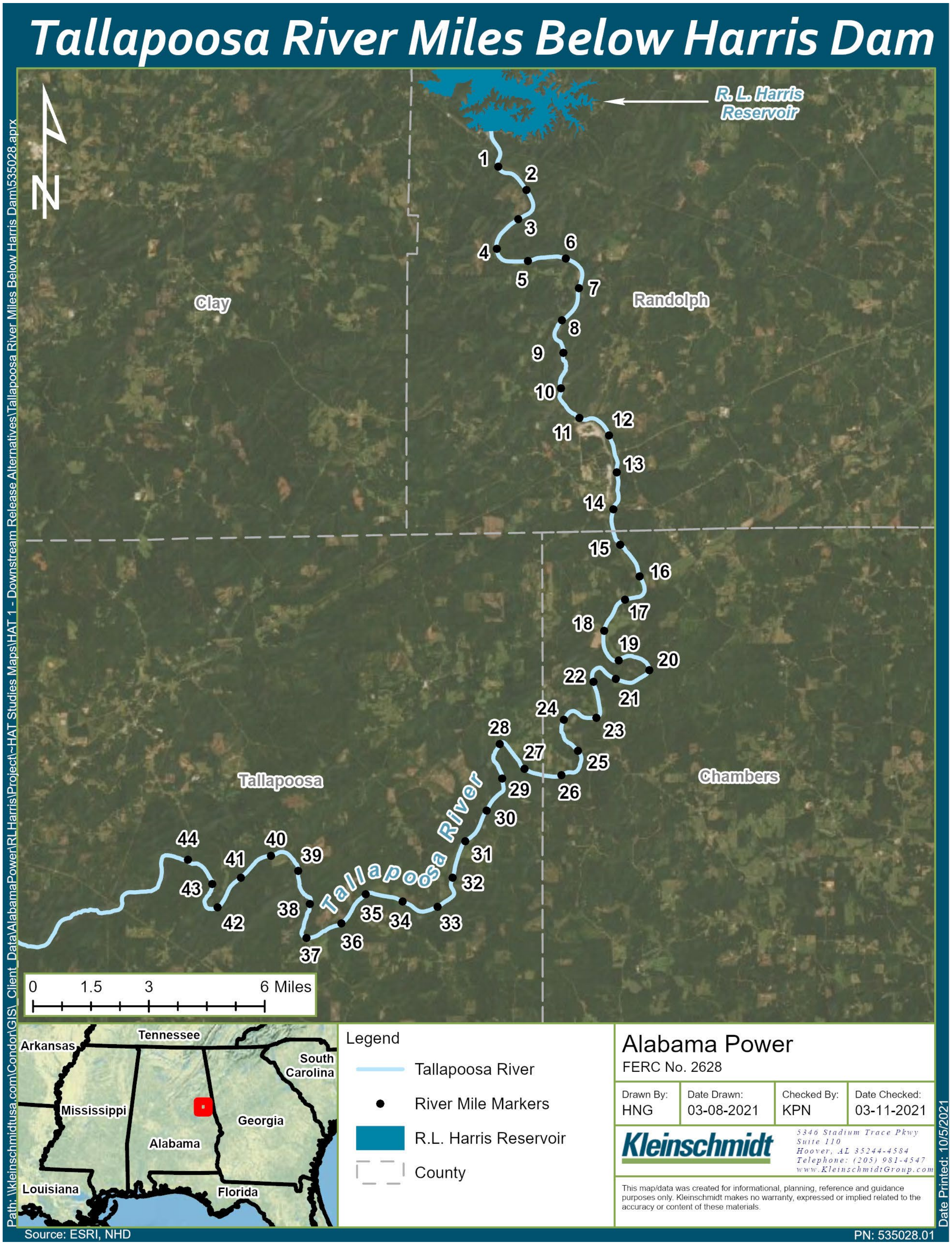


Figure 7-7 Miles of the Tallapoosa River Downstream of Harris Dam

Table 7-5 Proposed Operations and PME Measures That May Affect Geology and Soils

<table>
<tr><th>PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT GEOLOGY AND SOILS</th></tr>
<tr><td>

- Continue to operate the Harris Project according to the existing operating curve.
- Continue to operate in high flow conditions according to the USACE-approved flood control procedures in the Harris Water Control Manual (USACE 2022).
- Continue daily peak-load operations.
- Continue operating in accordance with ADROP (Alabama Power Company 2016) to address drought management.

</td></tr>
<tr><td>

- Install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs with a generating capacity of approximately 2.5 MW. Based on the preliminary design, the continuous minimum flow unit would require a new reinforced concrete addition located on the outside of the Unit 1 side (east side) of the powerhouse. The new steel-lined penstock would penetrate the existing Unit 1 penstock for source water and discharge below the tailrace water surface.
- Develop drought operations procedures for the minimum flow.
- Operate in accordance with Green Plan (baseline) during CMF unit outages and outages where the water supply to the Unit 1 penstock is affected.

</td></tr>
<tr><td>

- Develop and implement an Erosion Monitoring Plan (EMP) (Alabama Power 2021d) for Downstream of Harris Dam.
  - ❖ Goals of the EMP.
    - o To evaluate any change in downstream erosion following implementation of the 300 cfs continuous minimum flow.
  - ❖ Anticipated erosion parameters to be monitored and methods for monitoring those parameters.
    - o Perform a High-Definition Stream Survey (HDSS) to collect geo-referenced video (forward, left, and right), water depth, side-scan sonar, and high-resolution global positioning survey (GPS) information downstream of Harris Dam.
  - ❖ Number and General locations of monitoring sites.
    - o The HDSS conducted by Trutta (2020) during relicensing, which included a survey of the 44 RMs of the Tallapoosa River between Harris Dam and Horseshoe Bend will be repeated following implementation of the 300 cfs continuous minimum flow.

</td></tr>
</table>

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT GEOLOGY AND SOILS
❖ Monitoring and reporting frequency. o The three downstream erosion surveys will be conducted concurrently with the three ARM Plan sample events. The first survey will occur 1 year after the minimum flow system is fully operational, with each subsequent survey occurring on a 5-year interval. o Following each survey, a report will be developed, sent to appropriate resource agencies, and filed with FERC. ❖ Schedule for developing and implementing the EMP. o Within 9 months of license issuance, Alabama Power will develop the EMP, consult with appropriate agencies and file with FERC for approval.
• Finalize and implement a WMP (Alabama Power 2021e) for Lake Harris and Skyline. ❖ Consult with USFWS to develop measures protective of federally listed bats. ❖ Incorporate timber management into the WMP. o Including maintenance of gates and the construction/maintenance of logging roads. o Conduct surveys for Price's Potato-bean at the location of the extant population prior to timbering activities that may affect the extant population. Timbering crews will be notified of the location of any Price's Potato-bean prior to timbering activities. ❖ Maintain pollinator plots at Little Fox Creek. ❖ Continue to provide hunting opportunities to the public. ❖ Continue to manage approximately 105 acres of permanent openings to provide diverse habitat that benefits both game and nongame species. ❖ Continue to conduct property boundary maintenance, such as painting/marking of property lines ❖ Schedule for revising and implementing the WMP. o Within 6 months of license issuance, Alabama Power will revise or update the WMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval.

Proposed Operations and PME Measures that May Affect Geology and Soils
• Finalize and implement a Shoreline Management Plan (SMP) (Alabama Power 2022c) for Lake Harris. ❖ Incorporate proposed changes in land use classifications (including reclassifying the botanical area at Flat Rock Park from recreation to Natural/Undeveloped). ❖ Continue to encourage the use of alternative bank stabilization techniques other than seawalls. ❖ Continue implementing the Dredge Permit Program (Appendix A to the SMP). ❖ Continue implementing the Water Withdrawal Policy (Kleinschmidt 2018b). ❖ Continue implementing a shoreline classification system to guide management and permitting activities (Appendices C and D of the SMP). ❖ Continue the requirements of a scenic easement for the purpose of protecting scenic and environmental values. ❖ Continue the use of a "sensitive resources" designation in conjunction with shoreline classifications on Harris Project lands managed for the protection and enhancement of cultural resources, wetlands, and threatened and endangered species. ❖ Continue implementing a shoreline compliance program and shoreline permitting program. ❖ Continue to encourage the adoption of shoreline best management practices (BMPs), including BMPs to maintain and preserve naturally vegetated shorelines, to preserve and improve the water quality of the Harris Project's reservoir, and to control soil erosion and sedimentation (Appendix E of the SMP). o Plant native trees, shrubs, and flowers for landscaping and gardens in order to reduce watering as well as chemical and pesticide use. o Preserve or establish a naturally managed vegetative filter strip along the shoreline to keep clearing of native trees and vegetation to a minimum. Alabama Power recommends a buffer set back of at least 15 feet measured horizontally from the full pool elevation. o Plant a low maintenance, slow growing grass that is recommended for your soil conditions and climate. o Maintain the grass as high as possible in order to shade out weeds and improve rooting so less fertilizing and watering are required.

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT GEOLOGY AND SOILS
○ Avoid dumping leaves or yard debris on or near the shoreline. ❖ Provide an update to the SMP every 10 years. ❖ Schedule for revising and implementing the SMP. ○ Within 6 months of license issuance, Alabama Power will revise or update the SMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval.
• Finalize and implement a Recreation Plan (Alabama Power 2022d). ❖ Continue to operate and maintain 11 Harris Project recreation sites. ❖ Remove Wedowee Marine South as a Harris Project recreation site and request approval of entire facility as non-project use. ❖ Install and maintain recreation (canoe/kayak) access below Harris Dam within the Harris Project Boundary. ❖ Provide an additional recreation site on Lake Harris to include a day use park (swimming, picnicking, and boat ramp). ❖ Implement Barrier-Free Evaluation Program at existing recreation sites. ❖ Provide descriptions of the Project recreation sites including maps. ❖ Provide a Recreation Plan update to FERC every 10 years including monitoring protocols and proposed methodologies for sampling. ❖ Schedule for finalizing and implementing the Recreation Plan. ○ Within 6 months of license issuance, Alabama Power will revise the Recreation Plan, as needed, in consultation with appropriate resource agencies, and file with FERC for approval.

7.2.1 Skyline

7.2.1.1 Wildlife Management Plan/Timber Management

Alabama Power proposes to finalize and implement a WMP, including specific timber management actions and best management practices (BMPs) that reduce or prevent runoff, erosion, and sedimentation that may impact streams and waterbodies within Skyline. Specifically, Alabama Power will continue to incorporate Alabama's Best

Management Practices for Forestry as provided by the Alabama Forestry Commission. These practices include: the establishment of Streamside Management Zones (SMZs); avoidance of crossing of streams by roads, skid trails, or firebreaks when possible; when unavoidable, the utilization of the fewest possible steam crossings located where the bank and SMZ would be least disturbed; and the proper planning and location of roads (Alabama Forestry Commission 2021). These management activities would continue to benefit soil resources and erosion by reducing runoff and disturbance.

Little Coon Creek, which flows through portions of the Skyline Project Boundary, is currently listed as impaired due to siltation. The sources of this impairment include non-irrigated crop production and pasture grazing (ADEM 2020). Timber management benefits soils by avoiding large or total acreages of clear cutting, which maintains the overall soil stability in the adjacent forested areas of Little Coon Creek.

7.2.2 Lake Harris

7.2.2.1 Project Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. As part of the Erosion and Sedimentation Study, Alabama Power evaluated potential causes of erosion at existing erosion sites identified by stakeholders around Lake Harris. Potential causes of erosion were classified into several categories during the assessment. These categories included: Harris Project Operations (water level fluctuations, maintenance/construction activities), Natural Factors independent of operations (e.g., seasonal flooding, riverine processes), Land Use (e.g., farming, ranching, mining, development), Anthropogenic (foot/bike paths, vehicle traffic, boat waves), or "Other" noted causes identified during the survey. Of the 22 erosion sites identified on Lake Harris, 8 sites were confirmed to have no significant signs of active erosion. The remaining 14 sites did show signs of active erosion; however, the erosion at these sites is occurring at or above normal full pool elevation and were likely the result of anthropogenic and/or natural processes/factors independent of existing Harris Project operations. Anthropogenic factors include wave action due to boating activity, land clearing and landscaping, and other construction activities affecting runoff towards the reservoir (MSU2020). Natural erosion processes observed included wind generated wave action and bank scour due to channelized flows at the toe of banks. These processes would occur independently of any Harris Project operations, and therefore, Alabama Power's proposal to continue operations on Lake Harris according to the existing operating curve, flood control procedures, and ADROP would have no adverse effect on erosion at Lake Harris.

Sedimentation in Lake Harris is most pronounced in the Little Tallapoosa River arm where sediment transported from upstream settles out of the water column as water velocities decrease upon entering the reservoir. Land uses in the basin upstream of Lake Harris and adjacent to the river contribute sediment load to the upper reaches of Lake Harris. This is illustrated in the growth of all but one of the sedimentation areas identified on Lake Harris. Sedimentation rates on the reservoir would likely remain consistent with rates under the existing operations, assuming upstream influences remain consistent (Kleinschmidt 2021a). Drawdown periods occur under normal winter operating conditions and expose areas of accumulated sediment, allowing for winter and early spring rains to flush sediment to deeper depths, reducing the overall areas of sedimentation. Risk of establishment of submerged aquatic vegetation populations is higher because of improved growing conditions in the sedimentation areas. Continued exposure of the sedimentation areas during winter pool drawdown would help manage any submerged aquatic vegetation by killing seeds and vegetation due to freezing, drying, or soil compaction (Alabama Power and Kleinschmidt 2022a).

7.2.2.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. Hydrologic Engineering Center's Reservoir System Simulation (HEC-ResSim) models were used to determine Alabama Power's ability to maintain the Harris Reservoir at the current operating curve under downstream release alternatives. The HEC-ResSim model indicated that a 300 cfs continuous minimum flow would have negligible effects on average reservoir elevations throughout the year compared to the Green Plan (baseline). As part of the Downstream Release Alternatives Phase 2 Study, Alabama Power evaluated the effects of a continuous minimum flow of 300 cfs on erosion in Harris Reservoir. The proposed downstream release would not affect identified erosion areas on Harris Reservoir (Alabama Power and Kleinschmidt 2022b). The identified erosion areas on Harris Reservoir exist at or above the existing full pool elevation, and the proposed minimum flow has a negligible effect on average summer or winter pool elevations.

7.2.2.3 Wildlife Management Plan/Timber Management

Alabama Power proposes to finalize and implement a WMP, including specific timber management actions and BMPs that reduce or prevent runoff, erosion, and sedimentation that may impact streams and waterbodies at Lake Harris. Specifically, Alabama Power will continue to incorporate Alabama's Best Management Practices for Forestry as provided by the Alabama Forestry Commission. These practices include: the establishment of SMZs; avoidance of crossing of streams by roads, skid trails, or firebreaks when possible; when unavoidable, the utilization of the fewest possible steam crossings located where the bank and SMZ would be least disturbed; and the proper planning and location of roads (Alabama Forestry Commission 2021). These management activities would continue to benefit soil resources and erosion by reducing runoff and disturbance.

7.2.2.4 Shoreline Management Plan

Alabama Power encourages the use of alternative bank stabilization techniques other than seawalls. Such alternatives include, but are not limited to, riprap, bioengineering techniques, natural vegetation with riprap, and gabions. Alabama Power requires, as a condition of a permit, that any future seawall proposals include the placement of riprap, for fish and other semi-aquatic species habitat and increased stability, in front of the seawall. Only in very limited cases where the Alabama Power regional coordinator is convinced that riprap would not be an effective source of bank stabilization, or would be economically unfeasible, would seawalls without riprap be permitted. Alternative bank stabilization techniques are preferred methods of erosion control and would likely minimize adverse effects of erosion at Lake Harris.

Alabama Power's Dredge Permit Program, developed in consultation with the USACE and other agencies, establishes the processes and procedures for permittees seeking to obtain direct authorization from Alabama Power for dredging activities up to 500 CY of material (below the full pool elevation). The Dredge Permit Program is not intended to cover applications for dredging on lands determined to be "sensitive"[20]. The Dredge Permit

[20] "Sensitive Resources" is a designation used in conjunction with the shoreline classifications (e.g., Recreation, Natural/Undeveloped, etc.), as appropriate. This designation is used on Project lands managed for the protection and enhancement of resources which are protected by state and/or federal law, executive order, or where other natural features are present which are considered important to the area or natural environment. This may include cultural resources, sites and structures listed on, or eligible for listing on, the National Register of Historic Places (NRHP); wetlands; Rare, Threatened, and Endangered species (RTE)

Program streamlines the process for allowing dredging under 500 CY thus providing opportunity for homeowners to remove sediments that may restrict access. The proposed location of the spoil site for placement of dredged materials requires approval by Alabama Power and must be identified and included with the application. Spoils may not be placed in areas identified as potentially environmentally sensitive, adjacent waters, bottomland hardwoods, or wetlands, and spoils must be placed in a confined upland area in such a manner that sediment will not re-enter the waterway or interfere with natural drainage. Continued implementation of the Dredge Permit Program would have a beneficial effect on sedimentation in Lake Harris.

Implementing a shoreline classification system would allow for management and permitting activities that are specific to the designated uses in those areas around the reservoir. For example, areas or shorelines designated as Natural/Undeveloped would be managed and protected to prohibit or limit certain construction activities often associated with residential development. Those shorelines in the Natural/Undeveloped areas would be less likely to need shoreline stabilization as naturally vegetated shorelines are preserved. Continuing the requirements of the "scenic easement" on Harris would also protect currently vegetated areas that could be subject to future development. A scenic easement would ensure no clearcutting of natural vegetation to the water's edge, which frequently results in soil destabilization and the need for formal shoreline stabilization (i.e., seawalls or riprap).

Continued implementation of the shoreline compliance and shoreline permitting programs, along with shoreline BMP education, would ensure that Alabama Power implements its permitting program consistently at Harris across all land use designations. Adjacent land-use and anthropogenic disturbance is a common cause for erosive and destabilized banks around Lake Harris (Kleinschmidt 2021a). Providing homeowner education on shoreline BMPs, particularly those that help preserve or establish a naturally managed vegetative filter strip along the shoreline may have a beneficial effect on the long-term stability of the Lake Harris shoreline as homeowners choose to keep vegetated shorelines that stabilize soils. Maintaining trees along the shoreline may also result in shoreline stabilization.

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habitat protection areas; significant scenic areas; and other sensitive ecological areas. Federal and state regulations require some information concerning the Sensitive Resources designation to remain confidential or proprietary.

7.2.2.5 Recreation Plan

Alabama Power proposes to finalize and implement a Recreation Plan that will incorporate the continued operation and maintenance of 11 existing recreation sites and the construction of new recreation sites at Lake Harris. Alabama Power's proposal to construct new recreation access and facilities including the proposed day use park on Lake Harris would require land disturbing activity that could adversely affect soils and may result in localized erosion and sedimentation. The Recreation Plan would include provisions for soil erosion and sedimentation control BMPs to reduce or eliminate the temporary effects of construction. Adding boat ramps on Lake Harris may result in an increase in recreational boating, and should boat wave action increase, the Harris Reservoir banks could be exposed to an increase in these erosive forces. Implementation of the SMP shoreline stabilization techniques along with the erosion and sedimentation BMPs used during construction would mitigate these potential adverse effects.

7.2.3 Tallapoosa River Downstream of Harris Dam

7.2.3.1 Project Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. No effects over Green Plan (baseline) on erosion sites identified on the Tallapoosa River downstream of Harris Dam are expected to occur from these continued operations.

7.2.3.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. During the Downstream Release Alternatives Study, Alabama Power used the results of the Erosion and Sedimentation Study (Kleinschmidt 2021a) and outputs from the HEC-RAS model to assess the effects of downstream release alternatives quantitatively and qualitatively on erosion in the Tallapoosa River downstream of Harris Dam. The HEC-RAS model results were used to produce daily average water surface fluctuations for the study area (Harris Dam through Horseshoe Bend). The HEC-RAS model results were further analyzed to produce fluctuation exceedance curves at representative locations downstream of Harris Dam. Daily fluctuations were calculated for each day of the year for each downstream release alternative. Daily fluctuations were calculated by determining the difference between the daily maximum and minimum water surface elevations. The values were then ranked from greatest to least and assigned an exceedance probability. These factors were weighed against bank and soils conditions to qualitatively assess potential for bank degradation or erosion.

Results of the HEC-RAS model of water surface elevation fluctuations downstream of Harris Dam and the delineation of miles downstream of Harris Dam are provided in the *Final Downstream Release Alternatives Phase 2 Report* (Alabama Power and Kleinschmidt 2022b). Generally, results show that daily water surface elevation fluctuations are lower with the 300 cfs continuous minimum flow (Table 7-6). Although the Erosion and Sedimentation Study found that existing erosion sites in the Tallapoosa River downstream of Harris Dam are primarily attributed to adjacent land use/clearing and riverine processes and not the direct result of Harris Project operations, the addition of a 300 cfs continuous minimum flow release downstream of Harris Dam would slightly reduce river fluctuations over Green Plan (baseline), having a potential minor benefit to areas of downstream erosion. Therefore, Alabama Power's proposal to implement a continuous minimum flow in the Tallapoosa River below Harris Dam of approximately 300 cfs would not adversely affect geology and soils.

Table 7-6 shows that river fluctuations are higher in areas closer to the dam and dissipate as flows attenuate downstream; however, values for some locations (for example, 4, 14, and 43 RMs downstream) do not follow the pattern shown by the values for the other locations. These cross-sections may experience a higher magnitude of water level fluctuations due to a combination of factors, including channel geometry, slope, and proximity to hydraulic controls along the length of the river. The greatest benefit to decreased fluctuations would be seen in the first 7-miles below Harris Dam where fluctuations are greatest due to proximity to the Project.

Table 7-6 Daily Average Water Surface Elevation Fluctuations (in Feet) in the Tallapoosa River Downstream of Harris Dam Based on HEC-RAS Model of Green Plan (Baseline) and 300CMF

Alternative	Miles Below Harris Dam										
	0.4	**1**	**2**	**4**	**7**	**10**	**14**	**19**	**23**	**38**	**43**
GP (Baseline)	4.62	4.24	3.99	4.22	3.20	2.56	3.60	3.01	2.01	0.92	1.79
300CMF	3.59	3.51	3.44	3.72	2.96	2.34	3.54	2.99	1.99	0.92	1.74

Source: Alabama Power and Kleinschmidt 2022b

7.2.3.3 Erosion Monitoring Plan

Alabama Power proposes to develop and implement an Erosion Monitoring Plan (EMP) for downstream of Harris Dam. Following implementation of the minimum flow, this plan would evaluate any change in downstream erosion via HDSS methods utilized during the 2020 Erosion and Sedimentation Study. The EMP would begin 1 year after the minimum flow system is fully operational, with each subsequent event occurring on a 5-year interval. The three downstream erosion surveys would occur concurrently with the three Aquatic Resources Management Plan surveys events. The EMP would provide ongoing analysis of streambank erosion downstream and verify the approximately 300 cfs continuous minimum flow's anticipated benefit to downstream streambank erosion compared to Green Plan (baseline) operations.

7.2.3.4 Recreation Plan

Alabama Power proposes to finalize and implement a Recreation Plan that would provide for the construction of canoe/kayak access at the existing Harris Tailrace Fishing Pier below Harris Dam. Alabama Power's proposal to design and install public access and recreation facilities downstream of Harris Dam would require land disturbing activity that would affect soils in the proposed area. Land clearing activities would occur to accommodate the new access and canoe/kayak launch; however, land clearing would be limited to the extent possible. The Recreation Plan includes provisions for soil erosion and sedimentation control BMPs such as silt fences to reduce or eliminate the temporary effects of construction. Implementation of BMPs and shoreline stabilization in the canoe/kayak recreation area could mitigate potential adverse effects of increased human traffic at the recreation site owned and operated by Alabama Power.

7.3 Unavoidable Adverse Impacts

7.3.1 Skyline

Local and basin land disturbing activities (construction, farming/agriculture practices, private timber harvesting) may occur and cause short-term adverse impacts on soils at Skyline, including soil destabilization, runoff, and erosion and sedimentation.

7.3.2 Lake Harris

Local and basin land disturbing activities (construction, farming/agriculture practices, private timber harvesting) may occur resulting in continued sedimentation and erosion on Lake Harris. Wind and wave induced erosive forces would continue to have some effect on the soil resources at Lake Harris. Alabama Power's proposal to provide BMP education to property owners and customers through the shoreline permitting process and the Alabama Power website[21] may reduce this unavoidable impact.

7.3.3 Tallapoosa River Downstream of Harris Dam

Local and basin land disturbing activities (construction, farming/agriculture practices, private timber harvesting) may occur resulting in continued erosion downstream of Harris Dam. Alabama Power's proposal to provide BMP education through their website to property owners and customers may reduce this unavoidable impact.

Development of recreation sites may result in short-term localized areas of erosion. Use of BMPs during these activities would minimize these impacts.

High flow events, especially those attributed with flood conditions, would continue to occur, and may continue to impact existing erosion sites downstream of Harris Dam. By continuing to encourage the adoption of shoreline and riparian BMPs, landowners adjacent to the Tallapoosa River may reduce the overall impact to existing eroded sites and minimize future erosion.

7.4 Recommended PME Measures Not Adopted

In response to the PLP, resource agencies, NGOs, and other stakeholders recommended specific PME measures that may affect geology and soil resources. Some of the recommended PME measures are incorporated in Alabama Power's proposal. This section briefly describes the stakeholder recommended PME measures that Alabama Power is not including in its relicensing proposal.

7.4.1 Unit Ramping

The ADCNR and various downstream stakeholders recommend that Alabama Power consider ramping the generators during peaking operations. Ramping would involve incrementally increasing the flow through the turbines up to best/full gate. Ramping would not change the overall magnitude of water surface fluctuations experienced downstream, resulting in a negligible effect on geology and soil resources. Ramping would reduce the rapid change between baseline flow and either one- or two-unit

[21] Alabama Power website includes a link to the Smart Lakes APP and *Shorelines*.

generation but would have very little effect on erosion downstream of Harris Dam. Because the turbines at Harris Dam were not designed to run at flows less than best/full gate, they would be subject to mechanical damage and therefore, Alabama Power would not operate the units in this manner.

7.4.2 Downstream Erosion Repair

Stakeholders recommend that Alabama Power:

- Repair the areas identified by the HDSS as slightly impaired, impaired, or non-functional
- Monitor, report, and address ongoing erosion exacerbated by Harris Project operations
- Assist landowners along the river to better control erosion through technical and financial assistance

Alabama Power currently provides shoreline BMP education to the public on the Alabama Power website and as described above, is proposing to implement an EMP; however, Alabama Power would not provide direct financial assistance to repair the erosion of non-Project land along the Tallapoosa River. Several federal and state resource agencies such as the Natural Resources Conservation Service (NRCS), ADEM, and the EPA, currently provide technical assistance and may provide some funding to qualifying landowners that are experiencing erosion.

8.0 WATER RESOURCES

8.1 Affected Environment

8.1.1 Skyline Water Quality

Alabama's water quality standards consist of three components: designated uses, numeric and narrative criteria, and an anti-degradation policy. Designated use is a classification system designed to identify the best uses of individual waterways. ADEM Administrative Code r. 335-6-11 outlines seven designated uses, as follows (ADEM 2016):

- Outstanding Alabama Water (OAW)
- Public Water Supply (PWS)
- Shellfish Harvesting (SH)
- Swimming and Other Whole-Body Water-Contact Sports (S)
- Fish and Wildlife (F&W)
- Limited Warmwater Fishery (LWF)
- Agricultural and Industrial Water Supply (A&I)

Skyline is located within two watersheds: Coon Creek watershed includes Coon Creek, Big Coon Creek, and Little Coon Creek streams and Crow Creek watershed includes Crow Creek and Little Crow Creek (Figure 8-1).

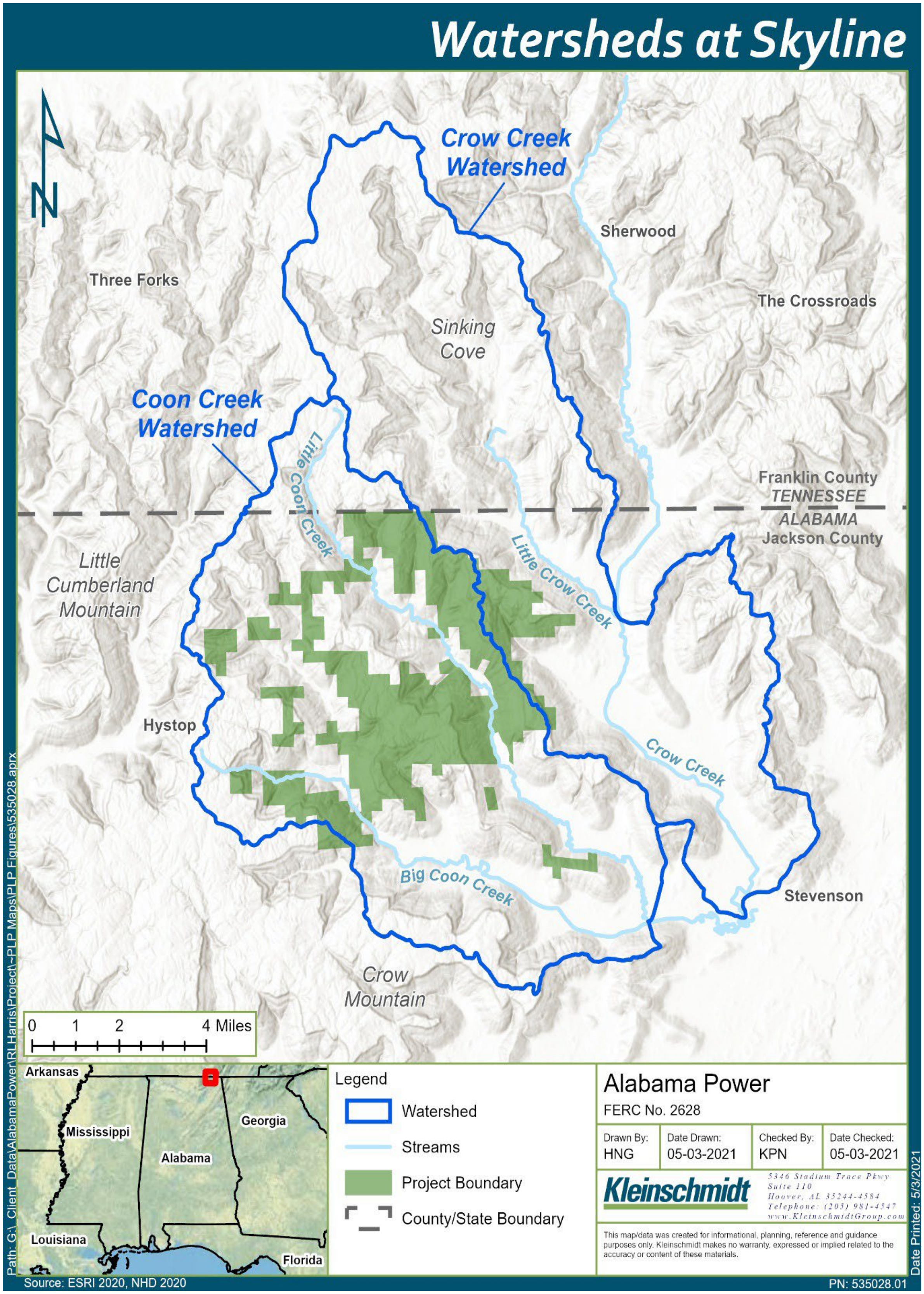

Figure 8-1 Watersheds at Skyline

The state of Alabama designated uses for Coon Creek from Guntersville Lake upstream to its source are swimming and fish and wildlife (S/F&W) (ADEM 2017). Of these streams, only Little Coon Creek is currently included in Alabama's 303(d) Impaired Waters List. The stream is listed as impaired because of siltation. The source of siltation is listed as non-irrigated crop production and pasture grazing (ADEM 2020). Water quality criteria applicable for these use designations are presented in Table 8-1.

Table 8-1 Specific Water Quality Criteria for State of Alabama Waters

VARIABLE	STANDARD FOR FISH AND WILDLIFE/PUBLIC WATER SUPPLY	STANDARD FOR SWIMMING
pH	Between 6.0 and 8.5	Between 6.0 and 8.5
Dissolved Oxygen	Not less than 5.0 mg/L at a depth of 5 feet in waters 10 feet or greater in depth	Not less than 5.0 mg/L at a depth of 5 feet in waters 10 feet or greater in depth
Water Temperature	Not greater than 86 degrees F[22]	Not greater than 86 degrees F
Turbidity	Not greater than 50 NTUs	Not greater than 50 NTUs
Bacteria	E. coli: • May-October - 126 colonies/100 mL geometric mean;298 colonies/100 mL single sample max • November-April - 548 colonies/100 mL geometric mean; 2507 colonies/100 mL single sample max	E. coli: • 126 colonies/100 mL geometric mean;235 colonies/100 mL single sample max

Source: ADEM 2016

Note: mg/L milligrams per liter
mL milliliters
NTU Nephelometric Turbidity Unit

[22] The maximum temperature in streams, lakes, and reservoirs in the Tennessee and Cahaba River Basins, and for that portion of the Tallapoosa River Basin from the tailrace of Thurlow Dam at Tallassee downstream to the junction of the Coosa and Tallapoosa rivers which has been designated by ADCNR as supporting Smallmouth Bass, Sauger, or Walleye, shall not exceed 86°F." In the case of R. L. Harris reservoir, the 90°F maximum temperature would apply.

The state of Alabama designated use for Crow Creek from Guntersville Lake to the Alabama-Tennessee state line is F&W (ADEM 2017), indicating these waters are best suited for fish and wildlife habitat. No waters in the Crow Creek watershed are included in Alabama's 303(d) Impaired WatersList (ADEM 2020).

The 2020 ADEM 303(d) Impaired Waters List identifies 79 stream segments in the Tennessee River Basin as partially or not supporting designated uses for fish and wildlife, agriculture and industry, swimming, and public water supply (ADEM 2020). Organic enrichment, siltation, and pathogens are the most frequently cited reasons for the stream segments not meeting Alabama's water quality standards.

ADEM performed periodic sampling at six stream sites that drain land within the Skyline Project Boundary. A summary of results from common parameters that were tested at each site is presented in the *Baseline Water Quality Report* (Kleinschmidt 2018c).

8.1.2 Skyline Water Quantity

Alabama Power does not manage any water body within the Skyline Project Boundary and there is no Harris Project discharge at Skyline.

8.1.3 Lake Harris Water Quality

The primary designations for best use of Harris Reservoir are for swimming and fish and wildlife (S/F&W) (refer to ADEM Administrative Code r. 335-6-11-.02(11)) (ADEM 2017). From Highway 431 to Wolf Creek, the Little Tallapoosa River has the additional classification of public water supply.

Additionally, ADEM's regulations contain a specific standard for chlorophyll *a* (corrected, as described in Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998) for Harris Reservoir:

> The mean of photic-zone composite chlorophyll *a* samples collected monthly, April through October, shall not exceed 10 micrograms per liter (µg/l), as measured at the deepest point, main river channel, dam forebay; or 12 µg /l, as measured at the deepest point, main river channel, immediately upstream of the Tallapoosa River – Little Tallapoosa River confluence (ADEM Administrative Code r. 335-6-10-.11(h)4).

Water bodies not attaining set standards are placed on the state of Alabama's list of water bodies impaired pursuant to CWA Section 303(d), then the state designs a program which establishes total maximum daily loads (TMDLs) to improve water quality to set criteria.

A portion of the Harris Reservoir was placed on ADEM's 2020 303(d) Impaired Waters List due to mercury in fish tissue samples. The 2020 303(d) Impaired Waters List included portions of 49 other lakes/reservoirs in Alabama including portions of Lakes Martin, Yates, and Thurlow downstream of Harris on the Tallapoosa River due to mercury in fish tissue attributed to atmospheric deposition (ADEM 2020).

ADEM, Alabama Power, and Alabama Water Watch (AWW) collected water quality data at Lake Harris (Table 8-2), which was included in the *Water Quality Study Report* (Kleinschmidt 2021b). Baseline water quality data collected by ADEM from 2005 to 2015 is presented in the *Baseline Water Quality Report* (Kleinschmidt 2018c). Based on monitoring results, water quality criteria at Lake Harris are being met and designated uses are beingfully supported.

Table 8-2 Summary of Water Quality Data Sources at Lake Harris

SOURCE	DESCRIPTION	PERIOD
ADEM	Vertical profiles and discrete chemistry samples at six locations	April - October 2018; June, July, September, and October 2020
Alabama Power	Vertical profiles in the forebay	March - October 2017 – 2020
Alabama Water Watch	Surface samples at six locations	Monthly to semi-monthly, 2011 – 2019

Source: Kleinschmidt 2021b

As part of its monitoring program, ADEM collected basic water quality data throughout vertical profiles from the reservoir surface to the bottom at regular depth intervals (approximately 3 feet). Water temperature, dissolved oxygen, pH, and conductivity data from these profiles are presented in the *Water Quality Study Report* (Kleinschmidt 2021b). In 2020, only water temperature and dissolved oxygen profiles were available. Alabama Power collected monthly vertical dissolved oxygen and temperature profile data in the forebay from March through October each year from 2017 to 2020 (Figure 8-2). Due to high flows, Alabama Power was unable to collect vertical profile data in September 2017 (Kleinschmidt 2021b).Data from these forebay profiles are presented in the *Water Quality Study Report* (Kleinschmidt 2021b).

Generally, during the spring and summer, the Harris Reservoir stratifies into three layers (Kleinschmidt 2021b):

- An epilimnion, which is fairly uniform in temperature and is well oxygenated
- A hypolimnion, a cold, less oxygenated bottom layer
- A metalimnion or thermocline, which is a transition layer between the epilimnion and hypolimnion

Harris Reservoir is typically stratified from June through October, with hypoxic/anoxic conditions at depths greater than 30 feet (Kleinschmidt 2021b). However, in the summer months of some years, the reservoir may develop a negative heterograde dissolved oxygen profile, with oxygenated surface and bottom layers and a mid-depth layer with lower oxygen levels.

In addition to vertical profiles, ADEM collected and analyzed monthly surface water samples for numerous parameters (discrete chemistry samples) at six stations (Figure 8-3) on Harris Reservoir in April through October 2018, and in June, July, September, and October 2020. Water clarity, as measured by Secchi Disk depth, was highest at reservoir station RLHR-6 and lowest at RLHR-3. Similarly, concentrations of nutrients such as nitrogen and phosphorus, as well as chlorophyll *a* (a measure of algal abundance), were higher at the upper reservoir stations (RLHR-3, RLHR-4, and RLHR-5) (Kleinschmidt 2021b).

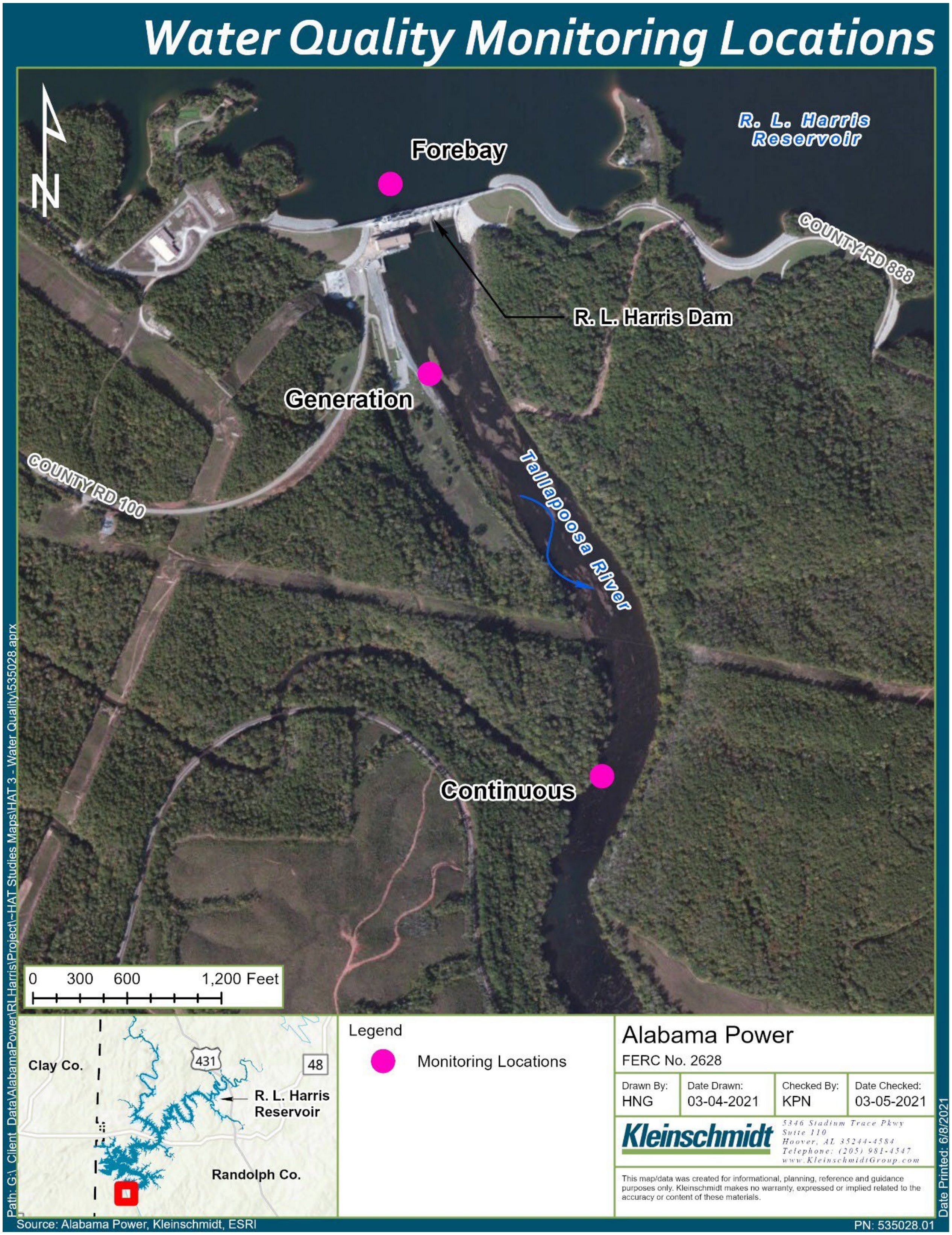

Figure 8-2 Alabama Power Water Quality Monitoring Locations

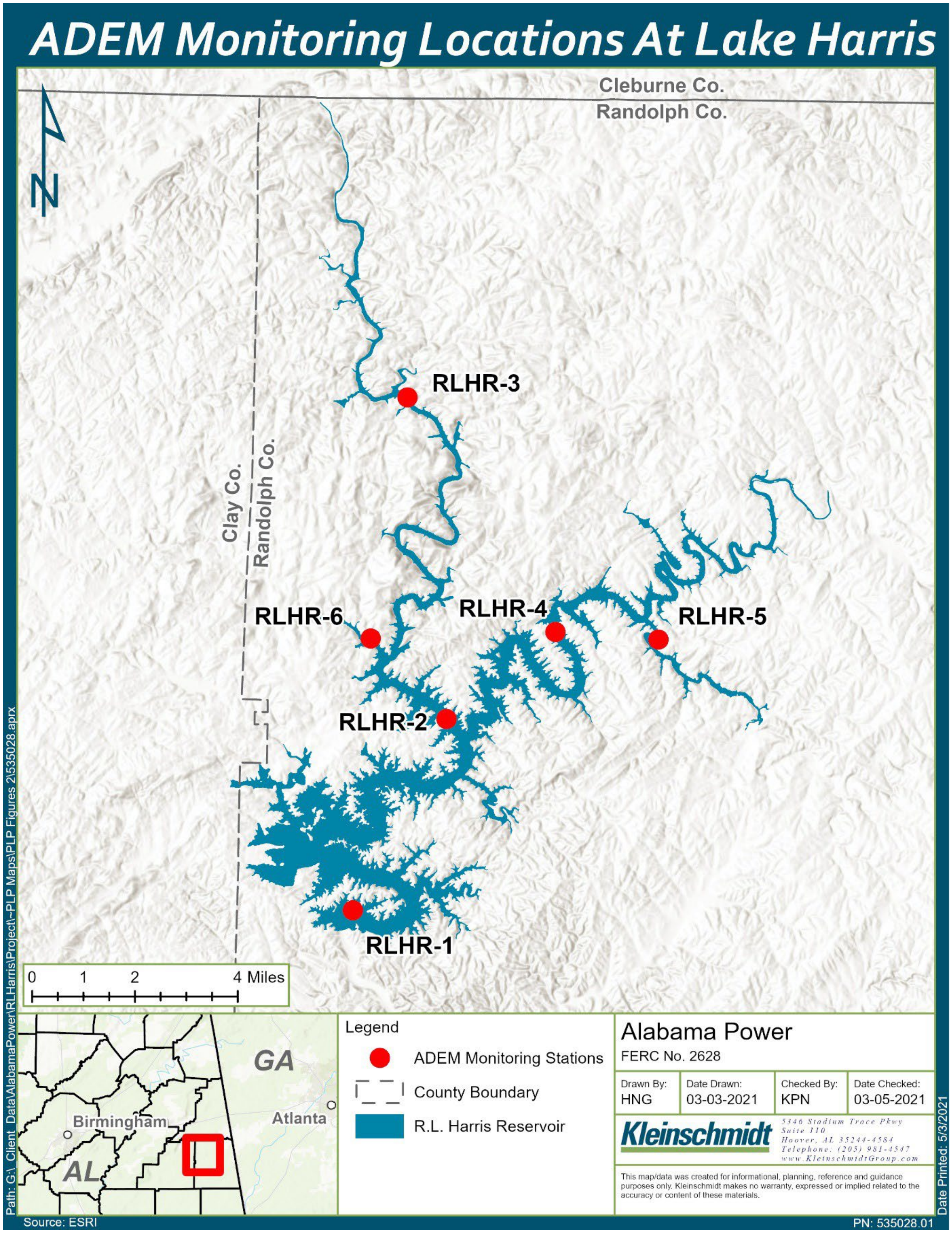

Figure 8-3 Alabama Department of Environmental Management Monitoring Sites on Harris Reservoir

Water quality data collected by AWW was included in the *Water Quality Study Report*. AWW is a citizen volunteer water quality monitoring program that was established in 1992. As part of this program, citizens, including members of the Lake Wedowee Property Owners Association, have performed monitoring at over 40 sites on Harris Reservoir according to EPA approved monitoring plans. Many of the sites are currently inactive and did not have recent data available. AWW collected surface samples at six locations (Figure 8-4) monthly to semi-monthly from 2011 to 2019 and data are summarized in the *Final Water Quality Study Report* (Kleinschmidt 2021b).

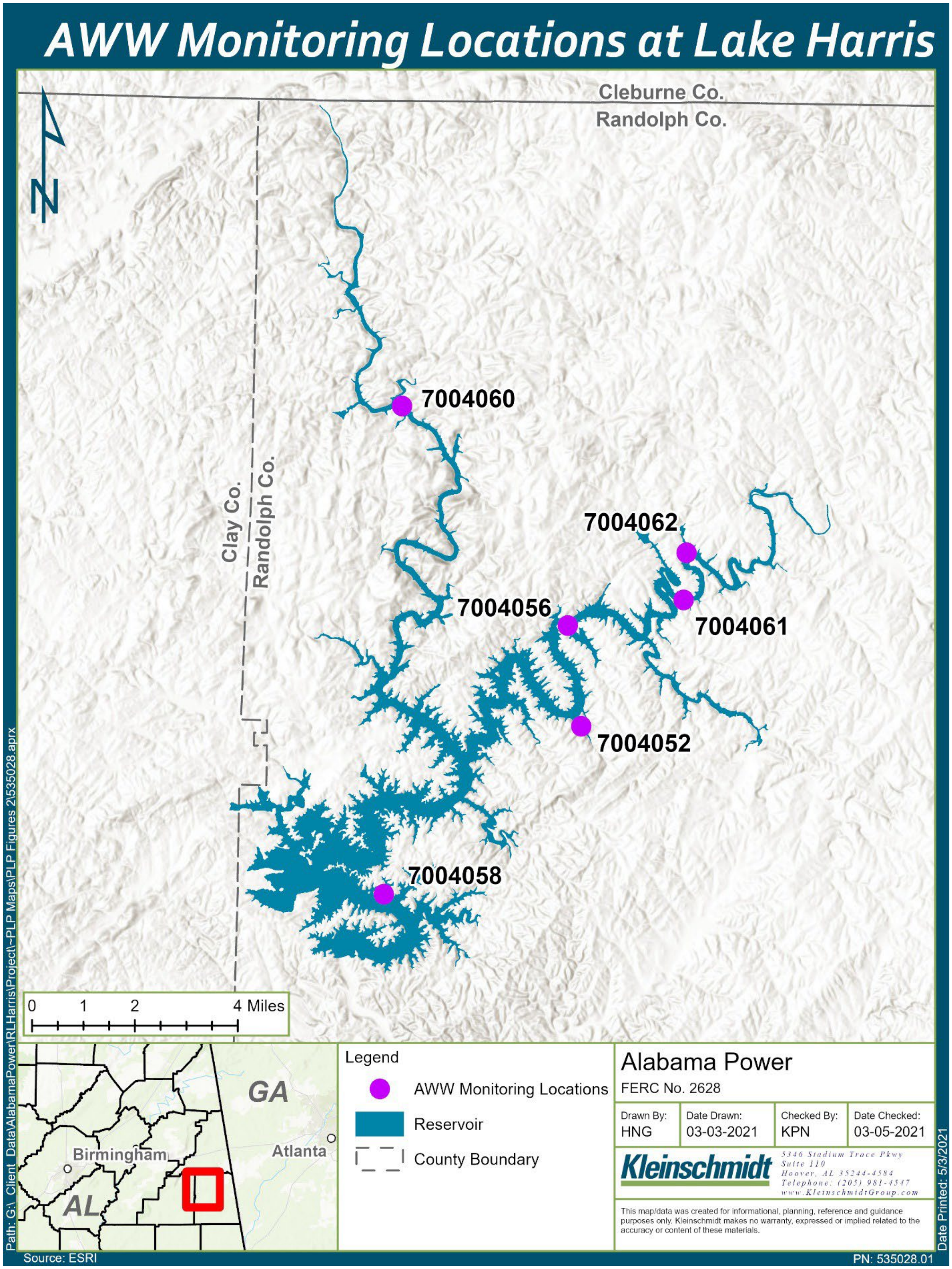

Figure 8-4 Alabama Water Watch Monitoring Sites at Harris Reservoir

8.1.4 Lake Harris Water Quantity

The Tallapoosa River drainage basin encompasses approximately 4,687 square miles, including 1,454 square miles above Lake Harris. Approximately 15 percent of the basin's drainage area lies in Georgia. The remaining 85 percent of the basin's drainage area is in Alabama (CH2MHILL 2005). Precipitation in the Tallapoosa River Basin typically ranges from 46 to 64 inches annually. Approximately 80 percent of the flood-producing storms occur in the winter and spring months, of which approximately 27 percent occur in the month of March. The principal tributaries to Lake Harris are the Tallapoosa River, Little Tallapoosa River, Wedowee Creek, and Ketchepedrakee Creek (Alabama Power and Kleinschmidt 2018).

Lake Harris has a surface area of 9,870 acres and a gross storage volume of 425,721 acre-feet at the normal (full) pool level of 793.0-feet msl. The reservoir is 29-miles-long, has a maximum depth of 121 feet, and a mean depth of 110 feet.[23] The average flushing rate (residence time) for the reservoir is estimated to be approximately 109 days. The reservoir has a total shoreline length of 367 miles. Reservoir substrates are comprised of bedrock, sand, and silt (Alabama Power and Kleinschmidt 2018).

Article 14 of the existing FERC license for the Harris Project states that, upon the application by any person, association, corporation, federal agency, state, or municipality, Alabama Power will permit reasonable use of its reservoir in the interest of the comprehensive development of the waterway as ordered by FERC (FERC 1973).

With very little industrial and agricultural use in the Lake Harris area, most of the demand for water is for municipal use. The population of Randolph and Clay counties are projected to decrease by 2.7 percent and 12.8 percent, respectively, between 2015 and 2040; the population of Cleburne County is projected to increase 3.3 percent (CBER 2017)[24].

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[23] Reservoir depth varies according to the reservoir topography. Mean depth and average depth are determined using bathymetric data.

[24] Population projection data referenced in the *Recreation Evaluation Report* were obtained from a different source and differs from the statistics provided here. Population projection data referenced in the *Recreation Evaluation Report* were obtained from the Alabama Statewide Comprehensive Outdoor Recreation Plan and states the following: "There is a projected decrease in population between 2020 and 2040 in Clay County, Alabama and a projected increase in Cleburne and Randolph counties in Alabama and in Carroll County, Georgia (ADECA 2013).

The Wedowee Water, Sewer, and Gas Board (WSGB) withdraws from and discharges to the upper Little Tallapoosa River and is the only water user that withdraws within the Harris Project Boundary. The Wedowee WSGB withdraws from the upper Little Tallapoosa River a daily average of 0.411 mgd (0.636 cfs) and a permitted daily maximum of 0.50 mgd (0.774 cfs) and discharges a daily average of 0.045 mgd (0.070 cfs) and a daily maximum of 0.150 mgd (0.232 cfs) (Kleinschmidt 2018b).

8.1.5 Tallapoosa River Downstream of Harris Dam Water Quality

The Harris tailrace is designated for fish and wildlife (ADEM 2017)). ADEM, Alabama Power, and AWW collected water quality data in the Tallapoosa River downstream of Harris Dam (Table 8-3), which is included in the *Water Quality Study Report* (Kleinschmidt 2021b). Historic water quality data collected by ADEM from 2005-2016 is presented in the *Baseline Water Quality Report* (Kleinschmidt 2018c). Based on monitoring results, water quality criteria in the Tallapoosa River downstream of Harris Dam are being met, except for the dissolved oxygen in the tailrace during some limited summer periods.

Table 8-3 Summary of Water Quality Study Data Sources in the Tallapoosa River Downstream of Harris Dam

SOURCE	DESCRIPTION	PERIOD
ADEM	Monthly measurements and discrete samples at Tailrace, Malone, Wadley, and Horseshoe Bend	2018–2020 (no measurements collected atTailrace in 2019)
ADEM	Continuous (15-minute intervals) monitoring at Malone	May 2018–November 2019; April – November2020
Alabama Power	15-minute intervals monitoring during generation (approximately 800 ft downstream of dam)	June–October of 2017–2020; June 2021
Alabama Power	Continuous (15-minute interval) monitoring (approximately 0.5 miles downstream of dam)	March – October 2019; May – October 2020; March – June 2021
Alabama Water Watch	Surface samples at Horseshoe Bend	1993 to 2007, and 2014 through 2017

Source: Kleinschmidt 2021b

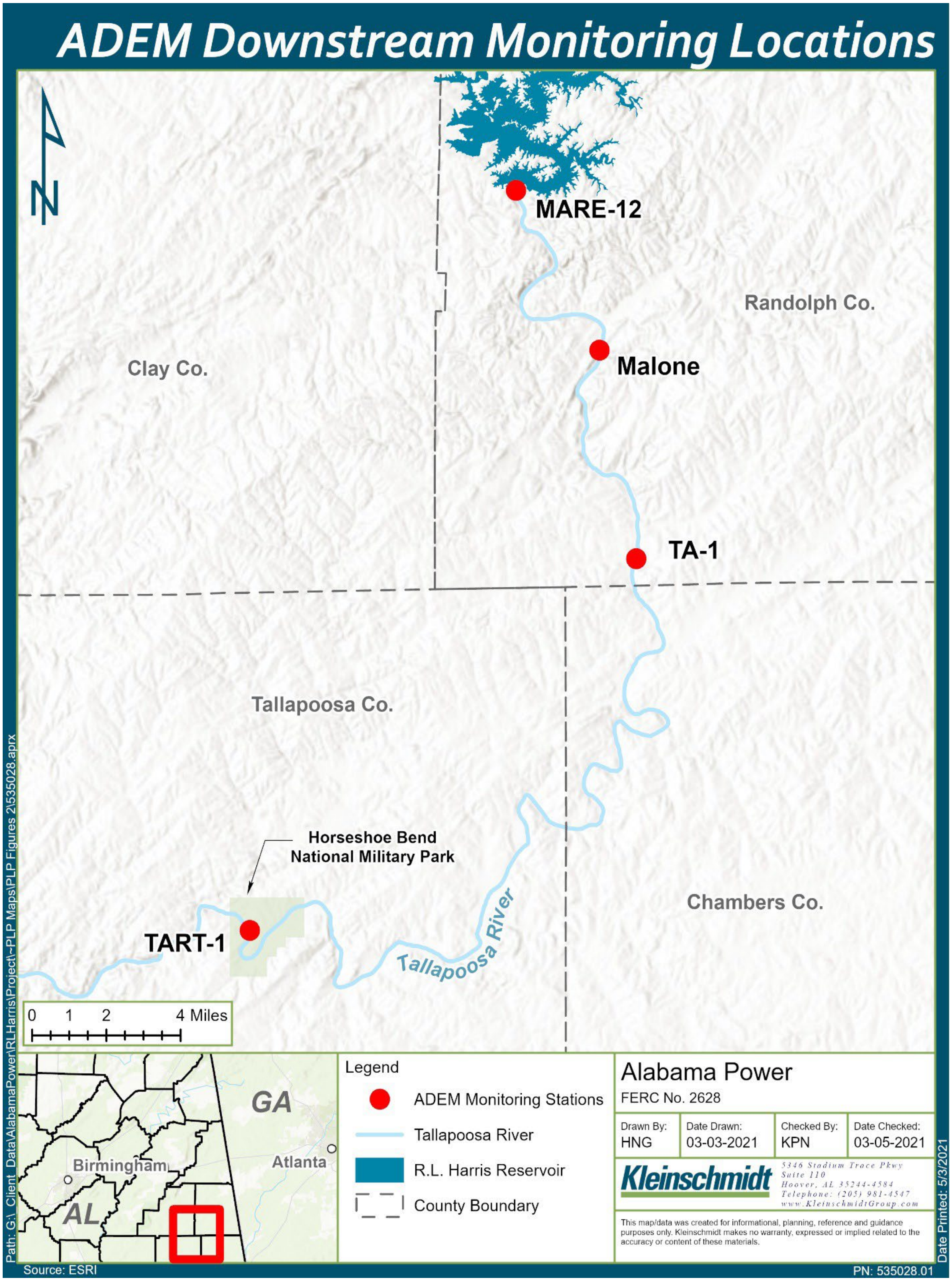

Figure 8-5 ADEM Monitoring Sites on Tallapoosa River

ADEM performed monitoring in the Tallapoosa River at four sites downstream of Harris Dam in 2018, 2019, and 2020 (Figure 8-5). The site immediately downstream of Harris Dam (MARE-12) was sampled monthly in 2018 from April to October during non-generation, and in 2020 from June to October only during periods generation. There were no instances of DO levels less than 5 mg/l. Conductivity ranged from 39 to 45 microsiemens per centimeter (µs/cm), and pH ranged from 6.44 to 6.92 (Kleinschmidt 2021b).

In May 2018, ADEM installed a monitoring station in the Tallapoosa River at the Malone bridge crossing near the east bank, approximately 7 RMs downstream of Harris Dam. The station recorded measurements of water temperature, dissolved oxygen, conductivity, pH, Turbidity, and chlorophyll *a* at 15-minute intervals. In April 2019, ADEM relocated the monitor to the middle of the river channel. In 2018, there were 467 measurements where dissolved oxygen levels were less than 5 mg/L between July and November. In 2019, three measurements less than 5 mg/L were recorded in November. In 2020, ten measurements less than 5 mg/L were recorded in October. Overall, dissolved oxygen levels were above 5 mg/L for a majority of monitoring period, with less than 1 percent of all measurements falling below 5 mg/L (Kleinschmidt 2021b).

Results of the monthly in-stream measurements collected by ADEM from March 2018 through February 2019 at the Wadley site (TA-1), located approximately 14-miles downstream of Harris Dam, indicated the highest water temperatures occurred during July through September. Lowest dissolved oxygen levels occurred in the July through October samples, though no measurements less than 6.0 mg/L were recorded. Measurements of pH were typically circumneutral[25], and conductivity ranged between 34 and 45 µs /cm (Kleinschmidt 2021b).

Results of the monthly in-stream measurements collected by ADEM from January 2018 through December 2020 at the Horseshoe Bend site (TART-1) located approximately 44-miles downstream of Harris Dam indicated the highest water temperatures occurred during July. Lowest dissolved oxygen levels typically occurred in June through October, though no measurements less than 7.1 mg/L were recorded. Measurements of pH were typically circumneutral, and conductivity ranged from 33 to 45 µs/cm (Kleinschmidt 2021b).

[25] Meaning "nearly neutral."

On May 5, 1972, the Alabama Water Improvement Commission (AWIC) (predecessor agency to ADEM) issued a certificate pursuant to Section 21(b) of the Federal Water Pollution Control Act (CWA) for Alabama Power's Crooked Creek Hydroelectric Development (now referred to as Harris Project). AWIC's certificate concluded as follows: 1) will not violate applicable water quality standards for the Tallapoosa River; and 2) will maintain a minimum flow of not less than 45 cfs at the gaging station on the Tallapoosa River at the bridge on Alabama State Highway 22 at Wadley, Alabama. A description of the 45 cfs minimum flow is provided in "Existing Project Operations" Section of this Exhibit E.

Alabama Power operates an aeration system, which was incorporated into the original turbine design, to provide up to 2 mg/L increase in dissolved oxygen (Alabama Power 1980). Prior to 2017, Alabama Power employed a surveillance program at Harris Dam to assess dissolved oxygen levels. In May of each year, Alabama Power would begin monitoring dissolved oxygen in the tailrace of the Harris Dam during generation every 2 weeks using a handheld instrument and the turbine aeration system was turned on when dissolved oxygen levels approached 5.5 mg/L. Beginning September 1 each year, Alabama Power would begin measuring dissolved oxygen in the Harris Dam tailrace every 2 weeks using a handheld instrumentduring generation. When dissolved oxygen levels were maintained at or above 6.0 mg/L,turbine aeration was turned off. In 2017, a dissolved oxygen and temperature monitor was installed in the tailrace for purposes of gathering data during discharge for development of a Section 401 WQC application. Data from this monitor are now used to determine aeration system operation.

In addition, the Harris Dam intake structure includes a skimmer weir, which was designed to be raised or lowered to meet water quality needs. The skimmer weir was incorporated into the design to allow the intake to draw from different layers in the water column, providingfor warmer releases with the added benefit of higher dissolved oxygen during periods of stratification. The weir has been in the uppermost position for the last 15-20 years drawingfrom relatively high in the water column. The invert elevation of the plant intake structure is located at 746.0-feet msl when the skimmer weir is fully lowered, and it is at 764.0-feet msl when it is fully raised.

For purposes of developing an application for a Section 401 WQC, and per agreement with ADEM, Alabama Power conducted dissolved oxygen and temperature monitoring in the tailrace approximately 800-feet downstream of the Harris Dam on the west bank of the river. Measurements were recorded at 15-minute intervals during generation from June to October of 2017 – 2020, and June 2021. Dissolved oxygen levels were consistently greater than 5 mg/L during the 2018, 2019, and 2020 monitoring periods and were typically lowest in August each year of the monitoring period. Dissolved oxygen levels in 2017 were lower than those measured during the 2018, 2019, and 2020 monitoring periods. Water temperatures were typically lowest in June and October and highest in August and September during the monitoring period (Kleinschmidt 2021b). Tabular descriptions and line plots of dissolved oxygen and temperature data from the generation monitor are presented in the *Water Quality Study Report* (Kleinschmidt 2021b).

Alabama Power monitored dissolved oxygen and water temperature continuously regardless of discharge approximately 0.5 miles downstream of Harris Dam from March to October 2019 and May to October 2020, and March to June 2021(Figure 8-2). Measurements of dissolved oxygen and water temperature were recorded at 15-minute intervals. Dissolved oxygen levels were generally lowest from June through October. These data indicate the highest average water temperature occurred during August. Tabular descriptions and line plots of dissolved oxygen and temperature data from the continuous monitor are presented inthe *Water Quality Study Report* (Kleinschmidt 2021b).

AWW performed periodic monitoring on the Tallapoosa River at Horseshoe Bend since 1993, including from 1993 to 2007, and 2014 through 2017. Results were similar to those obtained by ADEM during its monitoring events at the same location.

8.1.6 Tallapoosa River Downstream of Harris Dam Water Quantity

Releases from Harris Dam flow into the Tallapoosa River approximately 78 miles upstream of Martin Dam. The Upper Tallapoosa River Basin stretches from the Tallapoosa River headwaters to Harris Dam. The Middle Tallapoosa River Basin stretches from Harris Dam to Martin Dam. The river descends at an average rate of 3.4 feet-per-mile in the upper and middle segments of the basin. The lower Tallapoosa River Basin, from Martin Dam to the Tallapoosa River's confluence with the Coosa River, has more gradual gradient averaging 1.6 feet-per-mile (CH2MHILL 2005). The Green Plan (baseline) outlines specific daily and hourly release schedules from Harris Dam based on the previous day's flow at the USGS gage near Heflin (Station. No. 02412000). The daily volume releases are suspended during flood operations, and specific drought release criteria are also outlined.

The primary source of information relating to flow statistics downstream of Harris Dam is the USGS Wadley gage (Station No. 02414500). The highest flows typically occur in late winter and early spring, and the lowest flows typically occur in the fall. The peak instantaneous daily flow at the Wadley gage was 125,000 cfs on May 8, 2003 (USGS 2016a).

8.2 Environmental Analysis

Alabama Power conducted relicensing studies and associated analyses that pertain to effects on water resources. Those analyses are presented in the following reports.

- Final Downstream Release Alternatives Phase 2 Study Report
- Final Operating Curve Change Feasibility Analysis Phase 2 Study Report
- Final Water Quality Study Report
- Water Quantity, Water Use, and Discharge Report
- Baseline Water Quality Report

Table 8-4 includes the proposed operations and PME measures that may affect water resources at Skyline, Lake Harris, and the Tallapoosa River Downstream of Harris Dam. Not all operations or PME measures apply to each geographic area of the Harris Project; therefore, the analysis of beneficial and adverse effects is presented accordingly. A complete list of Alabama Power's operations and PME measures is in Table 5-2.

Table 8-4 Proposed Operations and PME Measures That May Affect Water Resources

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT WATER RESOURCES
• Continue to operate the Harris Project according to the existing operating curve. • Continue to operate in high flow conditions according to the USACE-approved flood control procedures in the Harris Water Control Manual (USACE 2022). • Continue daily peak-load operations. • Continue operating in accordance with ADROP (Alabama Power Company 2016) to address drought management.
• Install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs with a generating capacity of approximately 2.5 MW. Based on the preliminary design, the continuous minimum flow unit would require a new reinforced concrete addition located on the outside of the Unit 1 side (east side) of the powerhouse. The new steel-lined penstock would penetrate the existing Unit 1 penstock for source water and discharge below the tailrace water surface. • Develop drought operations procedures for the minimum flow. • Operate in accordance with Green Plan (baseline) during CMF unit outages and outages where the water supply to the Unit 1 penstock is affected.
• Develop and implement a Project Operations and Flow Monitoring (POFM) Plan (Alabama Power 2021a) to monitor compliance with 1) Project Operation and Water Level Management; 2) flood control operations 3) drought management; and 4) flow releases from the Harris Dam. Elements of the POFM Plan would include: ❖ Goals of the monitoring plan. o To establish a framework to periodically confirm that the Harris Project is operated in compliance with the new license. ❖ Variables to be monitored, anticipated methods for monitoring project operation and flow, and general locations of monitoring sites. o Variables to be monitored include, but are not limited to, reservoir levels, tailrace elevation, wicket gate settings, generation data, unit discharge, and spillway gate operation.

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT WATER RESOURCES
❖ Provisions for reporting results. o Provisions for making notification to FERC and appropriate agencies when the proposed minimum flow is not met due to unit outages, O&M, or when modifications are made due to low-inflow/drought. ❖ Schedule for developing and implementing the POFM Plan. o Within3 months of license issuance, Alabama Power will develop the plan, consult with appropriate agencies, and file with FERC for approval.
• Develop and implement a Water Quality Monitoring Plan (Alabama Power 2022a) consistent with the 401 WQC. ❖ Goals of the monitoring. o To ensure compliance with applicable water quality standards and the conditions of the 401 WQC to be issued by ADEM. ❖ Anticipated water quality parameters to be monitored and methods for monitoring those parameters. o Alabama Power proposes to monitor dissolved oxygen and water temperature year-round in the Harris Project tailrace during periods of discharge associated with generation or minimum flow releases for the term of the new FERC license. o Although not a compliance point to determine if the turbine or minimum flow discharge is meeting the state standard, Alabama Power also proposes to monitor dissolved oxygen and water temperature year-round at two United States Geological Survey (USGS) gages on the Tallapoosa River downstream of Harris Dam (Malone USGS Site No. 02414300 and Wadley USGS Site No. 02414500) for the term of the new FERC license. ❖ The number and general locations of monitoring sites. o The number and general locations of the monitoring sites will be determined based on the requirements in ADEM's 401 WQC. Based on consultation with ADEM, Alabama Power proposes to monitor in the tailrace at the current site located approximately 800 feet downstream of the Harris Dam on the west bank of the river. Although not a compliance point, Alabama Power will also monitor dissolved oxygen and temperature year-round at the USGS gages on the Tallapoosa River at Malone (USGS Site No. 02414300) and Wadley (USGS Site No. 02414500).

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT WATER RESOURCES
❖ Provisions for reporting results and monitoring and reporting frequency. o Following license issuance and subsequent installation of the minimum flow unit, Alabama Power will provide annual tailrace monitoring data to ADEM and file with FERC following each monitoring year for the first three years. o Following the third full year of monitoring, Alabama Power will provide a Water Quality Assessment within six months, including if additional measures are needed, to ADEM for determination if the conditions of the WQC are being met. The assessment and ADEM consultation will be filed with FERC. o If after the initial three years of year-round monitoring ADEM determines that conditions of the WQC are not being met, Alabama Power will determine, in consultation with ADEM, additional ways to increase DO and file a plan with FERC for approval. In addition, at any point during the term of the license, Alabama Power and ADEM may work together to modify the year-round monitoring requirement. ❖ Schedule for developing and implementing the Water Quality Monitoring Plan. o Within 6 months of license issuance, Alabama Power will develop the Water Quality Monitoring Plan, consult with appropriate resource agencies, and file for FERC approval.
• Continue operating the existing aeration system which was incorporated into the original turbine design.
• Incorporate an aeration system in the design of the new continuous minimum flow unit.
• Continue to maintain the skimmer weir that was incorporated into the original design to allow the intake to draw from different layers in water column, providing for warmer releases with the added benefit of higher dissolved oxygen during periods of stratification. The skimmer weir will continue to be operated at the highest setting possible.
• Finalize and implement a WMP (Alabama Power 2021e) for Lake Harris and Skyline. ❖ Consult with USFWS to develop measures protective of federally listed bats. ❖ Incorporate timber management into the WMP. o Including maintenance of gates and the construction/maintenance of logging roads. o Conduct surveys for Price's Potato-bean at the location of the extant population prior to timbering activities that may affect the extant

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT WATER RESOURCES
population. Timbering crews will be notified of the location of any Price's Potato-bean prior to timbering activities. ❖ Maintain pollinator plots at Little Fox Creek. ❖ Continue to provide hunting opportunities to the public. ❖ Continue to manage approximately 105 acres of permanent openings to provide diverse habitat that benefits both game and nongame species. ❖ Continue to conduct property boundary maintenance, such as painting/marking of property lines. ❖ Schedule for revising and implementing the WMP. • Within 6 months of license issuance, Alabama Power will revise or update the WMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval
• Finalize and implement a Shoreline Management Plan (SMP) (Alabama Power 2022c) for Lake Harris. ❖ Incorporate proposed changes in land use classifications (including reclassifying the botanical area at Flat Rock Park from recreation to Natural/Undeveloped). ❖ Continue to encourage the use of alternative bank stabilization techniques other than seawalls. ❖ Continue implementing the Dredge Permit Program (Appendix A to the SMP). ❖ Continue implementing the Water Withdrawal Policy (Kleinschmidt 2018b). ❖ Continue implementing a shoreline classification system to guide management and permitting activities (Appendices C and D of the SMP). ❖ Continue the requirements of a scenic easement for the purpose of protecting scenic and environmental values. ❖ Continue the use of a "sensitive resources" designation in conjunction with shoreline classifications on Harris Project lands managed for the protection and enhancement of cultural resources, wetlands, and threatened and endangered species. ❖ Continue implementing a shoreline compliance program and shoreline permitting program. ❖ Continue to encourage the adoption of shoreline best management practices (BMPs), including BMPs to maintain and preserve naturally vegetated shorelines, to preserve and improve the water quality of the Harris Project's reservoir, and to control soil erosion and sedimentation (Appendix E of the SMP). o Plant native trees, shrubs, and flowers for landscaping and gardens in order to reduce watering as well as chemical and pesticide use. o Preserve or establish a naturally managed vegetative filter strip along the shoreline to keep clearing of native trees and vegetation to a minimum. Alabama Power recommends a buffer set back of at least 15 feet measured horizontally from the full pool elevation.

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT WATER RESOURCES
o Plant a low maintenance, slow growing grass that is recommended for your soil conditions and climate. o Maintain the grass as high as possible in order to shade out weeds and improve rooting so less fertilizing and watering are required. o Avoid dumping leaves or yard debris on or near the shoreline. ❖ Provide an update to the SMP every 10 years. ❖ Schedule for revising and implementing the SMP. o Within 6 months of license issuance, Alabama Power will revise or update the SMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval
• Finalize and implement a Recreation Plan (Alabama Power 2022d). ❖ Continue to operate and maintain 11 Harris Project recreation sites. ❖ Remove Wedowee Marine South as a Harris Project recreation site and request approval of entire facility as non-project use. ❖ Install and maintain recreation (canoe/kayak) access below Harris Dam within the Harris Project Boundary. ❖ Provide an additional recreation site on Lake Harris to include a day use park (swimming, picnicking, and boat ramp). ❖ Implement Barrier-Free Evaluation Program at existing recreation sites. ❖ Provide descriptions of the Project recreation sites including maps. ❖ Provide a Recreation Plan update to FERC every 10 years including monitoring protocols and proposed methodologies for sampling. ❖ Schedule for finalizing and implementing the Recreation Plan. • Within 6 months of license issuance, Alabama Power will revise the Recreation Plan, as needed, in consultation with appropriate resource agencies, and file with FERC for approval

8.2.1 Skyline Water Quality

8.2.1.1 Wildlife Management Plan/Timber Management

Little Coon Creek at Skyline is listed as impaired on the 303(d) Impaired Waters List due to siltation. The sources of this impairment include non-irrigated crop production and pasture grazing on adjacent land, which more easily allows for soils loosened due to tilling or other agricultural practices to be washed into the creek, resulting in sedimentation of the creek bottom. Alabama Power proposes to finalize and implement a WMP, including specific timber management actions and BMPs that reduce or prevent runoff, erosion, and sedimentation that may impact streams and waterbodies within Skyline. Alabama Power will continue to incorporate Alabama's Best Management Practices for Forestry as provided by the Alabama Forestry Commission. These practices include: the establishment of SMZs; avoidance of crossing of streams by roads, skid trails, or firebreaks when possible; when unavoidable, the utilization of the fewest possible steam crossings located where the bank and SMZ will be least disturbed; the proper planning and location of roads (Alabama Forestry Commission 2021). Alabama Power's timber management practices would maintain the overall soil stability in the adjacent forested areas of Little Coon Creek potentially having a beneficial effect on water quality.

8.2.2 Skyline Water Quantity

Because Alabama Power does not manage any water body within the Skyline Project Boundary, none of the proposed operations and PME measures would affect water quantity at Skyline.

8.2.3 Lake Harris Water Quality

8.2.3.1 Continued Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. Water quality conditions support the designated uses of the reservoir (S and F&W) (Kleinschmidt 2021b) and would be expected to continue under Alabama Power's proposal. No changes to water quality at Lake Harris are expected due to the proposed operations; therefore, Alabama Power's continued operations would have no effect on water quality at Lake Harris compared to baseline.

8.2.3.2 Wildlife Management Plan/Timber Management

Alabama Power proposes to finalize and implement a WMP, including specific timber management actions and BMPs that reduce or prevent runoff, erosion, and sedimentation that may impact streams and waterbodies at Lake Harris. Specifically, Alabama Power will continue to incorporate Alabama's Best Management Practices for Forestry as provided by the Alabama Forestry Commission. These practices include: the establishment of SMZs; avoidance of crossing of streams by roads, skid trails, or firebreaks when possible; when unavoidable, the utilization of the fewest possible steam crossings located where the bank and SMZ will be least disturbed; the proper planning and location of roads (Alabama Forestry Commission 2021). The proposed WMP would likely benefit water quality by minimizing adverse effects of timber cutting at Lake Harris.

8.2.3.3 Shoreline Management Plan

Alabama Power proposes to finalize and implement a SMP for Lake Harris that would likely benefit water quality by minimizing adverse effects at Lake Harris.

Alabama Power encourages the use of alternative bank stabilization techniques other than seawalls. Such alternatives include, but are not limited to, riprap, bioengineering techniques, natural vegetation with riprap, and gabions. Alabama Power requires, as a condition of a permit, that any future seawall proposals include the placement of riprap, for fish and other semi-aquatic species habitat and increased stability, in front of the seawall. Alternative bank stabilization techniques are preferred methods of erosion control and would likely benefit water quality by minimizing adverse effects at Lake Harris.

Alabama Power's Dredge Permit Program, developed in consultation with the USACE and other agencies, establishes the processes and procedures for permittees seeking to obtain direct authorization from Alabama Power for dredging activities up to 500 CY of material (below the full pool elevation). The Dredge Permit Program is not intended to cover applications for dredging on lands determined to be "sensitive." The Dredge Permit Program streamlines the process for allowing dredging under 500 CY thus providing opportunity for homeowners to remove sediments that may restrict access. The proposed location of the spoil site for placement of dredged materials requires approval by Alabama Power and must be identified and included with the application. Spoils may not be placed in areas identified as potentially environmentally sensitive, adjacent waters, bottomland hardwoods, or wetlands, and spoils must be placed in a confined upland area in such a manner that sediment will not re-enter the waterway or interfere with natural drainage. Dredging can contribute to turbidity and localized water quality issues; therefore, managing dredging through a permit program may minimize adverse effects on water quality.

Alabama Power's continued implementation of the Water Withdrawal Policy would allow Alabama Power to evaluate each application for permission to withdraw water from its Project reservoirs, and, in appropriate circumstances, seek FERC authorization to permit water withdrawals on Harris Project lands. Water withdrawals can affect the assimilative capacity of the reservoir and the Water Withdrawal Policy would provide a beneficial effect on Lake Harris water quality.

Alabama Power proposes to continue implementing a shoreline classification system to guide management and permitting activities. Restrictions on land use along the shoreline could minimize runoff and erosion and potentially benefit water quality by minimizing adverse effects at Lake Harris. In addition, Alabama Power would continue to encourage adoption of shoreline BMPs, including BMPs to maintain and preserve naturally vegetated shorelines, to preserve and improve the water quality of the Harris Project's reservoir, and to control soil erosion and sedimentation. Implementation of shoreline BMPs may result in less stormwater runoff and may minimize adverse effects on Lake Harris water quality.

Alabama Power proposes to continue the requirements of a scenic easement on Lake Harris. Continuing this requirement would provide an overall beneficial effect to land management and provide for stable shorelines, potentially benefiting water quality.

8.2.3.4 Recreation Plan

Alabama Power proposes to finalize and implement a Recreation Plan that includes installing and maintaining an additional recreation site on Lake Harris. Ground disturbing activities associated with recreation development on Lake Harris including the proposed day use park may result in short-term adverse impacts to water quality, potentially causing short-term increases in turbidity near the construction site. The Recreation Plan would include provisions for soil erosion and sedimentation control BMPs to reduce or eliminate the temporary effects of construction resulting in a beneficial effect on Lake Harris water quality.

8.2.4 Lake Harris Water Quantity

8.2.4.1 Continued Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. The implementation of ADROP, would reduce impacts to lake levels and conserve water during drought periods, and have a beneficial effect on water quantity.

8.2.4.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. HEC-ResSim models were used to determine Alabama Power's ability to maintain the Harris Reservoir at the current operating curve under downstream release alternatives. The HEC-ResSim model indicated that a continuous minimum flow of approximately 300 cfs would have negligible effects on average reservoir elevations throughout the year compared to the Green Plan (baseline) (Figure 8-6) and would not affect current water users in Lake Harris (Alabama Power and Kleinschmidt 2022a). In the summer (May through September), the difference in average reservoir elevations over the period of record[26] is approximately -0.09 foot and, in the winter, (October through April) the difference is approximately -0.13 foot.

[26] 1939 to 2011

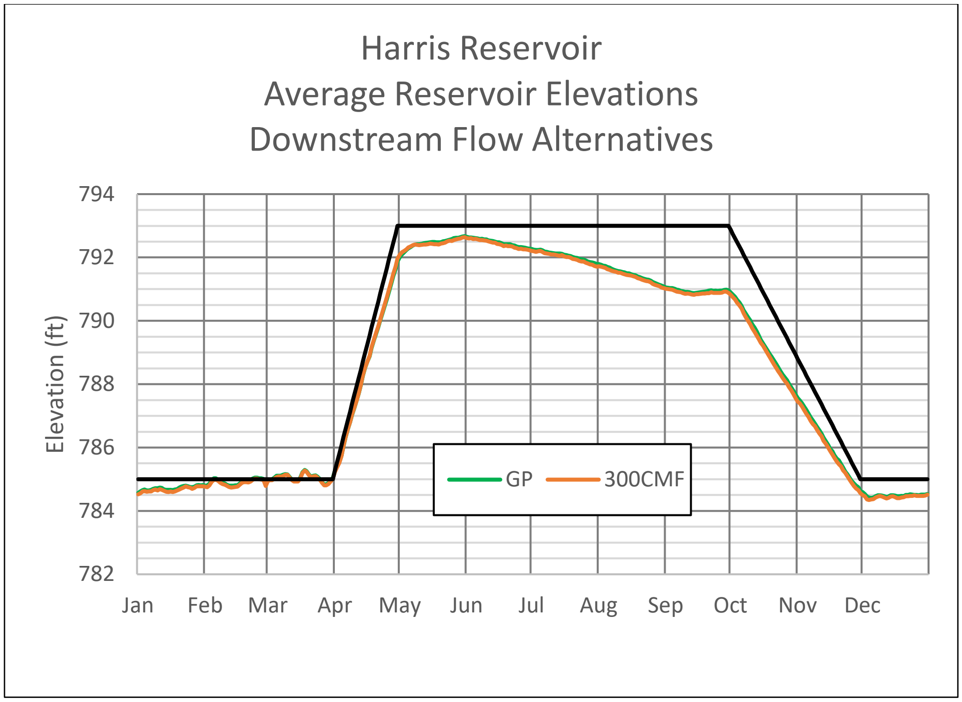

Figure 8-6 Average Elevations of Harris Reservoir Based on HEC-ResSim Model of Downstream Release Alternatives (GP and CMF)

In addition, Alabama Power proposes to develop low-inflow and drought operations procedures for the minimum flow unit in consultation with resource agencies following unit installation and performance testing. Any such procedures would not be inconsistent with ADROP. Drought operations procedures for the minimum flow unit would be developed so that reservoir elevations would not be lower than would occur under baseline operating conditions.

8.2.4.3 Project Operations and Flow Monitoring Plan

Alabama Power proposes to develop and implement a POFM Plan to ensure that Harris Project operations comply with applicable requirements of the new license. The Flow Monitoring Plan may include, but not be limited to 1) project operation and water level management; 2) flood control operations 3) drought management; and 4) flow releases from the Harris Dam. Implementing a POFM Plan would have a long-term beneficial effect on water quantity in Lake Harris through the implementation of water level monitoring and reporting. The POFM Plan provides a framework that ensures the Harris Project complies with its license relative to Lake Harris elevations.

8.2.4.4 Shoreline Management Plan

Alabama Power's continued implementation of the Water Withdrawal Policy would allow Alabama Power to evaluate each application for permission to withdraw water from its Project reservoirs, and, in appropriate circumstances, seek FERC authorization to permit water withdrawals on Harris Project lands. Water withdrawals can affect the assimilative capacity of the reservoir and the Water Withdrawal Policy would provide a beneficial effect on Lake Harris water quantity.

8.2.5 Tallapoosa River Downstream of Harris Dam Water Quality

8.2.5.1 Continued Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. These continued operations would maintain existing conditions and have no effect on water quality in the Tallapoosa River downstream of Harris Dam.

8.2.5.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. A continuous minimum flow of 300 cfs would not lower average lake level elevations, and in that regard should have no effect on water quality in the tailrace. The continuous minimum flow would meet state water quality standards. The effects of the proposed minimum flow on water temperature in the Tallapoosa River downstream of Harris Dam are discussed in Fish and Aquatics Resources.

8.2.5.3 Water Quality Monitoring Plan

Alabama Power proposes to continue monitoring water quality to ensure compliance with state water quality standards. Alabama Power would develop and implement a Water Quality Monitoring Plan consistent with a Section 401 WQC issued by ADEM, to monitor water quality in the tailrace at the existing tailrace monitoring location approximately 800-feet downstream of the Harris Dam on the west bank of the river. Monitoring would occur year-round during periods of discharge associated with generation or minimum flow releases for the term of the new FERC license to address any potential effects on water quality in the Tallapoosa River downstream of Harris Dam. Following license issuance and subsequent installation of the minimum flow unit, Alabama Power will provide annual tailrace data to ADEM and file with FERC following each monitoring year for the first three years. The data will be filed by February 28 for the preceding year. Following the third year of monitoring, Alabama Power will provide a Water Quality Assessment within six months, including if additional measures are needed, to ADEM for determination if the conditions of the WQC are being met. The assessment and ADEM consultation will be filed with FERC. If after the initial three years of year-round monitoring ADEM determines that conditions of the WQC are not being met, Alabama Power will determine, in consultation with ADEM, additional ways to increase DO and file a plan with FERC for approval. In addition, at any point during the term of the license, the Alabama Power and ADEM may work together to modify the year-round monitoring requirement.

Although not a compliance point to determine if the turbine or minimum flow discharge is meeting the state standard, Alabama Power also proposes to monitor dissolved oxygen and water temperature year-round at the USGS gages on the Tallapoosa River at Malone (USGS Site No. 02414300) and at Wadley (USGS Site No. 02414500) for the term of the new FERC license. At any point during the term of the license, Alabama Power and ADEM may work together to modify the year-round monitoring requirement. Implementing a Water Quality Monitoring Plan would provide long-term beneficial effects on water quality in the Tallapoosa River below Harris Dam.

8.2.5.4 Aeration System and Skimmer Weir

Alabama Power proposes to continue operating the existing aeration system at the Harris Project, as well as incorporate an aeration system in the design of the new minimum flow unit, to ensure compliance with state water quality standards in the Harris Project tailrace. In addition, Alabama Power proposes to continue to maintain the skimmer weir in the highest position to pull water from as high as possible in the water column. Operating these systems would have a long-term beneficial effect on water quality, as measured in the Harris tailrace.

8.2.6 Tallapoosa River Downstream of Harris Dam Water Quantity

8.2.6.1 Continued Operations (Normal, Flood, Drought)

Alabama Power’s proposal to continue operating the Harris Project during daily peak-load periods according to the existing operating curve and flood control procedures would not affect Alabama Power’s ability to provide the proposed continuous minimum flow in the Tallapoosa River downstream of Harris Dam. In addition, operating in accordance with ADROP would potentially provide a beneficial effect on water quantity downstream by conserving water to maintain some level of flow in the Tallapoosa River downstream of Harris Dam during periods of extreme drought.

8.2.6.2 Continuous Minimum Flow

Current water users downstream of Harris Dam are not likely to be affected by a continuous minimum flow release as water users are located in tributaries of the Tallapoosa River. A continuous downstream release of 300 cfs could increase the assimilative capacity of the Tallapoosa River downstream of Harris Dam, but this is unlikely to affect the town of Wadley Water System due to the location of their discharge in Hutton Creek. Furthermore, there are no reported issues with the existing assimilative capacity (Alabama Power and Kleinschmidt 2022b).

8.2.6.3 Project Operations and Flow Monitoring Plan

Alabama Power proposes to develop and implement a POFM Plan to ensure that Harris Project operations comply with applicable requirements of the new license. The Flow Monitoring Plan may include, but not be limited to 1) project operation and water level management; 2) flood control operations 3) drought management; and 4) flow releases from the Harris Dam. Implementing a POFM Plan would have a long-term beneficial effect on water quantity in the Tallapoosa River below Harris Dam through the implementation of managing water releases from Harris Dam. The POFM Plan provides a framework that ensures the Harris Project complies with its license relative to downstream releases.

8.3 Unavoidable Adverse Impacts

8.3.1 Skyline

Timber harvesting may result in temporary, adverse effects on water quality, particularly turbidity. Construction BMPs, such as silt fencing would be implemented to minimize or eliminate soil erosion and runoff that may adversely affect water quality in the streams and creeks in Skyline. Following Alabama's Best Management Practices for Forestry as provided by the Alabama Forestry Commission would reduce any unavoidable adverse effects on water quality.

8.3.2 Lake Harris

Inflows to the Harris Project may not always meet both Project and downstream water requirements during drought periods. During these times, Alabama Power would operate the Harris Project according to the ADROP and the drought procedures developed for the continuous minimum flow to minimize adverse impacts to water quality and quantity.

Ground disturbing activities associated with recreation development on Lake Harris including the proposed day use park may result in short-term unavoidable adverse impacts to water quality, potentially causing short-term increases in turbidity near the construction site. Construction BMPs such as silt fencing would be implemented to minimize or eliminate these unavoidable adverse impacts.

Dredging on Lake Harris may cause short-term, localized effects on water quality due to increases in turbidity and suspended solids. Continued implementation of Alabama Power's Dredge Permit Program would result in practices that minimize water quality impacts.

8.3.3 Tallapoosa River Downstream of Harris Dam

Inflows to the Harris Project may not always meet both Project and downstream water requirements during drought periods. During these times, Alabama Power would operate the Harris Project according to the ADROP and the drought procedures developed for the continuous minimum flow to minimize adverse impacts to water quality and quantity.

Ground disturbing activities associated with canoe/kayak access development at the existing Harris Tailrace Facility downstream of Harris Dam may result in short-term unavoidable adverse impacts to water quality, potentially causing short-term increases in turbidity near the construction site. Construction BMPs such as silt fencing would be implemented to minimize or eliminate these unavoidable adverse impacts.

8.4 Recommended PME Measures Not Adopted

In response to the PLP, resource agencies, NGOs, and other stakeholders recommended specific PME measures that may affect water resources. Some of the recommended PME measures are incorporated in Alabama Power's proposal. This section briefly describes the stakeholder recommended PME measures that Alabama Power is not including in its relicensing proposal.

8.4.1 Unit Ramping

The ADCNR and various downstream stakeholders recommend that Alabama Power consider ramping the generators during peaking operations. Ramping would involve incrementally increasing the flow through the turbines up to best/full gate. It is not known how this would affect water quality in the tailrace as the aeration system has only been tested at best/full gate. Because the turbines at Harris Dam were not designed to run at flows less than best/full gate, they would be subject to mechanical damage and therefore, Alabama Power would not operate the units in this manner.

8.4.2 Refurbish/Replace Aeration System

The ARA and ADCNR recommend that Alabama Power refurbish or replace the existing passive draft tube aeration system so that the state standard for dissolved oxygen is met at all times. Alabama Power believes such actions would be premature as it intends to monitor water quality following installation of the proposed minimum flow unit. Following that evaluation, ADEM and Alabama Power would investigate and implement additional measures, if needed, pursuant to the proposed Water Quality Monitoring Plan. Alabama Power notes that the aeration system only operates during generation when the state standard for dissolved oxygen would apply.

8.4.3 Modify Intake Structure

The ARA and ADCNR recommend modifying the intake structure at Harris Dam so that it draws water from higher in the water column into the penstock, potentially resulting in generation releases that are slightly warmer and more oxygenated. It is unknown how this might affect water quality in Lake Harris and in the Tallapoosa River downstream of Harris Dam. Alabama Power believes modifying the intake structure would be premature as it intends to monitor water quality following installation of the proposed minimum flow unit. Following that evaluation, ADEM and Alabama Power would investigate and implement additional measures, if needed, pursuant to the proposed Water Quality Monitoring Plan.

9.0 FISH AND AQUATIC RESOURCES

9.1 Affected Environment

9.1.1 Skyline

9.1.1.1 Fish Community

Little information is available relative to fish communities within the Skyline Project Boundary. The aquatic habitat information that is available for Skyline indicates it is comprised primarily of intermittent or first order streams. Alabama Power performed surveys at four locations in Little Coon Creek to determine if the federally endangered Palezone Shiner (*Notropis albizonatus*) was present. The most upstream location sampled occurred just downstream of a spring. Above that point, Little Coon Creek appeared to be more intermittent in nature and likely is periodically dry. No Palezone Shiner were detected (refer to Threatened and Endangered Species). The most common fish species in those surveys included Banded Sculpin (*Cottus carolinae*), Striped Shiner (*Luxilus chrysocephalus*), Bluegill (*Lepomis macrochirus*), and Bluntnose Minnow (*Pimephales notatus*) (Kleinschmidt 2021e).

A study by the Geological Survey of Alabama (GSA) in nearby Hurricane Creek found fish assemblages dominated by cyprinids, small catostomids, and darters (GSA 2013).

9.1.1.1.1 Benthic Macroinvertebrates

The ADEM sampled the benthic macroinvertebrate community in Little Coon Creek, Alabama, in June 2013, using standardized methodology. The sample site is located approximately 4 miles downstream of the Skyline Project Boundary. Sample results indicated a total of 72 taxa, with 13 of those taxa in the Ephemeroptera (Mayfly), Plecoptera (Stonefly), or Trichoptera (Caddisfly) orders (EPT species). Based on metrics that compare sample results to those expected for the region, this sample was assessed a rating of Fair (ADEM 2013).

9.1.2 Lake Harris

9.1.2.1 Fish Community

The reservoir supports several sport fisheries. Anglers frequently target Largemouth Bass (*Micropterus salmoides*) with several bass fishing tournaments occurring on Harris Reservoir annually. The ADCNR is the resource agency responsible for fishery resource management and regulation. A 13-inch to 16-inch slot limit for all black bass species on the reservoir (meaning that all fish 13 inches to 16 inches must be released) was implemented in 1993 (Andress and Catchings 2005). The percentage of Largemouth Bass in Harris Reservoir that are greater than 20 inches (12 percent) exceeds the state average (7 percent) for Alabama reservoirs. However, there was low recruitment to age one in 2015, with just 2 percent of the population reaching this age class. Growth rates for Largemouth Bass in their first 4 years of life are similar to growth rates for Largemouth Bass found in other reservoirs throughout the state (ADCNR 2015).

Alabama Bass (*Micropterus henshalli*) occur in Harris Reservoir. The 13-inch to 16-inch slot limit was removed for this species in 2006 due to an overabundance of specimens smaller than 13 inches (Andress and Catchings 2007). The condition of Largemouth Bass steadily improved in 2010 (Holley et al. 2010) and by 2012, maintaining the slot limit for Largemouth Bass and removing the slot limit for Alabama Bass in 2006 was found to have a positive effect on black bass populations (Holley et al. 2012). As of 2018, the slot limit on Largemouth Bass and the removal of the slot limit on Alabama Bass in 2006 have continued to yield positive results, indicated by a greater relative density of slot-sized or larger Bass (Hartline et al. 2018); however, annual Alabama Bass mortality appears to be high in Harris Reservoir and Largemouth Bass mortality is relatively low as compared to other reservoirs in the state as indicated by age distributions of sampled fish (ADCNR 2015).

Relative weight of black bass species in the reservoir is low. This low condition rating is likely associated with the relatively low primary productivity of Harris Reservoir (ADCNR 2016a). Primary productivity can be defined as the rate at which biomass is produced by the conversion of inorganic substrates into organic substances. In Harris Reservoir, this refers to the number of photosynthetic organisms at the bottom of the food web.

In 2015, Black Crappie (*Pomoxis nigromaculatus*) were sampled to investigate low catch rates reported in 2010 creel surveys (Holley et al. 2010, Hartline et al. 2018). Black Crappie were found in large numbers in the Harris Reservoir and exhibited much better growth and size structure than crappie (Pomoxis spp.) in the Tallapoosa River near Foster's Bridge, which was attributed to more abundant habitat and forage availability in the reservoir (Hartline et al. 2018).

ADCNR has historically provided supplemental stocking of sport fish to Harris Reservoir. During 1983 and 1984, ADCNR stocked White Bass x-Striped Bass (*Morone chrysops x Morone saxatilis*) hybrids, Largemouth Bass, Channel Catfish (*Ictalurus punctatus*), and Bluegill in Harris Reservoir (ADCNR 1983 and 1984). Currently, the reservoir provides a fishery for crappie, catfish, White Bass (*Morone chrysops*), and sunfish species, along with Largemouth Bass; however, Striped Bass (*Morone saxatilis*) and hybrids are not commonly observed in the reservoir. There are fish consumption advisories for Blue Catfish (*Ictalurus furcatus*) (2 meals per month) and Alabama Bass (1 meal per month) associated with mercury contamination due to atmospheric deposition (AL Dept of Public Health 2020). A list of fish species documented in Harris Reservoir, as well as in the reaches upstream and downstream of the reservoir, is presented in Table 9-1.

Table 9-1 Fishes Known or Expected to Occur in the Lake Harris Project Vicinity

FAMILY	COMMON NAME	SCIENTIFIC NAME
Petromyzontidae (Lampreys)	Southern Brook Lamprey	*Ichthyomyzon gagei*
Amiidae (Bowfins)	Bowfin	*Amia calva*
Clupeidae (Herrings and Shads)	Blueback Herring	*Alosa aestivalis*
	Gizzard Shad	*Dorosoma cepedianum*
	Threadfin Shad	*Dorosoma petenense*
Cyprinidae (Minnows and Carps)	Largescale Stoneroller	*Campostoma oligolepis*
	Alabama Shiner	*Cyprinella callistia*
	Tallapoosa Shiner	*Cyprinella gibbsi*
	Blacktail Shiner	*Cyprinella venusta*
	Common Carp	*Cyprinus carpio*
	Lined Chub	*Hybopsis lineapunctata*
	Striped Shiner	*Luxilus chrysocephalus*
	Bandfin Shiner	*Luxilus zonistius*
	Pretty Shiner	*Lythrurus bellus*
	Speckled Chub	*Macrhybopsis aestivalis*
	Coosa Chub	*Macrhybopsis etnieri*
	Bluehead Chub	*Nocomis leptocephalus*
	Golden Shiner	*Notemigonus crysoleucas*
	Longjaw Minnow	*Notropis amplamala*
	Emerald Shiner	*Notropis atherinoides*
	Rough Shiner	*Notropis baileyi*
	Silverstripe Shiner	*Notropis stilbius*
	Weed Shiner	*Notropis texanus*
	Coosa Shiner	*Notropis xaenocephalus*
	Riffle Minnow	*Phenacobius catostomus*
	Fathead Minnow	*Pimephales promelas*
	Bullhead Minnow	*Pimephales vigilax*
	Creek Chub	*Semotilus atromaculatus*
	Dixie Chub	*Semotilus thoreauianus*
Catostomidae (Suckers)	Alabama Hog Sucker	*Hypentelium etowanum*
	Spotted Sucker	*Minytrema melanops*
	River Redhorse	*Moxostoma carinatum*
	Black Redhorse	*Moxostoma duquesnei*
	Golden Redhorse	*Moxostoma erythrurum*
	Blacktail Redhorse	*Moxostoma poecilurum*
Ictaluridae (Catfishes)	Snail Bullhead	*Ameiurus brunneus*
	Black Bullhead	*Ameiurus melas*
	Yellow Bullhead	*Ameiurus natalis*
	Brown Bullhead	*Ameiurus nebulosus*

FAMILY	COMMON NAME	SCIENTIFIC NAME
	Blue Catfish	*Ictalurus furcatus*
	Black Madtom	*Ictalurus punctatus*
	Speckled Madtom	*Noturus leptacanthus*
	Flathead Catfish	*Pylodictis olivaris*
Fundulidae (Topminnows and Killifishes)	Stippled Studfish	*Fundulus bifax*
	Blackspotted Topminnow	*Fundulus olivaceus*
Poeciliidae (Livebearers)	Western Mosquitofish	*Gambusia affinis*
	Tallapoosa Sculpin	*Cottus tallapoosae*
Moronidae (Temperate Basses)	White Bass	*Morone chrysops*
	Striped Bass	*Morone saxatilis*
	White Bass X Striped Bass Hybrid	*Morone chrysops x saxatilis*
Centrarchidae (Sunfishes)	Shadow Bass	*Ambloplites ariommus*
	Redbreast Sunfish	*Lepomis auritus*
	Green Sunfish	*Lepomis cyanellus*
	Warmouth	*Lepomis gulosus*
	Bluegill	*Lepomis macrochirus*
	Longear Sunfish	*Lepomis megalotis*
	Redear Sunfish	*Lepomis microlophus*
	Redspotted Sunfish	*Lepomis miniatus*
	Tallapoosa Bass	*Micropterus tallapoosae*
	Alabama Bass	*Micropterus henshalli*
	Largemouth Bass	*Micropterus salmoides*
	White Crappie	*Pomoxis annularis*
	Black Crappie	*Pomoxis nigromaculatus*
Percidae (Perches)	Lipstick Darter	*Etheostoma chuckwachatte*
	Goldstripe Darter	*Etheostoma parvipinne*
	Speckled Darter	*Etheostoma stigmaeum*
	Gulf Darter	*Etheostoma swaini*
	Tallapoosa Darter	*Etheostoma tallapoosae*
	Mobile Logperch	*Percina kathae*
	Blackbanded Darter	*Percina nigrofasciata*
	Bronze Darter	*Percina palmaris*
	Muscadine Bridled Darter	*Percina smithvanizi*

Source: Travnichek and Maceina 1994, Mettee et al. 1996, Auburn University 2020

9.1.2.2 Entrainment

The rate of fish entrainment at Harris Dam was estimated under current operations using a database of fish entrainment information from Electric Power Research Institute (EPRI)

(Kleinschmidt 2018d). Over the past 23 years, FERC has accepted the practice of using fish entrainment and mortality study data from regionally similar projects as surrogate data for new or existing hydropower projects. Licensees have performed desktop studies in more than 15 states. In each desktop study, the state and federal agencies were able to use the study results to assist in determining the impact of hydropower operations on the reservoir fishery community and identify appropriate protection, mitigation, or enhancement measures. In addition to the examples in Alabama, this same methodology has been used throughout Georgia and South Carolina at multiple hydropower projects. This method is much safer, less costly, and when performed in coordination with the state and federal agencies, provides the analysis required by the National Environmental Policy Act. measures.

Information used for the study was derived from specific studies on projects similar to Lake Harris regarding geographic location, station hydraulic capacity, station operation, number and dimensions of trash racks including the bar spacing, intake approach velocity and through-rack velocity and fish information (species, assemblage, water quality) that had available entrainment data. Applicable trashrack data specific to the Harris Project is provided in Table 9-2. Estimated turbine-induced mortality rates were applied to fish entrainment estimates to determine potential fish mortality (Kleinschmidt 2018d).

Table 9-2 Harris Dam Trashracks

# Trashracks	Trashrack Dimensions	Bar Spacing	Velocity	
			Approach	Through-rack
30	27 ft 9 in X 11 ft	6 in on center	Best Gate: 2.41 ft/sec Full Gate: 2.97 ft/sec	Best Gate: 3.56 ft/sec Full Gate: 4.38 ft/sec

Fish entrainment is estimated to be highest during the winter (263,847 fish entrained) and lowest during the summer (3,714 fish entrained) (Table 9-3). Clupeids (Gizzard Shad [*Dorosoma cepedianum*] and Threadfin Shad [*Dorosoma petenense*]) comprised most of estimated fish losses associated with entrainment at the Harris Project (Table 9-4). Details about the entrainment and mortality at the Harris Project are included in the *Desktop Fish Entrainment and Turbine Mortality Report* (Kleinschmidt 2018d).

Table 9-3 Estimated Seasonal Number of Entrained Fish by Family/Genus Group at the Harris Project

Family/Genus Group	Winter	Spring	Summer	Fall	Total
Catostomidae	18	9	1	0	28
Sunfish	461	1,479	468	158	2,566
Bass	5	51	2	5	63
Clupeidae	253,752	13,649	3,108	8,926	279,435
Cyprinidae	287	154	22	68	531
Ictaluridae	9,324	231	113	2,136	11,804
Total	**263,847**	**15,573**	**3,714**	**11,293**	**294,427**

Source: Kleinschmidt 2018d

Table 9-4 Estimated Number of Entrained Fish Lost Due to Turbine Mortality by Season and Family/Genus Group at the Harris Project

Family/Genus Group	Winter	Spring	Summer	Fall	Total
Catostomidae	5	2	0	0	7
Sunfish	135	483	152	44	814
Bass	2	16	0	2	20
Clupeidae	13,606	734	169	488	14,997
Cyprinidae	45	25	3	10	83
Ictaluridae	2,273	55	28	531	2,887
Total	**16,066**	**1,315**	**352**	**1,075**	**18,808**

Source: Kleinschmidt 2018d

9.1.2.3 Temperature

Alabama Power collected monthly vertical dissolved oxygen and temperature profiles in Harris Reservoir at the forebay (i.e., just upstream of Harris Dam) from March through October each year from 2017 to 2020 (Figure 9-1).[27] Due to high flows, Alabama Power was unable to collect vertical profile data in September 2017. Average surface water temperatures ranged from a low of 14.8 degrees Celsius (°C) in March to a high of 30.4 °C in August. Average water temperatures at a depth of 30 feet (approximate depth of Harris intake with skimmer weir fully raised) ranged from a low of 12.5 °C in March to a high of 23.8 °C in September (Kleinschmidt 2021b).

[27]Alabama Power verified the temperature data filed August 16, 2021 (Accession Number 20210816-5246) as correct and was used in this analysis.

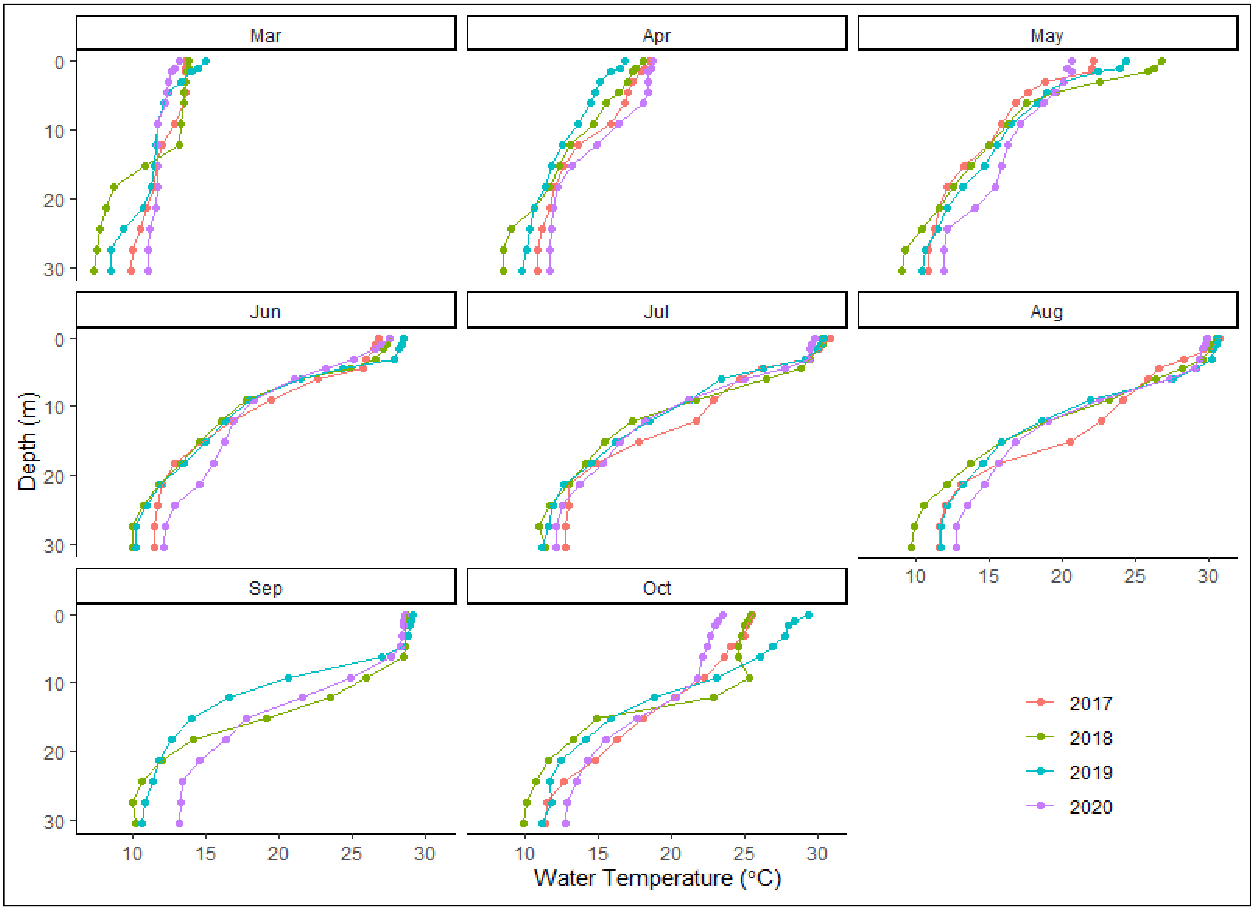

Figure 9-1 Vertical Water Temperature Profiles in Harris Reservoir at Dam Forebay

9.1.2.4 Benthic Macroinvertebrates

There is no existing information on benthic macroinvertebrates in Lake Harris.

9.1.3 Tallapoosa River Downstream of Harris Dam

9.1.3.1 Fish Community

Historically, Sport fish species (including black bass and sunfish) have been present downstream of the Harris Dam (Travnichek and Maceina 1994). Alabama Power and ADCNR funded research to assess the effects of Green Plan (baseline) operations on the fishery in the Tallapoosa River downstream of Harris Dam. During that assessment, ACFWRU conducted fish assemblage studies from 2005 to 2015. These efforts are described in greater detail in a 2018 report entitled *Summary of R.L. Harris Downstream Flow Adaptive Management History and Research* (Kleinschmidt 2018a).

The ACFWRU performed fishery surveys at six sites using prepositioned electrofishing grids one to two times per year, typically in the late spring or early summer and/or late summer or fall. The methods utilized during the study generally collected fish in riffle and run habitats, as opposed to pools and backwaters. Four of the sites were located on the Tallapoosa River between Harris Dam and Lake Martin: Malone, Wadley, Griffin Shoals, and Peters Island (known collectively as Middle Tallapoosa) (Table 9-5). Two unregulated sites were sampled as reference sites – one upstream of Harris on the Tallapoosa River near Heflin, Alabama (Upper Tallapoosa) and one on Hillabee Creek, a tributary to the Tallapoosa River near Alexander City, Alabama.

The ACFWRU collected 45 fish species at the Hillabee Creek site, 43 species at the Middle Tallapoosa sites, and 42 species at the Upper Tallapoosa site. The most abundant species collected from 2005 through 2015 included Alabama Shiner (*Cyprinella callistia*) (n=12,949), Lipstick Darter (*Etheostoma chuckwachatte*) (n=12,710), and Bronze Darter (*Percina palmaris*) (n=11,730). Combined, these three species comprised approximately 50 percent of all fish collected (Table 9-5).

The most abundant species collected during the study were generally abundant both upstream and downstream of Harris Dam. However, Threadfin Shad were only observed downstream of Harris Dam. Sport fish species collected downstream of Harris Dam included Channel Catfish, Bluegill, Redbreast Sunfish (*Lepomis auritus*), Flathead Catfish (*Pylodictis olivaris*), and Largemouth Bass. Ictalurids collected during the study include Speckled Madtom (*Noturus leptacanthus*), Black Madtom (*Noturus funebris*), Channel Catfish, and Flathead Catfish (Irwin 2016). Reaches of Hillabee Creek sampled during the study had a similar species composition to the upstream and downstream sites, with cyprinids and percids as the most abundant species collected across years and sites.

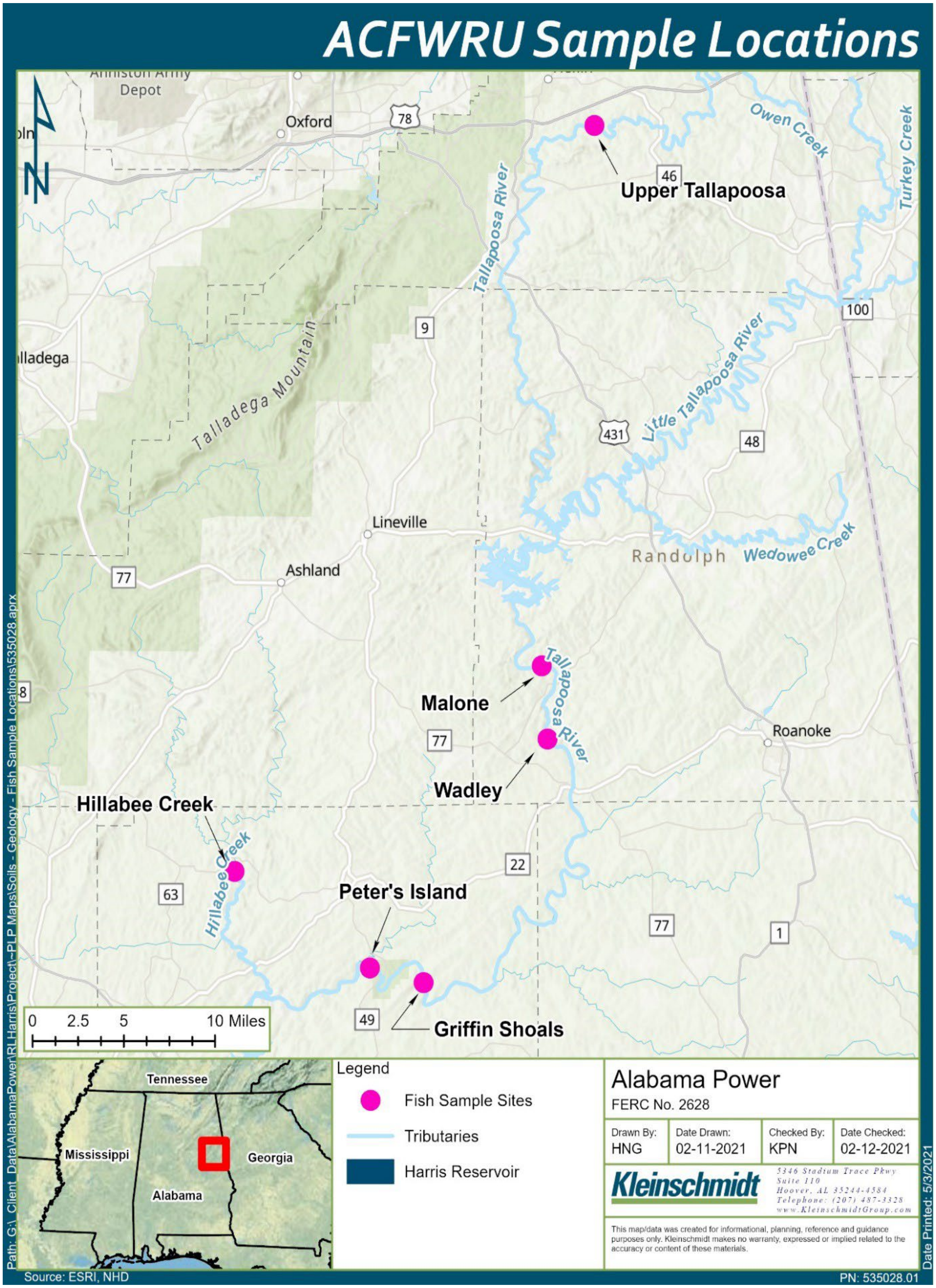

Figure 9-2 ACFWRU Fish Sampling Locations

Table 9-5 Relative Abundance of 10 Most Common Fish Species Collected During ACFWRU Surveys, 2005-2015

Common Name	Upper Tallapoosa (Upstream)	Middle Tallapoosa (Downstream)	Hillabee Creek	Total
Alabama Shiner	12.59%	21.22%	16.92%	17.16%
Lipstick Darter	11.45%	19.64%	18.85%	16.84%
Bronze Darter	8.30%	25.72%	10.90%	15.54%
Largescale Stoneroller	16.01%	3.56%	7.45%	8.67%
Bullhead Minnow	12.59%	0.42%	8.32%	6.74%
Speckled Darter	11.89%	3.18%	3.67%	6.04%
Tallapoosa Shiner	3.10%	1.47%	9.27%	4.48%
Muscadine Darter	3.55%	6.01%	2.68%	4.18%
Silverstripe Shiner	1.87%	3.06%	6.02%	3.64%
Alabama Hog Sucker	6.43%	2.56%	1.29%	3.36%

Source: Alabama Power and Kleinschmidt 2018

Alabama Power sampled fish communities in 2017 and 2018 using standardized methods developed by GSA and ADCNR known as the "30+2" method (GSA 2011). Samples were collected at sites along the Middle Tallapoosa within reaches historically referred to as "Malone" and "Wadley" in the spring and fall and at the Upper Tallapoosa site in July and October. A total of 31 species representing 8 families were collected at the Middle Tallapoosa sites during the spring and fall of 2017 and 2018, combined, compared with a total of 33 species, representing 8 families, collected at the Upper Tallapoosa site. The most common species collected along the Middle Tallapoosa were the Lipstick Darter (n=212), Bronze Darter (n=175), and Redbreast Sunfish (n=150). The most common species collected at the upstream site were Speckled Darter (*Etheostoma stigmaeum*) (n=163), Tallapoosa Shiner (*Cyprinella gibbsi*) (n=101), Muscadine Darter (*Percina smithvanizi*) (n=88), Redbreast Sunfish (n=87), and Lipstick Darter (n=63). Index of Biotic Integrity (IBI) scores at the Middle Tallapoosa sites during the spring and fall ranged from 30 (Poor) to 40 (Fair). Scores at the upstream site were 32 (Poor) to 42 (Fair).

Auburn University performed fish assemblage studies in 2019 and 2020 for the Aquatic Resources Study at Horseshoe Bend, Wadley, the Harris Dam tailrace, and an unregulated reference site approximately 4 miles upstream of Lee's Bridge (Alabama Power and Kleinschmidt 2021). Unlike the reach referred to as Wadley by Alabama Power's sampling, Auburn University's Wadley site was near the Wadley bridge. Standardized boat and barge electrofishing was determined by Auburn University to be more feasible than wadeable 30+2 sampling due to depth and flow at the sampling sites. Alabama Power provided

Auburn University's draft study proposal to ADCNR by email on Thursday, April 5, 2018. The draft proposal stated that fish sampling would be performed quarterly using electrofishing gear selected based on Auburn University's ability to access the tailrace. It was proposed that an electrofishing boat or an inflatable boat/electrofishing gear provided by Alabama Power would be used. Alabama Power, Auburn, and ADCNR met to discuss the draft proposal, including sampling protocol, on April 24, 2018.

A revised proposal reiterated that Auburn University would sample fish quarterly, specifically by standardized boat electrofishing sampling. Alabama Power provided Auburn University's revised proposal to ADCNR on Wednesday, August 1, 2018. Subsequent to the revised proposal, Auburn University expanded sampling to bi-monthly events and determined that boat-mounted electrofishing would not be feasible in the shallow habitat of the tailrace, and because there are non-wadeable areas of the tailrace, a barge electrofishing unit was used in the tailrace to sample both wadeable and non-wadeable habitat.

The Final Aquatic Resources Study Plan stated that wadeable, shallow water habitats would be sampled by the 30+2 method; however, Auburn University had already determined after joint field sampling was conducted that boat and barge electrofishing could sample both deep pools and shallow shoal areas, resulting in a more representative sample Although the ISR correctly describes the standardized sampling efforts as six, 10-minute sampling transects, it mistakenly does not list the deviation from standardized 30+2 sampling as a variance from the Final Aquatic Resources Study Plan. The ISR meeting presentation incorrectly reported that wadeable 30+2 sampling was being performed in addition to boat electrofishing. The change from the 30+2 method was presented as a part of the June 2, 2020 presentation of the Auburn University interim/progress report. No comments or concerns were provided in response to this change. Auburn University sampling procedure covered more area than the standard 30+2 method, integrating both shallow water and deeper water habitats, while still providing data desired by stakeholders. Furthermore, Auburn University determined that the 30+2 method was not feasible at the study sites but found that boat and barge electrofishing equipment were effective at reaching shallow habitat. Deep and shallow water habitats were not analyzed separately but were both incorporated into analysis to provide an overall picture of community structure in the Tallapoosa River. Additionally, previous comments from ADCNR regarding the use of the 30+2 method were addressed in the *Final Aquatic*

Resources Report filed with FERC on April 12, 2021 and Alabama Power's response provided to ADCNR on June 4, 2021 and filed with FERC on June 15, 2021.

During Auburn University's bimonthly sampling, a total of 57 species were collected, with 20 occurring at all four sites. Species richness was lowest at Horseshoe Bend (35) and greatest at the reference site and the tailrace (39). Shannon's diversity index (H) scored highest at Wadley (2.90) and lowest at Horseshoe Bend (2.56). Four species were unique to Horseshoe Bend, one species was unique to Wadley, five species were unique to the Harris Dam tailrace, and seven species were unique to the reference site near Lee's Bridge (Alabama Power and Kleinschmidt 2021).

The different sampling protocols used by the ACFWRU, Alabama Power, and Auburn University provide different implications regarding the fish community downstream of Harris Dam. The prepositioned electrofishing grids utilized by the ACFWRU are best for sampling riffles and runs and not pools. This sampling protocol was appropriate to accomplish their study's goal of specifically studying shoal-dwelling fishes. The wadeable 30+2 method utilized by Alabama Power which incorporates 10 riffle samples, 10 run samples, 10 pool samples (or proportionally for a total of 30 samples), and 2 shoreline samples is a standardized method used to gather data to conduct an IBI, which is a method for evaluating stream health by assessing the fish community (O'Neil et al. 2006). Alabama Power sampled sites within reaches historically referred to as Malone and Wadley, where this method of sampling was feasible. Because 30+2 IBI sampling was not feasible at the Auburn University sampling sites and had been used to evaluate stream health as recently as 2017 and 2018, Auburn University utilized different standardized protocols using boat-mounted and barge electrofishing to quantify the fish community across a gradient downstream from the Harris Dam tailrace and at the upstream reference site near Lee's Bridge. The electrodes of the boat-mounted electrofishing unit were able to sample both the deep, non-wadeable waters and extend over shallow shoal areas at the Horseshoe Bend, Wadley, and Lee's Bridge locations to collect a representative sample of both deep and shallow water habitat. Due to the relatively shallow habitat of the tailrace, boat-mounted electrofishing was not possible at this site, and the barge electrofishing unit was used to cover both deeper and shallower areas of the tailrace[28]. Auburn University sampling occurred bimonthly instead of once or twice a year and

[28] Although there are some differences in boat-mounted and barge electrofishing gear (e.g., voltage/amperage, mobility), differences in fish community at the tailrace compared to other sites cannot simply be attributed to the two different types of gear used. Much of the difference can likely be attributed to the difference in habitat in the tailrace, which was the reason a different gear type was selected for this site.

provided representative samples during each season at each site. The results of the ACFWRU, Alabama Power, and Auburn University sampling yielded results that should not be compared to each other due to the differing sampling protocols; however, these protocols could be replicated at future dates to measure change over time.

As part of their fish community assessment, Auburn University also gathered telemetry data to determine whether fish behavior in the Tallapoosa River downstream of Harris Dam is affected by fluctuating flows. The Final Aquatic Resources Study Plan and Auburn University study proposal stated telemetry would be performed by electromyogram (EMG) coded radio tags. The EMG tags would measure fish movement, including tail-beat frequency, to provide an in-situ measure of energy expenditures across the range of flow conditions experienced during baseline Harris Dam operations for use in bioenergetics models; however, preliminary work determined that EMG tags did not provide an accurate representation of muscle activity. Combined acoustic and radio tags (CARTs) were presented as a potential alternative to EMG tags in the ISR and were subsequently used instead to track fish movement, as presented in the *Draft Aquatic Resources Study Report* and November 5, 2020 HAT 3 meeting. Thirteen Alabama Bass and three Tallapoosa Bass were implanted with tags between the tailrace and Malone, and fish movement was monitored continuously with stationary acoustic receivers and at weekly intervals with manual tracking. Ideally, EMG tags would have provided adequate representation of muscle activity and valuable energy expenditure inputs for the bioenergetics model, but the telemetry results using the CARTs provided information on fish movement downstream of Harris Dam. Results suggested fish movement upstream and downstream within the river was minimally influenced by peaking operations of Harris Dam and fish were regularly detected within the same general areas (maximum movement was 6.2 km). Manual tracking data suggested that fish closer to Harris Dam may move somewhat less than fish further downstream.

In addition to evaluating the fish community, Auburn University integrated published data, field sampling, and laboratory investigations into a bioenergetics modeling framework to describe the potential impacts of fluctuating flow and temperature on the performance of select target species downstream of Harris Dam. Target species were selected in consultation with stakeholders during the relicensing process for Harris Dam and included Channel Catfish, Redbreast Sunfish, Alabama Bass, and Tallapoosa Bass (*Micropterus tallapoosae*). Auburn University used the fish bioenergetics model Fish Bioenergetics 4.0 (Deslauriers et al. 2017) to simulate growth of target species. Auburn

University provided input data such as fish growth (length-at-age, caloric density, and reproduction from target species gathered in the field), diet (prey type and caloric density of prey items from stomach contents of target species gathered in the field), water temperature gathered from historical data, and water velocity measured in the Tallapoosa River downstream of Harris Dam. Energy density of prey items were gathered from publications (Hanson et al. 1997; Martin 2008). To test the ability of the model for each species to reproduce the respiration rates that Auburn University measured in the lab, 1-day simulations were run for each fish that had been tested in the laboratory using the test temperature (10 or 21 C) and fish weight.

Growth over a period of 1 month was tested using temperatures recorded in the field and diets collected from field data. Hourly temperatures from the tailrace and Horseshoe Bend from mid-July to mid-August were used in growth simulations for fish ages 1, 3, and 5. To simulate downstream conditions during a release from Harris Dam, water temperature was rapidly lowered by 5 °C[29] during three 1-hour periods in a single day simulation. While temperature was lowered, activity rate was increased to 1.307, 2.009, and 2.03 for fish ages 1, 3, and 5, respectively. These activity rates were gathered during respirometry tests using water velocities typical of Horseshoe Bend during generation. No simulations were conducted using tailrace conditions since tailrace velocities exceeded U_{crit}[30] rates for the target species. The only species with models that accurately predicted respiration rates was Redbreast Sunfish. Age-1 fish lost approximately 0.41 percent of body weight during generation and lost 0.43 percent in non-generation, or 0.02 percent less during generation. Age-3 fish lost approximately 0.39 percent body weight during generation and 0.33 percent during non-generation, and age-5 fish lost approximately 0.38 percent body weight during generation and 0.33 percent during non-generation. Simulated generation may have had a slight positive effect on growth of age-1 Redbreast Sunfish. The slight negative effect on age-3 and age-5 Redbreast Sunfish may have been due to the larger body sizes of the fish and the extra energy expenditure required to maintain position during increased flows outweighing the benefits of the cooler temperature. Auburn University noted that these slight changes in growth rates would have multiplicative impacts over longer periods. However, the model assumed that fish do not take shelter from increased flow and that generation events caused hourly decreases in

[29] Auburn University wanted to test the more extreme fluctuations seen downstream of Harris Dam, so 5 °C decreases in temperature were used to simulate releases.

[30] Critical swimming speed, or U_{crit}, is a measure of the time and velocity at which a fish becomes fatigue and can no longer swim (Alabama Power and Kleinschmidt 2021).

temperature of 5 °C, when 99.71 percent of actual hourly temperature fluctuations were found to be < 2 °C changes (Alabama Power and Kleinschmidt 2021).

9.1.3.2 Temperature

Water temperatures in the Tallapoosa River below Harris Dam are generally coldest in January and warmest in August. Alabama Power collected water temperature data March to October from 2000 to 2018 in the tailrace, 7, and 14-miles downstream of Harris Dam. Those data indicate water temperatures in the tailrace are slightly cooler than downstream locations during most months. Daily average water temperatures reach a maximum of approximately 26 °C in August at the downstream locations, with a maximum of 24 °C in the tailrace. Monthly average water temperatures at each of these three locations are provided in Table 9-6. For comparison, monthly average water temperature data from the unregulated sites on the Tallapoosa River (Heflin) and Little Tallapoosa River (Newell) upstream of Lake Harris are also provided.

Table 9-6 Monthly Average Water Temperatures in the Tallapoosa River and Little Tallapoosa River

Month	Tailrace[1]	7 Miles Downstream of Harris Dam[1]	14 Miles Downstream of Harris Dam[1]	Heflin[2]	Newell[2]
Mar	11.2	11.7	11.9	13.2	13.9
Apr	14.8	15.5	16.1	16.1	16.9
May	17.8	18.9	19.7	20.5	21.3
Jun	20.7	22.5	23.4	23.6	24.2
Jul	22.7	24.5	25.3	26.0	26.4
Aug	24.0	25.4	26.1	25.9	26.1
Sep	23.5	24.1	24.5	24.6	24.5
Oct	20.7	20.0	20.0	18.5	19.5

Source Alabama Power and Kleinschmidt 2021

[1] 2000 – 2018

[2] 2018 – 2020

9.1.3.3 Migratory Fish

Alabama Power owns four hydroelectric developments (Harris Dam, Martin Dam, Yates Dam, and Thurlow Dam) on the Tallapoosa River upstream of its confluence with the Coosa River, which are located on the Tallapoosa River at RM 139.1; RM 60.6; RM 52.7;

and RM 49.7, respectively. In addition to the dams, Tallassee Falls, a natural bedrock outcrop, exists between RM 49 and RM 47. The river channel drops approximately 9 feet in elevation over this 2-mile section. This change in elevation was likely a natural barrier to fish movement even before the impoundments were built. None of the dams on the Tallapoosa River have locks that allow passage for fish. Use of the Tallapoosa River by migratory fish species has been impeded or blocked by the construction of navigation and hydropower projects in the Alabama River system including the USACE Claiborne Dam and Millers Ferry Dam. Mettee et. al. (1996) noted that there are 144 species of fish in the Alabama River, and 30 of these species are migratory Table 9-7 lists the anadromous, catadromous, and diadromous fish species collected during those surveys or believed by the USFWS to be present in the Tallapoosa River below Thurlow Dam (Alabama Power and Kleinschmidt 2018). Alabama Power conducted fisheries studies periodically between 1984 – 2015 in the Tallapoosa River downstream of Thurlow Dam.

Table 9-7 Anadromous, Catadromous, and Diadromous Fish Species Collected or Believed to be Present in the Alabama River and the Tallapoosa River Downstream of Thurlow Dam

Species		Movement	Alabama River	Tallapoosa River
Common Name	Scientific Name			
Alabama Hog Sucker	*Hypentelium etowanum*	Diadromous	X	
Alabama Shad	*Alosa alabamae*	Anadromous	X	X
Alabama Sturgeon	*Scaphirhynchus suttkusi*	Diadromous	X	X
Alligator Gar	*Lepisosteus spatula*	Diadromous	X	
American Eel	*Anguilla rostrata*	Catadromous	X	X
Atlantic Needlefish	*Strongylura marina*	Diadromous	X	
Black Redhorse	*Moxostoma duquesnei*	Diadromous	X	
Blacktail Redhorse	*Moxostoma poecilurum*	Diadromous	X	
Blue Catfish	*Ictalurus furcatus*	Diadromous	X	
Channel Catfish	*Ictalurus punctatus*	Diadromous	X	
Flathead Catfish	*Pylodictis olivaris*	Diadromous	X	
Freshwater Drum	*Aplodinotus grunniens*	Diadromous	X	
Golden Redhorse	*Moxostoma erythrurum*	Diadromous	X	
Gulf Sturgeon	*Acipenser oxyrinchus desotoi*	Anadromous	X	
Highfin Carpsucker	*Carpiodes velifer*	Diadromous	X	
Hogchoker	*Trinectes maculatus*	Diadromous	X	
Largemouth Bass	*Micropterus salmoides*	Diadromous	X	
Mooneye	*Hiodon tergisus*	Diadromous	X	X
Paddlefish	*Polyodon spathula*	Diadromous	X	X
Quillback	*Carpiodes cyprinus*	Diadromous	X	
River Redhorse	*Moxostoma carinatum*	Diadromous	X	X
Skipjack Herring	*Alosa chrysochloris*	Diadromous	X	X
Smallmouth Buffalo	*Ictiobus bubalus*	Diadromous	X	
Spotted Bass	*Micropterus punctulatus*	Diadromous	X	
Spotted Sucker	*Minytrema melanops*	Diadromous	X	
Southeastern BlueSucker	*Cycleptus meridionalis*	Diadromous	X	X
Southern Walleye	*Sander vitreus*	Diadromous	X	X
Striped Bass	*Morone saxatilis*	Anadromous	X	
Striped Mullet	*Mugil cephalus*	Diadromous	X	
White Bass	*Morone chrysops*	Diadromous	X	

Source: Mettee et al. 1996, Alabama Power 2011

9.1.3.4 Benthic Macroinvertebrates

ADEM sampled the benthic macroinvertebrate community in the Tallapoosa River at Wadley, Alabama, in July 2010, using standardized methodology. Sample results indicated a total of 38 taxa, with 11 of those taxa in the EPT orders (i.e., Ephemeroptera, Plecoptera, Trichoptera species). Based on metrics that compare sample results to those expected for the region, this sample was assessed a rating of Fair/Poor (ADEM 2010).

ACFWRU collected benthic macroinvertebrate samples using a surber sampler at the same six sites as fish were sampled. Analyses were conducted on sub samples collected during 2005 and 2014. ACFWRU identified a total of 151 taxa in the 2005 and 2014 samples, 62 of which were from the family Chironomidae.

Table 9-8 provides a summary of the benthic macroinvertebrate taxa by class and order. Generally, more individuals and taxa were collected in 2005 samples versus 2014. Differences in species composition between sites and years were variable. At the unregulated sites (Heflin and Hillabee), Plecoptera (Stoneflies) made up a larger percentage of insect order composition in comparison with the regulated sites (Malone and Wadley). The unregulated sites appeared to consist of a higher percentage of Ephemeroptera (mayflies) in comparison with the regulated sites (Kleinschmidt 2018a). Total macroinvertebrate abundance was highest in 2005 at the regulated site nearest Harris Dam (Malone).

Table 9-8 Number of Individual Benthic Macroinvertebrates Collected by Taxon in 2005 and 2014

	Heflin		Hillabee		Malone[1]		Wadley[2]	
Taxa	**2005**	**2014**	**2005**	**2014**	**2005**	**2014**	**2005**	**2014**
Arachnida								
Trombidiformes	10		6		16	5	5	2
Bivalvia								
Veneroida	12	3	11	21	72	5	38	12
Clitellata								
Lumbriculida	1	2			37	37	17	16
Tubificida	17	4	12	8	216	28	19	17
Gastropoda								
Basommatophora	16							
Neotaenioglossa	5	27	6	95	1	3	90	14
Insecta								
Coleoptera	14	97	85	170	49	25	15	25
Diptera	331	23	230	87	648	113	109	96
Ephemeroptera	43	9	125	52	111	150	70	228
Megaloptera	1	2	3	1			2	
Odonata	2	1	5			1		1
Plecoptera	55	34	56	59	5		2	4
Trichoptera	53	22	129	19	103	96	56	29
Malacostraca								
Amphipoda					1			
Isopoda					5			
Nematoda	2		4		10		1	1
Turbellaria								
Tricladida					12			2
Total	**562**	**224**	**672**	**512**	**1286**	**463**	**424**	**447**

Source: Kleinschmidt 2018a

[1] Seven miles downstream of Harris Dam
[2] Fourteen miles downstream of Harris Dam

An estimated nine crustacean species in the Upper and Middle Tallapoosa River Basins have been reported in ADCNR's Natural Heritage Database (Table 9-9). One species, the Virile Crayfish (*Orconectes virilis*), was reported only in the Upper Tallapoosa River Basin and two species, the Jewel Mudbug (*Lacunicambarus dalyae*) and the Grainy Crayfish (*Procambarus verrucosus*), were reported only in the Middle Tallapoosa River Basin (ADCNR 2020a, Johnson 1997). A list of state protected species is provided in Appendix E.

Table 9-9 Crustacean Species Reported in the Upper and Middle Tallapoosa River Basins

COMMON NAME	SCIENTIFIC NAME	PRE-DAM	PRE-GREEN PLAN	GREEN PLAN
Tallapoosa Crayfish	*Cambarus englishi*	UM	UM	UM
Slackwater Crayfish	*Cambarus halli*	UM	UM	UM
Variable Crayfish	*Cambarus latimanus*	UM	UM	UM
Ambiguous Crayfish	*Cambarus striatus*	UM		UM
Jewel Mudbug	*Lacunicambarus dalyae*		M	
Reticulate Crayfish	*Orconectes erichsonianus*		UM	
Virile Crayfish	*Orconectes virilis*			U
White Tubercled	*Procambarus spiculifer*	UM	UM	UM
Grainy Crayfish	*Procambarus verrucosus*			M

Source: ADCNR 2020a, Johnson 1997

Note: Upper Tallapoosa Basin (U), Middle Tallapoosa Basin (M)

9.2 Environmental Analysis

Alabama Power conducted relicensing studies and associated analyses that pertain to effects on fish and aquatic resources. Those analyses are presented in the following reports.

- Final Threatened and Endangered Species Study Report
- Final Downstream Release Alternatives Phase 2 Study Report
- Final Operating Curve Change Feasibility Analysis Phase 2 Study Report
- Final Aquatic Resources Study Report
- Final Downstream Aquatic Habitat Study Report
- Fish Entrainment and Mortality Desktop Assessment
- Final R.L. Harris 2018 Downstream Flow Adaptive Management History and Research Report

Table 9-10 includes the proposed operations and PME measures that may affect fish and aquatic resources at Skyline, Lake Harris, and the Tallapoosa River Downstream of Harris Dam. Not all operations or PME measures apply to each geographic area of the Harris

Project; therefore, the analysis of beneficial and adverse effects will be presented accordingly. A complete list of Alabama Power's operations and PME measures is located in Table 5-2.

Table 9-10 Proposed Operations and PME Measures That May Affect Fish and Aquatic Resources

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT FISH AND AQUATIC RESOURCES
• Continue to operate the Harris Project according to the existing operating curve. • Continue to operate in high flow conditions according to the USACE-approved flood control procedures in the Harris Water Control Manual (USACE 2022). • Continue daily peak-load operations. • Continue operating in accordance with ADROP (Alabama Power Company 2016) to address drought management.
• Install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs with a generating capacity of approximately 2.5 MW. Based on the preliminary design, the continuous minimum flow unit would require a new reinforced concrete addition located on the outside of the Unit 1 side (east side) of the powerhouse. The new steel-lined penstock would penetrate the existing Unit 1 penstock for source water and discharge below the tailrace water surface. • Develop drought operations procedures for the minimum flow. • Operate in accordance with Green Plan (baseline) during CMF unit outages and outages where the water supply to the Unit 1 penstock is affected.
• Develop and implement an Aquatic Resources Monitoring (ARM) Plan (Alabama Power 2021b) following implementation of the continuous minimum flow. Elements of the ARM Plan would include: ❖ Goals of the monitoring program. o To quantify the fish community at three sites downstream of Harris Dam and at a reference site upstream. Results will be used to compare the possible effects, if any, of the proposed CMF compared with baseline sampling conducted during relicensing. ❖ Preliminary criteria for determining success. o Patterns in fish community structure will be compared to the baseline established by the Auburn University fish community sampling. It is anticipated that fish community structure will show improvement (total species, total families, CPE, diversity) at downstream sites when compared to an upstream reference site or remain similar to baseline.

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT FISH AND AQUATIC RESOURCES
❖ Methods for monitoring aquatic resources. o Fish assemblage monitoring similar to the study conducted by Auburn University during relicensing. ❖ Number and general location of monitoring sites. o Three sites located downstream of Harris Dam (tailrace, Wadley, and Horseshoe Bend) and one upstream reference site (approximately 4 miles upstream of Lee's Bridge). ❖ Provisions for reporting. o Field collections and subsequent analysis will be summarized in a report that will be made available to resource agencies for review and discussed in a meeting the year following each collection cycle. Reports and meeting summaries will be filed with FERC. ❖ Monitoring and reporting frequency. o All four sites will be sampled for a total of three sample events. The first sample event will occur following license issuance and will begin 1 year after the minimum flow system is fully operational, with each subsequent event occurring on a 5-year interval. ❖ Schedule for developing and implementing the ARM Plan. o Within 9 months of license issuance, Alabama Power will develop the ARM Plan, consult with appropriate agencies, and file for FERC approval
• Develop and implement a Water Quality Monitoring Plan (Alabama Power 2022a) consistent with the 401 WQC. ❖ Goals of the monitoring. o To ensure compliance with applicable water quality standards and the conditions of the 401 WQC to be issued by ADEM. ❖ Anticipated water quality parameters to be monitored and methods for monitoring those parameters. o Alabama Power proposes to monitor dissolved oxygen and water temperature year-round in the Harris Project tailrace during periods of discharge associated with generation or minimum flow releases for the term of the new FERC license. o Although not a compliance point to determine if the turbine or minimum flow discharge is meeting the state standard, Alabama Power also proposes to monitor dissolved oxygen and water temperature year-round at two United States Geological Survey (USGS) gages on the Tallapoosa

Proposed Operations and PME Measures that May Affect Fish and Aquatic Resources
River downstream of Harris Dam (Malone USGS Site No. 02414300 and Wadley USGS Site No. 02414500) for the term of the new FERC license. ❖ The number and general locations of monitoring sites. o The number and general locations of the monitoring sites will be determined based on the requirements in ADEM's 401 WQC. Based on consultation with ADEM, Alabama Power proposes to monitor in the tailrace at the current site located approximately 800 feet downstream of the Harris Dam on the west bank of the river. Although not a compliance point, Alabama Power will also monitor dissolved oxygen and temperature year-round at the USGS gages on the Tallapoosa River at Malone (USGS Site No. 02414300) and Wadley (USGS Site No. 02414500). ❖ Provisions for reporting results and monitoring and reporting frequency. o Following license issuance and subsequent installation of the minimum flow unit, Alabama Power will provide annual tailrace monitoring data to ADEM and file with FERC following each monitoring year for the first three years. o Following the third full year of monitoring, Alabama Power will provide a Water Quality Assessment within six months, including if additional measures are needed, to ADEM for determination if the conditions of the WQC are being met. The assessment and ADEM consultation will be filed with FERC. o If after the initial three years of year-round monitoring ADEM determines that conditions of the WQC are not being met, Alabama Power will determine, in consultation with ADEM, additional ways to increase DO and file a plan with FERC for approval. In addition, at any point during the term of the license, Alabama Power and ADEM may work together to modify the year-round monitoring requirement. ❖ Schedule for developing and implementing the Water Quality Monitoring Plan. o Within 6 months of license issuance, Alabama Power will develop the Water Quality Monitoring Plan, consult with appropriate resource agencies, and file for FERC approval
• Continue operating the existing aeration system which was incorporated into the original turbine design.
• Incorporate an aeration system in the design of the new continuous minimum flow unit.

Proposed Operations and PME Measures that May Affect Fish and Aquatic Resources
• Continue to maintain the skimmer weir that was incorporated into the original design to allow the intake to draw from different layers in water column, providing for warmer releases with the added benefit of higher dissolved oxygen during periods of stratification. The skimmer weir will continue to be operated at the highest setting possible.
• When conditions exist, and upon request from ADCNR, hold Harris Reservoir water levels constant or slightly increasing for a 14-day period for spring spawning.
• Provide fish habitat improvements by adding habitat enhancements to Harris Reservoir, including but not limited to: ❖ Addition of fish attraction devices such as brush piles and other woody debris (recycled Christmas trees, felled trees) and synthetic materials (spider blocks, concrete, and PVC structures) in Harris Reservoir to provide cover for fish and to enhance angling opportunities in Harris Project waters.
• Finalize and implement a WMP (Alabama Power 2021e) for Lake Harris and Skyline. ❖ Consult with USFWS to develop measures protective of federally listed bats. ❖ Incorporate timber management into the WMP. o Including maintenance of gates and the construction/maintenance of logging roads. o Conduct surveys for Price's Potato-bean at the location of the extant population prior to timbering activities that may affect the extant population. Timbering crews will be notified of the location of any Price's Potato-bean prior to timbering activities. ❖ Maintain pollinator plots at Little Fox Creek. ❖ Continue to provide hunting opportunities to the public. ❖ Continue to manage approximately 105 acres of permanent openings to provide diverse habitat that benefits both game and nongame species. ❖ Continue to conduct property boundary maintenance, such as painting/marking of property lines. ❖ Schedule for revising and implementing the WMP. o Within 6 months of license issuance, Alabama Power will revise or update the WMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval
• Finalize and implement a Shoreline Management Plan (SMP) (Alabama Power 2022c) for Lake Harris.

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT FISH AND AQUATIC RESOURCES

- ❖ Incorporate proposed changes in land use classifications (including reclassifying the botanical area at Flat Rock Park from recreation to Natural/Undeveloped).
- ❖ Continue to encourage the use of alternative bank stabilization techniques other than seawalls.
- ❖ Continue implementing the Dredge Permit Program (Appendix A to the SMP).
- ❖ Continue implementing the Water Withdrawal Policy (Kleinschmidt 2018b).
- ❖ Continue implementing a shoreline classification system to guide management and permitting activities (Appendices C and D of the SMP).
- ❖ Continue the requirements of a scenic easement for the purpose of protecting scenic and environmental values.
- ❖ Continue the use of a "sensitive resources" designation in conjunction with shoreline classifications on Harris Project lands managed for the protection and enhancement of cultural resources, wetlands, and threatened and endangered species.
- ❖ Continue implementing a shoreline compliance program and shoreline permitting program.
- ❖ Continue to encourage the adoption of shoreline best management practices (BMPs), including BMPs to maintain and preserve naturally vegetated shorelines, to preserve and improve the water quality of the Harris Project's reservoir, and to control soil erosion and sedimentation (Appendix E of the SMP).
    - o Plant native trees, shrubs, and flowers for landscaping and gardens in order to reduce watering as well as chemical and pesticide use.
    - o Preserve or establish a naturally managed vegetative filter strip along the shoreline to keep clearing of native trees and vegetation to a minimum. Alabama Power recommends a buffer set back of at least 15 feet measured horizontally from the full pool elevation.
    - o Plant a low maintenance, slow growing grass that is recommended for your soil conditions and climate.
    - o Maintain the grass as high as possible in order to shade out weeds and improve rooting so less fertilizing and watering are required.
    - o Avoid dumping leaves or yard debris on or near the shoreline.
- ❖ Provide an update to the SMP every 10 years.
- ❖ Schedule for revising and implementing the SMP.
  Within 6 months of license issuance, Alabama Power will revise or update the SMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval

9.2.1 Skyline

9.2.1.1 Wildlife Management Plan/Timber Management

Alabama Power proposes to finalize and implement a WMP, including specific timber management actions and BMPs that would reduce or prevent runoff, erosion, and sedimentation that may impact streams and waterbodies within Skyline. Specifically, Alabama Power will continue to incorporate Alabama's Best Management Practices for Forestry as provided by the Alabama Forestry Commission. These practices include: the establishment of SMZs; avoidance of crossing of streams by roads, skid trails, or firebreaks when possible; when unavoidable, the utilization of the fewest possible steam crossings located where the bank and SMZ would be least disturbed; and the proper planning and location of roads (Alabama Forestry Commission 2021). These management activities would benefit soil resources and erosion by reducing runoff and disturbance which may indirectly improve fisheries habitats of lakes, rivers, and streams. Implementation of the WMP may have a beneficial effect on aquatic resources in Skyline, although Alabama Power does not have jurisdiction over any waterbody at Skyline.

9.2.2 Lake Harris

9.2.2.1 Continued Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. Maintaining the current operating curve and flood control procedures would cause no changes to the amount of littoral habitat available for fish spawning or for juvenile fish and mussels. Summer lake stratification would not deviate from what is typical under current operations and would have no adverse effect on reservoir fisheries during the summer months.

9.2.2.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. The HEC-ResSim model indicated that a 300 cfs continuous minimum flow would have negligible effects on average reservoir elevations throughout the year compared to the Green Plan (baseline). As part of the Downstream Release Alternatives Phase 2 Study, Alabama Power evaluated the effects of a continuous minimum flow of 300 cfs on Lake Harris fish and aquatic resources and determined that the proposed downstream release would not affect Harris Reservoir fish and aquatic resources.

9.2.2.3 Fish Entrainment and Mortality

The effect of the proposed minimum flow on fish entrainment and mortality rates was assessed qualitatively using the *Desktop Fish and Entrainment and Turbine Mortality Report* (Kleinschmidt 2018d). The effect of the proposed minimum flow on water temperature and aquatic habitat were simulated using the HEC-RAS model.

The estimated number of entrained fish can vary based on the volume of water passing through the turbines. However, on an annual and monthly basis the same volume of water would continue to be passed under the proposed continuous minimum flow operations as compared to Green Plan (baseline) operations; some of the water that would have otherwise been passed through the existing turbines during peak generation or during Green Plan (baseline) pulses would now be passed through the minimum flow turbine. Therefore, Alabama Power's proposed continuous minimum flow would have no effect on fish entrainment at Lake Harris compared to baseline. It is also notable that intake velocities during minimum flow-only operations (300 cfs) would be very low (0.11 feet per second) compared to operations of a single existing unit at best gate (6,500 cfs; 2.41 fps). This factor would likely result in a lower magnitude of fish entrainment during minimum flow-only operations.

Turbine-induced mortality is largely dependent on turbine characteristics such as turbine speed, and number of blades. Alabama Power provided minimum flow unit dimensions in Exhibit A, as available, based on preliminary design. A review of the turbine mortality dataset yielded data from three sites with turbine characteristics similar to those of the proposed minimum flow unit. Mortality rates of different genera (i.e., catostomids, centrarchids, clupeids, cyprinids, and ictalurids) were assessed for both the existing units and the proposed minimum flow unit. The proposed minimum flow unit would yield a higher percent mortality rate than the existing units but would account for only 13 percent of entrained fish (Appendix H).

9.2.2.4 Spring Spawning Stabilization

Currently, based on input from ADCNR and when conditions permit, Alabama Power voluntarily maintains the lake at a stable or a slightly rising elevation for a period of 14 days to increase the spawning success of fish species such as Largemouth Bass and crappie that spawn in littoral areas. Alabama Power proposes to continue to hold Lake Harris stable for spring fish spawning when conditions permit and upon request from ADCNR. This action would have a beneficial effect on fish and aquatic populations in Lake Harris.

9.2.2.5 Fish Habitat Improvements

Alabama Power proposes continuing to improve fish habitat by adding habitat enhancements within Lake Harris. Alabama Power initiated programs to enhance fisheries resources within Alabama Power managed reservoirs in January of 1993 by installing recycled Christmas trees as fish habitat (Alabama Power and Kleinschmidt 2018) and most recently in consultation with ADCNR, installed artificial habitat. These and other habitat enhancements provide structure for predator avoidance, macroinvertebrates, and mitigate the effects of entrainment and turbine-induced mortality on fish populations. Providing fish habitat improvements would have a beneficial effect on fish and aquatic populations in Lake Harris.

Addition of fish attraction devices such as brush piles and other woody debris (e.g., recycled Christmas trees and felled trees) (Figure 9-3) and synthetic materials (e.g., spider blocks and PVC structures [Figure 9-4]) provide cover for fish and to enhance angling opportunities in Harris Project waters.

Note: Christmas trees are joined at the base in bundles of four and anchored with three 12-inch concrete blocks.

Figure 9-3 Christmas Trees Used for Fish Attraction

Note: Spider block habitat in concrete securing polyethylene irrigation pipe.

Figure 9-4 Spider Block Habitat Used for Fish Attraction

9.2.2.6 Wildlife Management Plan/Timber Management Plan

Alabama Power proposes to finalize and implement a WMP, including specific timber management actions and BMPs that reduce or prevent runoff, erosion, and sedimentation that may impact streams and waterbodies at Lake Harris. Specifically, Alabama Power will continue to incorporate Alabama's Best Management Practices for Forestry as provided by the Alabama Forestry Commission. These practices include: the establishment of SMZs; avoidance of crossing of streams by roads, skid trails, or firebreaks when possible; when unavoidable, the utilization of the fewest possible steam crossings located where the bank and SMZ would be least disturbed; and the proper planning and location of roads (Alabama Forestry Commission 2021). These management activities would benefit soil resources and erosion by reducing runoff and disturbance which may indirectly improve fisheries habitats of lakes, rivers, and streams (Alabama Power 2021e). Implementation of the WMP would likely have a beneficial effect on aquatic resources at Lake Harris.

9.2.2.7 Shoreline Management Plan

Alabama Power proposes to finalize and implement an SMP that would continue to limit the construction of new sea walls to areas where erosion, wave action, and boat traffic are substantial or in areas where a previously installed seawall has failed. Alabama Power encourages the use of alternative bank stabilization techniques other than seawalls. Such alternatives include, but are not limited to, riprap, bioengineering techniques, natural vegetation with riprap, and gabions. Alabama Power requires, as a condition of a permit, that any future seawall proposals include the placement of riprap, for fish and other semi-aquatic species habitat and increased stability, in front of the seawall. Alternative bank stabilization techniques benefit aquatic species by providing additional habitat for aquatic species.

Implementing a shoreline classification system to guide management and permitting activities, along with continuing the requirements of the scenic easement on Lake Harris would provide an overall beneficial effect to land management and provide an opportunity for stable shorelines, potentially benefiting water quality and aquatic resources on Lake Harris. Encouraging landowners to implement shoreline BMPs may also benefit the aquatic resources on Lake Harris by reducing runoff and maintaining vegetative cover.

9.2.3 Tallapoosa River Downstream of Harris Dam

9.2.3.1 Continued Operation (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project according to the existing operating curve, flood control procedures, and ADROP. Maintaining the existing operating curve and flood control procedures would have no effect on aquatic resources in the Tallapoosa River downstream of Harris Dam. Operating in accordance with ADROP potentially benefits aquatic resources downstream of Harris Dam by conserving water to maintain some level of flow in the river during periods of extreme drought.

9.2.3.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. The proposed continuous minimum flow would increase the amount and stability of wetted habitat downstream of Harris Dam.

Table 9-11 shows the location below Harris Dam, the type of habitat and the percent difference from the Green Plan (baseline) for the 300 cfs continuous minimum flow with regard to average wetted perimeter. The largest percent increase occurs in the first 7-miles below Harris Dam in both pool and riffle habitat. As wetted perimeter fluctuations decrease, littoral habitat viability increases. A more stable water surface elevation results in greater uniformity among the environment and shallow breeding sites for early spring breeding aquatic species. Therefore, the proposed continuous minimum flow would have a beneficial effect on aquatic resources habitat in the Tallapoosa River between Harris Dam and Horseshoe Bend.

In addition, Alabama Power proposes to develop low-inflow and drought operations procedures for the minimum flow unit in consultation with resource agencies following unit installation and performance testing. Any such procedures would not be inconsistent with ADROP. Drought operations procedures for the minimum flow unit would be developed so that reservoir elevations would not be lower than would occur under baseline operating conditions.

Table 9-11 Comparison of Percent Difference from Green Plan (Baseline) Conditions in Average Wetted Perimeter Based on HEC-RAS Model[31] of Downstream Release Alternatives

Alternative	Miles Below Harris Dam Habitat Type										
	0.4	1	2	4	7	10	14	19	23	38	43
	Riffle	Riffle	Riffle	Pool	Pool	Riffle	Run-Pool	Riffle-Run	Riffle	Riffle	Pool
GP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
300 CMF	5.8%	2.2%	6.8%	0.5%	6.0%	1.1%	0.6%	2.4%	2.8%	1.3%	0.7%

Source: Alabama Power and Kleinschmidt 2022a

Alabama Power's proposal to implement a continuous minimum flow of approximately 300 cfs would result in a more stable riverine environment downstream of Harris Dam. This continuous minimum flow would decrease the wetted perimeter fluctuation between Harris Dam and Horseshoe Bend. The 300 cfs continuous minimum flow release provides a greater benefit compared to the Green Plan (baseline) operation of releasing periodic pulse flows downstream. A reduction in water surface fluctuation and increased wetted

[31] The HEC-RAS model uses the USACE's unimpaired data set from 1939-2011.

perimeter would have a beneficial effect on the amount of available littoral habitat downstream of Harris Dam.

Table 9-12 provides the results of evaluating the continuous minimum flow and habitat stability. The negative number in the table refers to the percent difference (decrease) in fluctuation of the wetted perimeter; therefore, the higher the negative number, the larger the reduction in fluctuation compared to Green Plan (baseline). Similar to the wetted habitat, the greatest decreases in fluctuation occur in the first 7-miles downstream of Harris Dam, however certain cross-sections may experience a higher magnitude of water level fluctuations due to a combination of factors, including channel geometry, slope, and proximity to hydraulic controls along the length of the river. Increasing habitat stability would provide a beneficial effect for fish and other aquatic organisms below Harris Dam.

Table 9-12 Comparison of Percent Difference from Green Plan (Baseline) in Daily Wetted Perimeter Fluctuation Based on HEC-RAS Model[32] of Downstream Release Alternatives

Alternative	Miles Below Harris Dam Habitat Type										
	0.4	1	2	4	7	10	14	19	23	38	43
	Riffle	Riffle	Riffle	Pool	Pool	Riffle	Run-Pool	Riffle-Run	Riffle	Riffle	Pool
GP	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
300CMF	-37%	-23%	-68%	-14%	-31%	-13%	-13%	0%	3%	-9%	-9%

Source: Alabama Power and Kleinschmidt 2022b

The proposed continuous minimum flow would have a minor beneficial effect on water temperature downstream of Harris Dam. Results of HEC-RAS model simulations (during summer months) confirm that the continuous minimum flow of 300 cfs would cause reductions in average and maximum daily, and maximum hourly temperature fluctuations (Table 9-13). The minimum flow would not result in changes in average monthly water temperature or average hourly temperature fluctuations. Any effect on water temperature from the proposed minimum flow would diminish seven or more miles downstream of Harris Dam as the effects of operations attenuate (Alabama Power and Kleinschmidt 2022b).

[32] The HEC-RAS model uses the USACE's unimpaired data set from 1939-2011

Table 9-13 Results of HEC-RAS Water Temperature Modeling Simulations for Downstream Release Alternatives

Alternative	Spring					Summer					Fall				
	Period Avg (°C)	Avg Daily Δ (°C)	Max Daily Δ (°C)	Avg Hourly Δ (°C)	Max Hourly Δ (°C)	Period Avg (°C)	Avg Daily Δ (°C)	Max Daily Δ (°C)	Avg Hourly Δ (°C)	Max Hourly Δ (°C)	Period Avg (°C)	Avg Daily Δ (°C)	Max Daily Δ (°C)	Avg Hourly Δ (°C)	Max Hourly Δ (°C)
0.2 Miles Downstream of Harris Dam															
GP	16.95	3.88	6.79	0.35	5.90	23.94	4.32	5.23	0.54	3.90	25.39	3.61	4.40	0.39	2.99
300CMF	17.06	2.36	3.71	0.23	2.85	23.65	2.54	3.24	0.31	2.04	25.56	2.20	2.89	0.23	1.61
1 Mile Downstream of Harris Dam															
GP	16.85	5.00	8.85	0.43	6.96	24.15	5.15	6.04	0.59	4.07	25.41	4.75	5.67	0.45	2.22
300CMF	17.02	2.90	4.78	0.27	2.82	23.88	3.28	4.05	0.36	2.24	25.65	2.98	3.72	0.26	1.63
7 Miles Downstream of Harris Dam															
GP	16.78	3.67	5.31	0.29	2.65	25.80	4.19	5.31	0.33	1.89	26.66	2.84	3.64	0.24	0.78
300CMF	16.79	3.57	5.15	0.28	2.29	25.37	3.90	5.10	0.31	1.63	26.18	2.97	4.14	0.25	0.71

Source: Alabama Power and Kleinschmidt 2022b

The effects of temperature reductions on spawning and growth of aquatic resources downstream of Harris Dam may vary due to several factors, such as fish age and species. Fish growth typically increases with increasing temperature until a thermal maximum is reached or exceeded, at which point fish become stressed and growth decreases. Bioenergetic modeling performed by Auburn University determined that simulated dam operations characterized by increasing flows and temperature decreases of 5°C had a variety of effects on Redbreast Sunfish. Simulated operations increased growth rate of age-1 Redbreast Sunfish, which was attributed to cooler water from releases preventing temperatures from reaching the thermal maxima for growth; however, growth rates of age-3 and age-5 Redbreast Sunfish were slightly reduced, which was attributed to the higher energetic cost required for older, larger fish to maintain position in the river during increased flows (Auburn University 2020). This model assumed that operations caused temperature decreases of 5°C and that fish were not sheltering from increased water velocity, though Auburn's analysis of the temperature data showed that average daily temperature fluctuations are typically much smaller (99.7 percent were less than 2°C). Other studies have attributed delayed or prolonged spawning periods for Channel Catfish to lower temperatures downstream of Harris Dam (Sakaris 2006). Any temperature-related beneficial effects of 300 cfs continuous minimum flows on aquatic resources would likely be minor and would be limited mainly to the first few miles downstream of Harris Dam.

9.2.3.3 Aquatic Resources Monitoring Plan

Alabama Power proposes to develop and implement an Aquatic Resources Monitoring Plan following implementation of the continuous minimum flow to quantify the fish community at three sites downstream of Harris Dam and at a reference site upstream. Results would be used to compare the potential effects, if any, of the proposed continuous minimum flow release compared to baseline sampling during relicensing. It is anticipated that fish community structure will show improvement (total species, total families, CPE, diversity) at downstream sites when compared to an upstream reference site or remain similar to baseline, resulting in an overall beneficial effect on the aquatic resources.

9.2.3.4 Aeration System and Skimmer Weir

Continuing to operate the existing aeration system at the Harris Project and incorporating an aeration system in the design of the new minimum flow unit would ensure that discharges meet state water quality standards. This would have a beneficial effect on fish and other aquatic organisms downstream of Harris Dam. In addition, continuing to maintain the skimmer weir in its highest position would continue to pull higher temperature water through the turbines.

9.3 Unavoidable Adverse Impacts

9.3.1 Skyline

Some level of short-term erosion and runoff may occur during timber harvesting; however, timber is managed using standard BMPs which serve to prevent long-term impacts to water bodies and reduce effects on aquatic resources.

9.3.2 Lake Harris

Under the proposed downstream minimum flow release, fish entrainment and turbine-induced mortality during the Harris Project operation would continue at a level similar to that under current operations.

Shoreline development could have an adverse effect on fish and aquatic habitat in the littoral zone. However, permitting guidelines that encourage alternative bank stabilization techniques instead of seawalls and/or require rip rap at the base of seawalls, and adopting BMPs would mitigate this impact.

9.3.3 Tallapoosa River Downstream of Harris Dam

Under the proposed operation, minor water temperature fluctuations would continue to occur and may have a minor adverse effect on some fish species/ growth and spawning, and life cycles.

9.4 Recommended PME Measures Not Adopted

In response to the PLP, resource agencies, NGOs, and other stakeholders recommended specific PME measures that may affect fish and aquatic resources. Some of the recommended PME measures are incorporated in Alabama Power's proposal. This section briefly describes the stakeholder recommended PME measures that Alabama Power is not including in its relicensing proposal.

9.4.1 Unit Ramping

The ADCNR and various downstream stakeholders recommend that Alabama Power consider ramping the generators during peaking operations. Ramping would involve incrementally increasing the flow through the turbines up to best/full gate. Ramping would potentially benefit aquatic resources by reducing the rate of change of discharge and increasing habitat stability, especially in areas immediately downstream of Harris Dam. Because the turbines at Harris Dam were not designed to run at flows less than best/full gate, they would be subject to mechanical damage and therefore, Alabama Power would not operate the units in this manner.

9.4.2 Seasonal Minimum Flows

The ADCNR recommends that Alabama Power consider a minimum flow that varies seasonally and more closely mimics an unregulated system. As mentioned, Alabama Power's proposed 300 cfs minimum flow unit is the largest that can practically be installed in the physical available space. The existing units are not capable of operating at levels less than best gate. Alabama Power notes that seasonality in releases from the Harris Dam is already inherent due to the nature of existing climate and hydrology, with higher flow periods typically occurring in late winter and early spring, and lower flow periods typically occurring in summer and early fall.

9.4.3 Adaptive Management

The ARA and ADCNR recommend that Alabama Power consider having an Adaptive Management Plan for releases from Harris Dam, where changes to minimum flows could be made based on results of the Aquatic Resources Monitoring Plan. As part of a proposed Aquatic Resources Monitoring Plan, Alabama Power proposes to include three aquatic studies post-implementation of the minimum flow unit and present these results to the agencies and interested stakeholders; however, Alabama Power is not proposing to adaptively manage the minimum flow. In addition, considering the capital and operation and maintenance costs of installing a new turbine, it is neither cost effective or practical to require adaptive management.

9.4.4 Aquatic Resources Monitoring Plan for Sensitive Species

The ARA recommends that Alabama Power’s proposed Aquatic Resources Monitoring Plan go beyond monitoring and describe and implement specific measures to protect sensitive species. Further, they recommend that Alabama Power proactively work to conserve the freshwater mussels that are under review for ESA listing so that these species can avoid extinction. The USFWS encourages proactive conservation for four freshwater mussels known to occur in Tallapoosa River (Tallapoosa Orb, Alabama Hickorynut, Delicate Spike, and Alabama Spike.) While no specific actions are prescribed for these species, the implementation of a continuous minimum flow of approximately 300 cfs and water quality that meets state standards would provide benefits to these species. Alabama Power will consult with USFWS on all ESA-listed species.

9.4.5 Modify Intake Structure

The ARA and ADCNR recommend modifying the intake structure at Harris Dam to draw from higher in the water column to potentially provide generation releases that are slightly warmer and more oxygenated. It is unknown how this might affect temperature in Lake Harris or in the tailrace below Harris Dam. Alabama Power believes modifying the intake structure would be premature as it intends to develop and implement an ARM Plan following implementation of the continuous minimum flow to quantify the fish community at three sites downstream of Harris Dam and at a reference site upstream. Results would be used to compare the potential effects, if any, of the proposed continuous minimum flow release compared to baseline sampling during relicensing. Furthermore, Alabama Power's proposal for a continuous minimum flow of approximately 300 cfs, based on modeling and study results, would mitigate some of the issues cited by ADCNR by reducing average daily and maximum water temperature fluctuations.

9.4.6 Refurbish/Replace Aeration System

The ARA and ADCNR recommend that Alabama Power refurbish or replace the existing passive draft tube aeration system so that the state standard for dissolved oxygen is met at all times. Alabama Power believes such actions would be premature as it intends to monitor water quality following installation of the proposed minimum flow unit. Following that evaluation, ADEM and Alabama Power would investigate and implement additional measures, if needed, pursuant to the proposed Water Quality Monitoring Plan.

9.4.7 Downstream Flow Stabilization for Fish Spawning

The ADCNR recommends that Alabama Power consider providing an annual 14-day window of stabilized flow releases from Harris Dam to benefit downstream fish spawning. Alabama Power previously consulted with Harris Technical Committee (Kleinschmidt 2018a) and attempted to examine the potential for this stabilization window. However, stabilization of downstream releases during early spring is difficult to accomplish due to high reservoir inflows typically experienced during this time of year.

9.4.8 Tailrace Fish Habitat Improvements

ADCNR recommends Alabama Power evaluate tailrace fish habitat improvement and enhancement options. Alabama Power is not aware of any tailrace habitat deficiencies, and none have been identified by stakeholders to date. There was some discussion relative to the Auburn University bioenergetics study noting that water velocities in the immediate tailrace area exceeded the swimming capabilities of target fish species. However, fish were captured in the tailrace as part of that study, indicating they are not permanently displaced by tailrace flows. Additionally, Channel Catfish and Redbreast Sunfish captured in the tailrace exhibited significantly better condition (e.g., body weight relative to total length) than those captured further downstream (Auburn University or Kleinschmidt).

10.0 WILDLIFE AND TERRESTRIAL RESOURCES

10.1 Affected Environment

10.1.1 Skyline Wildlife Resources

The James D. Martin-Skyline WMA is located in Jackson County, Alabama, and is approximately 60,000 acres. Approximately 15,000 acres are owned by Alabama Power and are included in the Harris Project (Figure 10-1). Alabama Power leases Skyline Project lands to ADCNR and provides funding for wildlife management activities while ADCNR is responsible for performing management activities, including the development and maintenance of wildlife habitat and recreational access (Alabama Power 1988). Skyline is managed for timber harvesting, which ensures long-term health and sustainability of the forest, while enhancing wildlife management through ecological diversity and habitat improvement.

The Skyline WMA provides quality habitat for a variety of upland wildlife species. Representative wildlife species (mammals, birds, amphibians, and reptiles) found in the Skyline Project Area are listed in Appendix D. A list of birds of conservation concern (BCC) found within the Skyline vicinity is also provided in Appendix D. Currently, invasive wildlife species are not being managed within the Skyline Project Area.

As part of the original license, Alabama Power developed a Harris Project Wildlife Mitigation Plan (Alabama Power 1988) in consultation with ADCNR and USFWS that FERC approved on July 29, 1988. The Harris Project Wildlife Mitigation Plan outlined specific measures to mitigate for the impacts to wildlife and habitats caused by the development of the Harris Project. The Harris Project Wildlife Mitigation Plan included provisions for Alabama Power to purchase and subsequently lease to ADCNR, over 15,000 acres of land adjacent to the already established Skyline WMA. The Harris Project Wildlife Mitigation Plan resulted in the development of a Skyline WMP (Alabama Power 1989) to guide the development and maintenance of wildlife habitat, timber management, and recreational access. The Skyline WMP was approved by FERC on June 29, 1990.

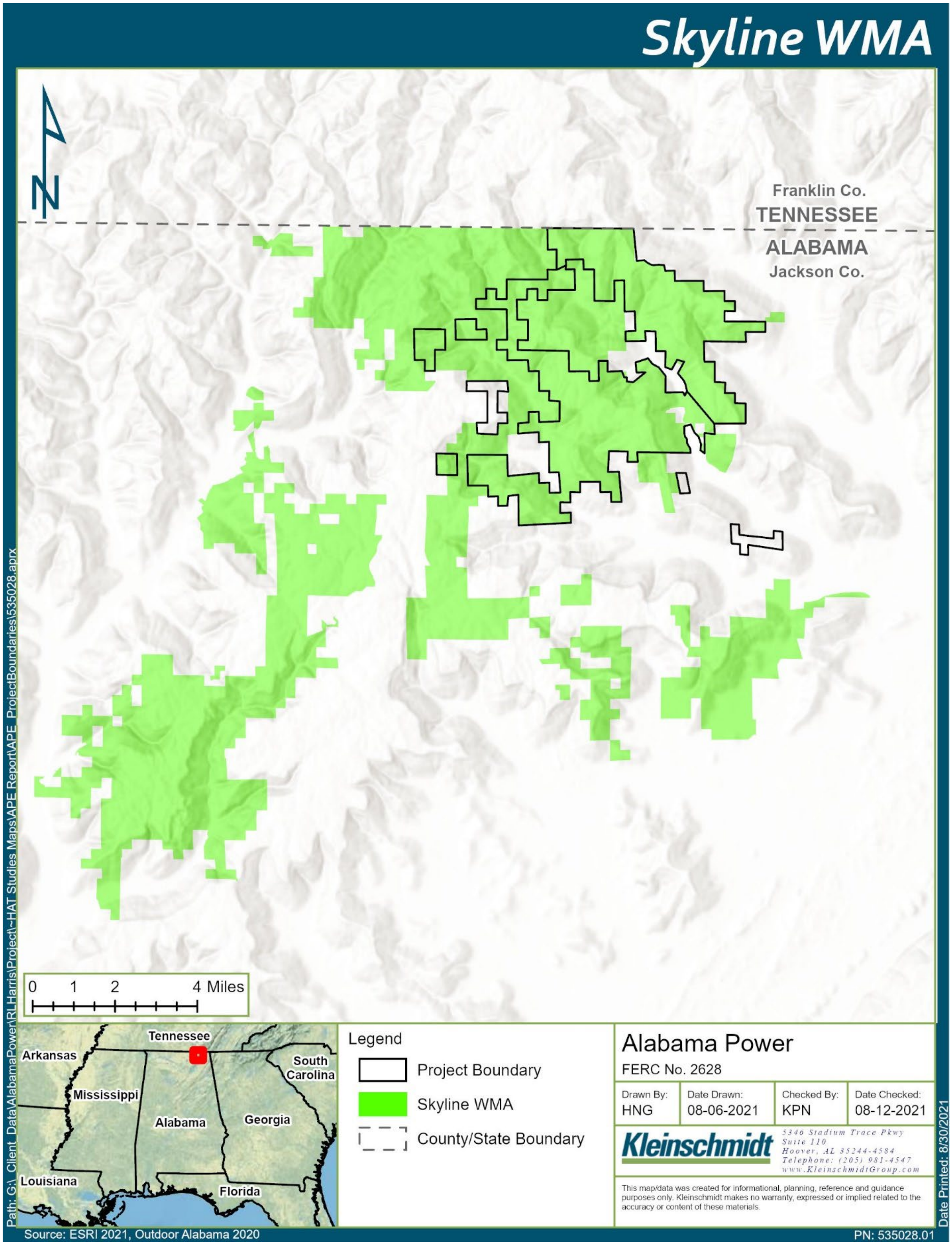

Figure 10-1 Skyline Wildlife Management Area

As discussed above, Skyline Project lands are managed for wildlife habitat, recreation, and timber harvesting.

Management activities conducted by ADCNR for the development and maintenance of wildlife habitat and recreational access, in accordance with the Skyline WMP include:

- Establishment and management of wildlife openings - Approximately 42 acres of wildlife openings/food plots are maintained on Project lands at Skyline by ADCNR. These areas are generally planted annually (with cool season grains and/or perennial legumes), but, if not planted in a particular year, are managed by disking. Additionally, approximately 210 acres of other openings (i.e., native grass stands, early successional fields) are maintained by mowing, disking, or prescribed fire.

- Establishment and maintenance of roads – all roads have been upgraded to all-weather status and are maintained annually; ADCNR maintains approximately 32 miles of roads at all-weather status (using a road grader, dozer and gravel deliveries as need) and seven gates (not connected to fencing, for the purpose of controlling access to areas outside of hunting season) on lands at Skyline.

- Establishment and maintenance of camping areas - There are two designated campsites on Project Lands at Skyline.

The Skyline WMP provides for the establishment and maintenance of various other enhancements as needed, such as firebreaks, waterholes, nesting structures, and planting/maintenance of herbaceous and shrub plantings. However, none of these additional activities have been needed at Skyline to date. Because prescribed burning is not utilized as part of timber management at Skyline, no activities for the addition of firebreaks have been conducted. Furthermore, because Skyline includes several natural ponds, no waterholes have been installed. The ponds are monitored and maintained by ADCNR as needed. Lastly, no nesting structures have been added at Skyline, and no plantings outside of those in conjunction with managed openings have been needed.

In conjunction with wildlife management, hunting opportunities are provided at Skyline and are managed by ADCNR as outlined in the 1990 Skyline WMP. Hunting management includes issuance of permits and maps and regulation determinations such as hunting seasons and bag limits.

10.1.1.1 Bats Not Listed Under the Endangered Species Act at Skyline

A cultural resources survey of a sample of the more than 236 known caves on Alabama Power owned property at Skyline was conducted and a visual inspection of bats in these caves was conducted as a secondary objective. The 2020 Skyline Cave Assessment (Alabama Power 2021g) summarizes a sample of eight caves in Alabama Power's Harris Project lands at Skyline that began on February 15, 2020 and concluded on March 1, 2020 (Appendix D). Cave walls, cave ceilings, and accessible crevices were assessed upon entering and leaving the eight caves. Observers noted the number and species of bats in each of the caves. Bats were visually inspected for clinical signs of white-nose syndrome.

No federally listed bat species were observed. A total of 48 bats, comprised of two species (Tricolored Bat (*Perimyotis subflavus*) and Rafinesque's Big-eared Bat (*Plecotus rafinesquii*) and one unidentified bat, were documented on Alabama Power Project lands at Skyline. None of the bats observed showed signs of white-nose syndrome.

10.1.2 Skyline Terrestrial Resources

Skyline is located in Jackson County, in the Cumberland Plateau Region of Alabama. This area is underlain by sandstones along with siltstones, shales, and coal. The landscape consists of flat-topped, high-elevation plateaus separated by deep, steep-sided valleys. The plateaus slope gently from the northeast to the southwest, and most of the area is forested, with characteristics of Southern Ridge and Valley/Cumberland Dry Calcareous Forest and South-Central Interior Mesophytic forest, and Allegheny Cumberland Dry Oak Forest and Woodland. Additional information about the forest types and associated dominant plant and animal species is available in Appendix D.

Additionally, Alabama Power conducts annual boundary line maintenance in conjunction with its timber management program in order to ensure that property boundary lines are clearly marked and identified. This includes the marking of trees along a property boundary with a specified color of paint to delineate the Alabama Power property line.

Contemporary timber stands at Skyline are dominated by Upland Hardwood. Timber stand composition on the 15,063 acres within Skyline is shown in Table 10-1.

Table 10-1 Timber Stand Composition on Harris Project Lands at Skyline

Stand Type	Percent Cover	Acreage
Mixed Pine-Hardwood	0.15	23
Natural[33] Longleaf Pine	0	0
Natural Pine	0	0
Upland Hardwood	99	14,922
Planted Pines	0	0
Other	0.85	118
Total	**100**	**15,063**

Source: Alabama Power 2021f

10.1.3 Skyline Wetlands

Results of a 2018 desktop assessment conducted by Cahaba Consulting, LLC confirmed that it was unlikely that large areas of wetlands occur in the Skyline Project Boundary due to steep terrain and smaller floodplains (Alabama Power and Kleinschmidt 2018). Detailed maps of delineated wetlands are provided in Cahaba Consulting 2018a and were filed on November 13, 2018[34] and June 29, 2021.[35]

10.1.4 Lake Harris Wildlife Resources

Harris Reservoir lies within the Northern Piedmont Upland district of the Piedmont Upland Physiographic Section. Harris Reservoir and surrounding woodland, agricultural, and residential areas provide high quality habitat for a variety of upland and semi-aquatic wildlife species. Representative wildlife species (mammals, birds, amphibians, and reptiles) found in the Lake Harris Project Vicinity, including their common and scientific names along with a list of BCCs found within the Lake Harris Project Vicinity are provided in Appendix D.

As described in Skyline Wildlife Resources, Alabama Power developed a Harris Project Wildlife Mitigation Plan (Alabama Power 1988) in consultation with ADCNR and USFWS that FERC approved on July 29, 1988. The Harris Project Wildlife Mitigation Plan outlined specific mitigation measures regarding possible impacts to wildlife and habitats caused by the development of the Harris Project. The Harris Project Wildlife Mitigation Plan

[33] "Natural" as defined in timber stand composition is that which it is not planted and allowed to naturally regenerate.

[34] 20181113-0016

[35] 20210629-5068

included provisions for the management of 5,900 acres of existing Project lands and acquisition of 779.5 additional acres of land in the vicinity of the Harris Reservoir. As part of the management activities, Alabama Power identified 263 acres of suitable Wood Duck habitat, erected Wood Duck boxes, and released Canada Geese to establish a population in and around Lake Harris, and constructed Osprey nesting platforms along the reservoir shoreline. Finally, Alabama Power managed forest lands within the Lake Harris Project Area and established 105 acres of permanent openings to provide diverse habitat that benefits both game and non-game species (Alabama Power 2021e).[36]

Alabama Power conducts annual monitoring and maintenance of Wood Duck boxes installed around Lake Harris. Maintenance activities included repair and replacement of broken boxes, as well as the relocation of underutilized boxes. Although Wood Ducks have utilized the artificial boxes, these structures were installed as a mitigative measure for lost habitat associated with the initial impoundment of Harris Reservoir. Wood Ducks using the area have had time to adapt to the surrounding habitat, and likely have demonstrated tolerance, or the ability to habituate, to existing human presence, activities, and infrastructure at Lake Harris. Double boxes were installed in most areas but clusters of 10 boxes were installed in higher use areas. Annual use of boxes by Wood Ducks from 2000 to 2019 ranged from 17 percent in 2000 to 47 percent in 2017 (average of 32 percent). Annual Wood Duck hatchings ranged from 28 successful nests in 2011 to 47 successful nests in 2017, averaging 37 hatchings since 2010. Other wildlife found utilizing the boxes included Eastern Screech Owl (*Megascops asio*), Eastern Gray Squirrel (*Sciurus carolinesis*), and flycatchers (Tyrannidae) (Alabama Power and Kleinschmidt 2018).

Alabama Power constructed and installed 300 large animal and cavity-nesting bird structures and 300 small animal and cavity-nesting bird structures in addition to structures constructed and installed for Wood Duck, Canada Geese, and Osprey. These structures were for the benefit of species such as the Eastern Screech Owl, Eastern Gray Squirrel, and flycatchers. However, unlike the Wood Duck boxes, Alabama Power does not monitor use of these structures.

Lands located at Lake Harris provide hunting opportunities through either hunting leases or individual permits. In consultation with ADCNR, Alabama Power developed the Harris

[36] See AIR letter response submitted by Alabama Power to FERC (Accession No. 20181113-0016) and Alabama Power's response to FERC's AIR (Accession No. 20181113-4002).

physically disabled hunting area, which included the construction of four shooting houses specifically designed to accommodate disabled hunters and associated access roads and greenfields. Information on the recreational use of the shooting houses for persons with disabilities is presented in Recreation and Land Use Section of this Exhibit E.

Alabama Power maintains Pollinator Plots at Little Fox Creek that strengthens natural habitat for the Monarch Butterfly and other pollinators such as bees, moths, and beetles. Little Fox Creek was developed with plants chosen for that specific habitat in order to benefit pollinator species.

10.1.5 Lake Harris Terrestrial Resources

Lake Harris is located predominately in the Northern Piedmont Upland Region of Alabama. Lake Harris is comprised of an impounded portion of the Tallapoosa River and includes mainly open water, deciduous, and evergreen forests with only small areas of agricultural and residential development (Alabama Power and Kleinschmidt 2018). Additional information about the forest types and associated dominant plant and animal species is available in Appendix D.

Alabama Power has actively managed timber on its lands for many years. At Lake Harris, contemporary timber stands are dominated by Mixed Pine-Harwood. Timber stand composition on the 6,269 acres within the Lake Harris Project Boundary is shown in Table 10-2.

Table 10-2 Timber Stand Composition on Harris Project Lands at Lake Harris

Stand Type	Percent Cover	Acreage
Mixed Pine-Hardwood	47	2938
Natural Longleaf Pine	0	0
Natural Pine	18	1109
Upland Hardwood	21	1343
Planted Pines	8	476
Other	6	403
Total	**100**	**6269**

Source: Alabama Power 2021a

10.1.5.1 Rights of Way Maintenance

Rights-of-way that contain Alabama Power owned facilities (e.g., electric transmission lines) are managed for safety and reliability of the electric system. Alabama Power utilizes integrated vegetation management (IVM) to maintain transmission rights-of-way. IVM balances the use of mechanical, chemical, and biological treatments to establish and maintain a vegetative cover type that is compatible with the environment (Alabama Power 2010). IVM allows Alabama Power to control tall-growing vegetation while promoting the growth of more compatible low-growing vegetation. This enhances wildlife habitat while not compromising the safety and reliability of the transmission lines. IVM is an approved method by the EPA as well as other relevant federal and state agencies (EPA 2017).

Alabama Power trims trees to provide reliable service to its customers. Planned maintenance is prioritized by evaluating reliability data, field conditions, and other specific information. There are instances when a tree must be trimmed or removed outside of planned maintenance.

Alabama Power uses environmentally responsible non-restricted herbicide applications to control tall-growing incompatible plants within power line rights of way. The objective is to promote low-growing vegetation to minimize potential electric power interruptions, which also enhances wildlife habitat. Alabama Power uses professional crews to apply non-restricted herbicides by utilizing different methods including foliar, stump, stem, and vine applications. Alabama Power crews have been trained on the proper, safe, and environmentally responsible techniques of managing plant growth. All products used by Alabama Power are registered by EPA and approved by appropriate state agencies.

Management of public road rights-of-way that cross project lands is conducted by the appropriate State or County agency in accordance with applicable laws and regulations. Management of utility rights-of-way of non-Alabama Power facilities that cross project lands is conducted by the respective utility company (e.g., water authority, co-operative electric utilities, natural gas companies) in accordance with applicable laws and regulations.

10.1.5.2 Botanical Inventories

Botanical inventories were conducted to catalog all plant species present at a 20-acre parcel (Diggs et al. 2020a) and a 35-acre parcel at the rare Blake's Ferry Pluton (Diggs et al. 2020b); both parcels are located adjacent to Alabama Power's Flat Rock Park on Lake

Harris. All plant species were identified either in the field, or in cases where identification was more difficult, a voucher specimen was taken for later identification in the laboratory. During the inventory of the 20-acre parcel, 365 species of plants were documented from the Inventory Area and surrounding buffer areas. These 365 species represent 97 plant families. During the inventory of the 35-acre parcel, 401 species of plants were documented from the Inventory Area and surrounding buffer areas. These 401 species represent 106 plant families. No federally protected species were found during the survey.

As indicated in the consultation record, stakeholders notified Alabama Power in March 2020 of trespassing vehicles and all-terrain vehicles (ATV) in the Flat Rock Park area. During the relicensing process, Alabama Power installed signage and a barrier to prevent ATV traffic (Figure 10-2).

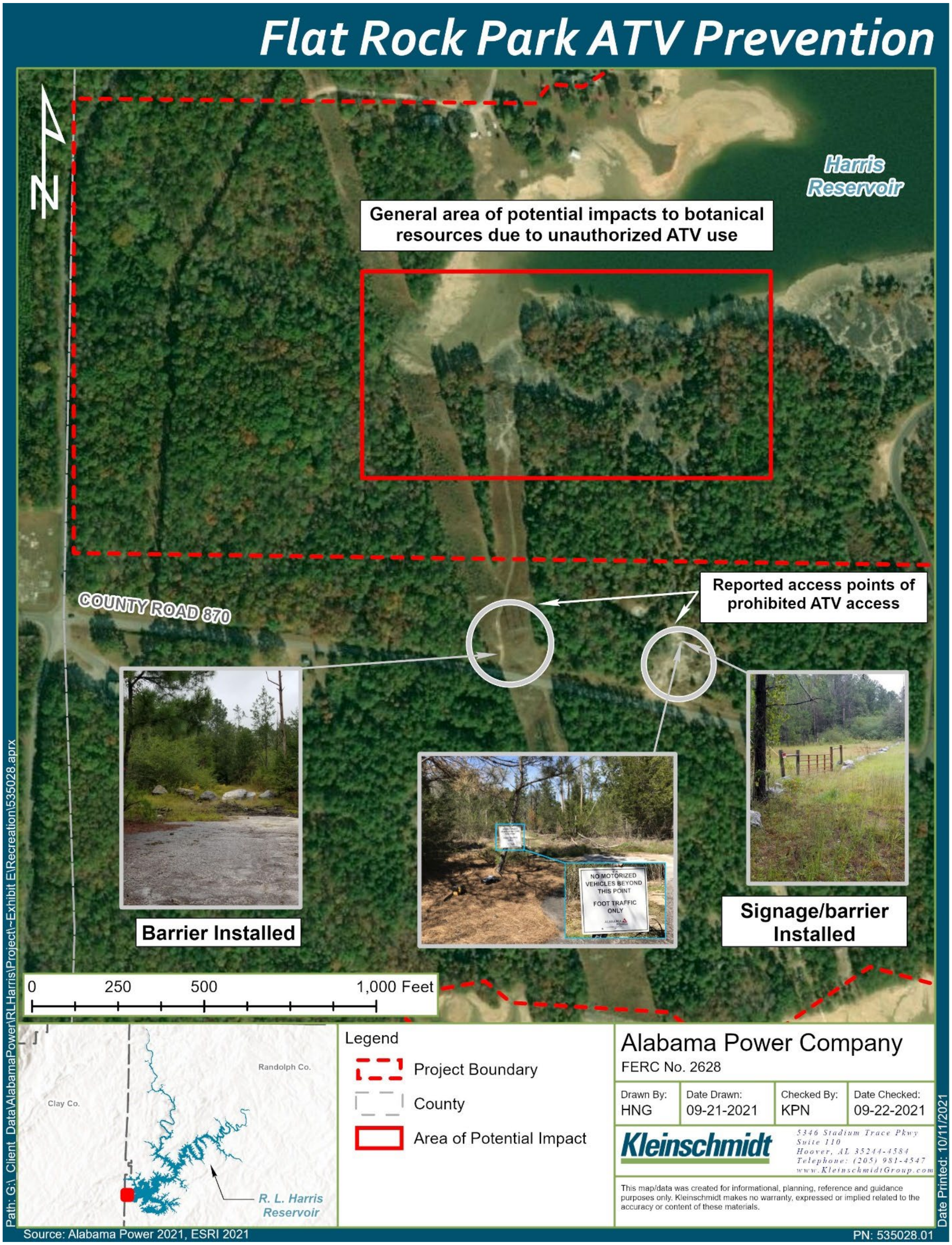

Figure 10-2 Flat Rock Park ATV Prevention

10.1.6 Lake Harris Wetlands

Alabama Power contracted Cahaba Consulting to identify, assess, and document possible wetlands located at, or below 793 ft msl on Lake Harris. Cahaba Consulting identified three types of wetlands along the Lake Harris shoreline, including riverine wetlands, emergent/lacustrine fringe wetlands, and alluvial forested or scrub-shrub wetlands. A wetlands report including detailed maps of delineated wetlands are provided in Cahaba Consulting 2018b and were filed on November 13, 2018[37] and June 29, 2021.[38]

Riverine wetlands are associated with the floodplains and riparian corridors of streams and rivers. In the Lake Harris Project Boundary, the riverine wetlands occur where perennial streams flow into the reservoir. Primary hydrological inputs include overbank flow from the stream or river or groundwater connections between the stream channel and wetland. Other hydrological sources may include overland flow from neighboring uplands, tributary inflow, or precipitation. Riverine wetlands are typically associated with first order streams; however, perennial flow is not required for a riverine classification (Cahaba Consulting 2018b).

One hundred sixty-five wetlands were identified and mapped on Harris Reservoir (Cahaba Consulting 2018b). Identified wetlands totaled 11.35 miles or 14.89 acres along the Lake Harris shoreline (Table 10-3). Detailed maps of delineated wetlands are provided in Cahaba Consulting (2018b).

[37] 20181113-0016
[38] 20210629-5068

Table 10-3 Acres, Linear Feet, and Quality of Wetland Types at Harris Reservoir

Quality	Lacustrine/Littoral on Shoreline		Shoreline and Alluvial Wetlands
	Linear Feet	Miles	Wetland Acres
Poor	5,268	1.00	2.16
Moderate	24,258	4.59	3.45
Good	30,430	5.76	9.28
Total	**59,956**	**11.35**	**14.89**

Source: Cahaba Consulting 2018b

The criteria for determining the quality of the wetlands are described below.

- Poor = A wetland that consists primarily of a single species of noxious or invasive vegetated plants/stems in an emergent shallow water condition.
- Moderate = A wetland that consists of noxious or invasive vegetation where there is a minimum of 2 additional hydrophytic plant species present.
- Good = A wetland of native hydrophytic vegetation that consists typically of 3 or more species. Generally, high quality wetland would include two layers of strata (i.e., herbaceous, scrub shrub, forested). Noxious or invasive species may be present but are not dominant within the wetland area being evaluated.

10.1.7 Tallapoosa River Downstream of Harris Dam Wildlife Resources

Wildlife resources along the Tallapoosa River downstream of Harris Dam are the same as those at Lake Harris. Animal and plant species common to the area are described in Appendix D.

10.1.8 Tallapoosa River Downstream of Harris Dam Terrestrial Resources

Terrestrial resources along the Tallapoosa River downstream of Harris Dam are the same as those at Lake Harris. Animal and plant species common to the area are described in Appendix D.

10.1.9 Tallapoosa River Downstream of Harris Dam Wetlands

Alabama Power used wetland data from the National Wetland Inventory (NWI) to identify wetlands from Harris Dam to Horseshoe Bend (NWI 2021). Wetlands in the area include: 4.0 acres freshwater emergent; 33.10 acres freshwater forested/shrub; 0.36 acres freshwater pond; and 1,320.51 acres riverine.

10.2 Environmental Analysis

Several studies incorporated components that evaluated wildlife and terrestrial resources at the Harris Project. Those analyses are presented in the following reports.

- Final Phase 1 Project Lands Evaluation Study Report
- Final Threatened and Endangered Species Study Report
- Final Erosion and Sedimentation Study Report
- Final Recreation Evaluation
- Final Downstream Release Alternatives Phase 2 Study Report
- Final Operating Curve Change Feasibility Analysis Phase 2 Study Report
- A Botanical Inventory of a 35-Acre Parcel at Flat Rock Park, Blake’s Ferry, Alabama

Table 10-4 includes the proposed operations and PME measures that may affect wildlife and terrestrial resources at Skyline, Lake Harris, and the Tallapoosa River Downstream of Harris Dam. Not all operations or PME measures apply to each geographic area of the Harris Project; therefore, the analysis of beneficial and adverse effects will be presented accordingly. A complete list of Alabama Power’s operations and PME measures is located in Table 5-2.

Table 10-4 Proposed Operations and PME Measures That May Affect Wildlife and Terrestrial Resources

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT WILDLIFE AND TERRESTRIAL RESOURCES
• Continue to operate the Harris Project according to the existing operating curve. • Continue to operate in high flow conditions according to the USACE-approved flood control procedures in the Harris Water Control Manual (USACE 2022). • Continue daily peak-load operations. • Continue operating in accordance with ADROP (Alabama Power Company 2016) to address drought management.
• Install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs with a generating capacity of approximately 2.5 MW. Based on the preliminary design, the continuous minimum flow unit would require a new reinforced concrete addition located on the outside of the Unit 1 side (east side) of the powerhouse. The new steel-lined penstock would penetrate the existing Unit 1 penstock for source water and discharge below the tailrace water surface. • Develop drought operations procedures for the minimum flow. • Operate in accordance with Green Plan (baseline) during CMF unit outages and outages where the water supply to the Unit 1 penstock is affected.
• Finalize and implement a Nuisance Aquatic Vegetation and Vector Control Program (Alabama Power 2021c), which includes: ❖ A description of the nuisance aquatic vegetation and vectors covered under this Program. o This program covers mosquitos (vectors) and nuisance aquatic vegetation and is directed toward non-indigenous aquatic vegetation species. ❖ Frequency, timing, and locations of surveys to identify where nuisance aquatic vegetation could create a public health hazard, affect power generation facilities, restrict recreational use, or pose a threat to the ecological balance of Lake Harris. o Perform lake-wide surveys annually to identify areas of aquatic plant infestation. o Monitor the presence and abundance of mosquitos. ❖ Methods for monitoring for increases in nuisance aquatic vegetation. o Increases would be monitored through annual survey and property owner reporting to Alabama Power. o Vectors are monitored through adult resting stations and larval sampling. ❖ Methods for controlling nuisance aquatic vegetation and vectors. o All aquatic plant control measures are directed by staff biologists certified as commercial aquatic applicators by the State of Alabama, Department of

Proposed Operations and PME Measures that May Affect Wildlife and Terrestrial Resources
Agriculture and Industries. Only EPA approved aquatic herbicides and algaecides are used in the management of invasive aquatic plants. ❖ Schedule for monitoring. o Surveys will occur in the late summer/early fall when vegetation biomass is usually at its peak. ❖ Schedule for finalizing and implementing the program. o Although this program is ongoing, within 3 months of license issuance, Alabam Power will revise or update the plan as needed and file with FERC for approval
• Finalize and implement a WMP (Alabama Power 2021e) for Lake Harris and Skyline. ❖ Consult with USFWS to develop measures protective of federally listed bats. ❖ Incorporate timber management into the WMP. o Including maintenance of gates and the construction/maintenance of logging roads. o Conduct surveys for Price's Potato-bean at the location of the extant population prior to timbering activities that may affect the extant population. Timbering crews will be notified of the location of any Price's Potato-bean prior to timbering activities. ❖ Maintain pollinator plots at Little Fox Creek. ❖ Continue to provide hunting opportunities to the public. ❖ Continue to manage approximately 105 acres of permanent openings to provide diverse habitat that benefits both game and nongame species. ❖ Continue to conduct property boundary maintenance, such as painting/marking of property lines. ❖ Schedule for revising and implementing the WMP. o Within 6 months of license issuance, Alabama Power will revise or update the WMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval
• Implement the Avian Protection Plan (Alabama Power 2022b) within the Harris Project Boundary
• Finalize and implement a Shoreline Management Plan (SMP) (Alabama Power 2022c) for Lake Harris. ❖ Incorporate proposed changes in land use classifications (including reclassifying the botanical area at Flat Rock Park from recreation to Natural/Undeveloped). ❖ Continue to encourage the use of alternative bank stabilization techniques other than seawalls. ❖ Continue implementing the Dredge Permit Program (Appendix A to the SMP). ❖ Continue implementing the Water Withdrawal Policy (Kleinschmidt 2018b). ❖ Continue implementing a shoreline classification system to guide management and permitting activities (Appendices C and D of the SMP).

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT WILDLIFE AND TERRESTRIAL RESOURCES
❖ Continue the requirements of a scenic easement for the purpose of protecting scenic and environmental values. ❖ Continue the use of a "sensitive resources" designation in conjunction with shoreline classifications on Harris Project lands managed for the protection and enhancement of cultural resources, wetlands, and threatened and endangered species. ❖ Continue implementing a shoreline compliance program and shoreline permitting program. ❖ Continue to encourage the adoption of shoreline best management practices (BMPs), including BMPs to maintain and preserve naturally vegetated shorelines, to preserve and improve the water quality of the Harris Project's reservoir, and to control soil erosion and sedimentation (Appendix E of the SMP). o Plant native trees, shrubs, and flowers for landscaping and gardens in order to reduce watering as well as chemical and pesticide use. o Preserve or establish a naturally managed vegetative filter strip along the shoreline to keep clearing of native trees and vegetation to a minimum. Alabama Power recommends a buffer set back of at least 15 feet measured horizontally from the full pool elevation. o Plant a low maintenance, slow growing grass that is recommended for your soil conditions and climate. o Maintain the grass as high as possible in order to shade out weeds and improve rooting so less fertilizing and watering are required. o Avoid dumping leaves or yard debris on or near the shoreline. ❖ Provide an update to the SMP every 10 years. ❖ Schedule for revising and implementing the SMP. o Within 6 months of license issuance, Alabama Power will revise or update the SMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval
• Finalize and implement a Recreation Plan (Alabama Power 2022d). ❖ Continue to operate and maintain 11 Harris Project recreation sites. ❖ Remove Wedowee Marine South as a Harris Project recreation site and request approval of entire facility as non-project use. ❖ Install and maintain recreation (canoe/kayak) access below Harris Dam within the Harris Project Boundary. ❖ Provide an additional recreation site on Lake Harris to include a day use park (swimming, picnicking, and boat ramp). ❖ Implement Barrier-Free Evaluation Program at existing recreation sites. ❖ Provide descriptions of the Project recreation sites including maps.

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT WILDLIFE AND TERRESTRIAL RESOURCES
❖ Provide a Recreation Plan update to FERC every 10 years including monitoring protocols and proposed methodologies for sampling. ❖ Schedule for finalizing and implementing the Recreation Plan. o Within 6 months of license issuance, Alabama Power will revise the Recreation Plan, as needed, in consultation with appropriate resource agencies, and file with FERC for approval

10.2.1 Skyline Wildlife and Terrestrial Resources

10.2.1.1 Wildlife Management Plan/Timber Management

Alabama Power proposes to implement a WMP, including specific timber management actions and BMPs that reduce or prevent runoff, erosion, and sedimentation that may impact streams and waterbodies within Skyline. Specifically, Alabama Power will continue to incorporate Alabama's Best Management Practices for Forestry. These practices include: the establishment of SMZs; avoidance of crossing of streams by roads, skid trails, or firebreaks when possible; when unavoidable, the utilization of the fewest possible steam crossings located where the bank and SMZ will be least disturbed; the proper planning and location of roads (Alabama Forestry Commission 2021). These management activities would continue to benefit ecological diversity and improve wildlife habitat. Management activities would also include continued provisions for hunting.

A small portion of one of the known populations of Price's Potato-bean within Skyline Project Boundary may still occur, although recent surveys did not detect the species within the Skyline Project Boundary. Alabama Power would conduct additional surveys in the area of the known population prior to any timber management activities to ensure that the known population is not impacted, if still present.

The ADCNR would continue to manage 42 acres of permanent openings. In an otherwise forested landscape, managed openings often serve as a valuable source of food for wildlife including brood habitat for forest birds and browse for deer and wild turkey and can foster diversity by providing early-successional habitat and by increasing edge habitat. Improvement of edge habitat can increase food and cover availability along the forest edge to benefit many wildlife species that utilize edge habitat for feeding, nesting, and travel (Brittingham 2016).

Alabama Power's proposal to manage the timber not only works in concert with, but also enhances, the primary objectives of wildlife management, habitat improvement, and aesthetics. Continuing to implement timber management as part of the WMP would have a long-term beneficial effect on timber and wildlife and its habitat.

Alabama Power proposes to implement the Alabama Power Company-Avian Protection Plan (APP) (Alabama Power 2022b) at the Harris Project. Implementing the elements of this plan, including using avian safe construction standards and implementing methods to reduce interactions, would have a long-term beneficial effect on the overall survivability of birds using power lines and structures.

10.2.2 Skyline Wetlands

10.2.2.1 Wildlife Management Plan/Timber Management

Due to steep terrain and smaller floodplains, there are limited large areas of wetlands that occur within the Skyline Project Boundary (Alabama Power and Kleinschmidt 2018). Alabama Power proposes to finalize and implement a WMP, including specific timber management actions and BMPs that reduce or prevent runoff, erosion, and sedimentation that may impact streams and waterbodies within Skyline. Specifically, Alabama Power will continue to incorporate Alabama's Best Management Practices for Forestry as provided by the Alabama Forestry Commission. These practices include: the establishment of SMZs; avoidance of crossing of streams by roads, skid trails, or firebreaks when possible; when unavoidable, the utilization of the fewest possible steam crossings located where the bank and SMZ would be least disturbed; and the proper planning and location of roads (Alabama Forestry Commission 2021). These management activities would continue to benefit riparian and streamline zones where wetlands may occur.

10.2.3 Lake Harris Wildlife and Terrestrial Resources

10.2.3.1 Continued Operation (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. Existing operations result in a winter pool elevation of 785-feet msl. Maintaining the existing winter pool elevation would continue providing both unwetted and littoral habitat for foraging species.

10.2.3.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. The proposed continuous minimum flow would not cause significant water surface elevation fluctuations or changes in wetted perimeter around Lake Harris. Therefore, Lake Harris wildlife and terrestrial resources would not be affected by the proposed continuous minimum flow.

In addition, Alabama Power proposes to develop low-inflow and drought operations procedures for the minimum flow unit in consultation with resource agencies following unit installation and performance testing. Any such procedures would not be inconsistent with ADROP. Drought operations procedures for the minimum flow unit would be developed so that reservoir elevations would not be lower than would occur under baseline operating conditions.

10.2.3.3 Nuisance Aquatic Vegetation and Vector Control Program

Alabama Power proposes to finalize and implement a Nuisance Aquatic Vegetation and Vector Control Program at Lake Harris. The Program would include: 1) the frequency, timing, and locations, of surveys to identify areas where nuisance aquatic vegetation could create a public health hazard, affect power generation facilities, restrict recreational use, or pose a threat to the ecological balance of Lake Harris; 2) methods for monitoring increases in nuisance aquatic vegetation; 3) methods for controlling nuisance aquatic vegetation and vectors; and 4) a schedule for monitoring. This Program would have a beneficial effect on wildlife and terrestrial resources by managing and controlling nonindigenous aquatic plant species using EPA-approved herbicides and algaecides. This will benefit natural vegetation and wildlife that forage in the littoral area. The Program will also control vectors, organisms that carry disease causing pathogens from one host to another. The main target of vector control is mosquitoes. Vectors are monitored and controlled by reduction of standing water that could be conducive to breeding, application of larvicide, and adulticiding of mosquitoes. Vector control is designed to prevent nuisance levels of mosquitoes that could affect the health and well-being of lake residents and visitors but could possibly reduce available forage for wildlife that prey on mosquitoes.

10.2.3.4 Wildlife Management Plan/Timber Management

Alabama Power proposes to finalize and implement a WMP, including specific timber management actions and BMPs that reduce or prevent runoff, erosion, and sedimentation that may impact streams and waterbodies at Lake Harris. Specifically, Alabama Power will continue to incorporate Alabama's Best Management Practices for Forestry. These practices include: the establishment of SMZs; avoidance of crossing of streams by roads, skid trails, or firebreaks when possible; when unavoidable, the utilization of the fewest possible steam crossings located where the bank and SMZ will be least disturbed; the proper planning and location of roads (Alabama Forestry Commission 2021). Implementing these BMPs would protect riparian habitat for those wildlife species that inhabit or forage in those areas.

The WMP would consolidate numerous wildlife management activities into a single document and provide the additional technical information and management guidelines requested by resource agencies and other stakeholders during relicensing. Wildlife management objectives identified during relicensing in consultation with ADCNR and USFWS include management of shoreline areas for native vegetative communities and enhanced value as wildlife habitat; implementation of timber management methods that result in enhanced value of Project lands as wildlife habitat; and management of public hunting areas, including areas for the physically disabled.

Forest lands located within the Lake Harris Project Boundary would be managed according to the timber management actions described in the WMP. The objective of timber management at Lake Harris is to ensure long-term health and sustainability of the forest, while enhancing wildlife management through ecological diversity and habitat improvement that would benefit wildlife and terrestrial resources.

Alabama Power would continue to manage approximately 105 acres of permanent openings. In an otherwise forested landscape, managed openings often serve as a valuable source of food for wildlife including brood habitat for forest birds and browse for deer and wild turkey and can foster diversity by providing early-successional habitat and by increasing edge habitat. Improvement of edge habitat can increase food and cover availability along the forest edge to benefit many wildlife species that utilize edge habitat for feeding, nesting, and travel (Brittingham 2016).

Alabama Power would continue to plant and maintain greenfields and/or other wildlife openings in the vicinity of the shooting houses annually. Shooting houses, specifically designed to accommodate disabled hunters, as well as road access to the shooting houses, would be maintained. Alabama Power would also continue to maintain Pollinator Plots at Little Fox Creek that strengthen natural habitat for the Monarch Butterfly and other pollinators such as bees, moths, and beetles. Little Fox Creek was developed with plants chosen for that specific habitat in order to benefit pollinator species.

10.2.3.5 Avian Protection Plan

Alabama Power proposes to implement the APP at the Harris Project. Powerline interactions can cause bird injuries/mortalities that can result in power outages and fires. Alabama Power seeks to manage and minimize potentially harmful or fatal avian interactions with power lines, transmission towers, or other Alabama Power structures. The implementation of an Avian Protection Plan, following guidelines set forth in peer-recognized industry and/or resource agency publications, would promote regulatory compliance with bird protection laws at all levels, provide for enhanced avian protection by revising best management practices where appropriate, allow and encourage cooperative protection efforts involving resource agencies and other stakeholders, provide adequate training and other resources for Alabama Power employees, and provide avian-friendly alternatives for construction standards and procedures as applicable. Alabama Power's APP would minimize adverse avian/utility structure interactions, which would multiple potential benefits to customers including increased reliability, cost savings, and opportunities for positive public relationships and environmental stewardship.

10.2.3.6 Shoreline Management Plan

At Lake Harris, protection and enhancement of available shoreline habitat for wildlife would occur through implementation of a SMP. The SMP outlines management practices for the 367 miles of shoreline within the Lake Harris Project Boundary. Alabama Power proposes to continue the shoreline classification system to guide management and permitting activities and proposes to continue the use of the "sensitive resources" designation in conjunction with shoreline classifications on Project lands managed for the protection and enhancement of cultural resources, wetlands, and threatened and endangered species.

The SMP would incorporate proposed changes in land use classifications (including reclassifying the botanical area at Flat Rock Park from recreation to Natural/Undeveloped) and a modified definition for lands classified as Natural/Undeveloped to include Project lands that would remain undeveloped for the following specific Project purposes.

- Protecting environmentally sensitive areas
- Preserving natural aesthetic qualities
- Serving as buffer zones around public recreation areas
- Preventing overcrowding of partially developed shoreline

This classification would assist in protecting environmentally sensitive areas and preserve vegetative buffer zones at Lake Harris. Alabama Power's proposal to reclassify 57-acres of project lands near Flat Rock Park from "Recreational" to "Natural/Undeveloped" would provide the natural plant and animal community at this location additional protection. Limiting development on these natural undeveloped lands would protect terrestrial resources along the shoreline, enhance food and cover availability for wildlife species, and provide corridors for passage among the larger habitats. These nearshore environments provide important breeding and nursery areas for fish and amphibians species, as well as feeding cover for North American River Otters (*Lontra canadensis*), North American Beavers (*Castor canadensis*), and waterfowl. Specific management actions associated with the natural undeveloped lands are included in the SMP.

The SMP would also recommend shoreline BMPs to landowners to maintain and preserve naturally vegetated shorelines to preserve and improve the water quality of the Project's reservoir, and to control soil erosion and sedimentation. The SMP would continue to limit the construction of new sea walls to areas where erosion, wave action, and boat traffic are substantial or in areas where a previously installed seawall has failed. Alabama Power encourages the use of alternative bank stabilization techniques other than seawalls. Such alternatives include, but are not limited to, riprap, bioengineering techniques, natural vegetation with riprap, and gabions. Alabama Power requires, as a condition of a permit, that any future seawall proposals include the placement of riprap, for fish and other semi-aquatic species habitat and increased stability, in front of the seawall. Alternative bank stabilization techniques are preferred methods of erosion control and would likely benefit wildlife and terrestrial resources by providing habitat and minimizing adverse effects on water quality at Lake Harris.

Alabama Power proposes to continue to incorporate a scenic easement for the purpose of protecting scenic and environmental values. This classification includes lands located between the 795-feet msl contour and the 800-feet msl[39] contour. These lands are currently controlled by easement for the Project purpose of protecting scenic and environmental values, maintaining a beneficial effect on wildlife and terrestrial resources.

Alabama Power's Dredge Permit Program, developed in consultation with the USACE and other agencies, establishes the processes and procedures for permittees seeking to obtain direct authorization from Alabama Power for dredging activities up to 500 CY of material (below the full pool elevation). The Dredge Permit Program is not intended to cover applications for dredging on lands determined to be "sensitive." The Dredge Permit Program streamlines the process for allowing dredging under 500 cubic yards thus providing opportunity for homeowners to remove sediments that may restrict access. The proposed location of the spoil site for placement of dredged materials requires approval by Alabama Power and must be identified and included with the application. Spoils may not be placed in areas identified as potentially environmentally sensitive, adjacent waters, bottomland hardwoods, or wetlands, and spoils must be placed in a confined upland area in such a manner that sediment will not re-enter the waterway or interfere with natural drainage. Continuing the Dredge Permit Program would have a beneficial effect on wildlife and terrestrial resources in and around Lake Harris.

10.2.3.7 Recreation Plan

Alabama Power is proposing to finalize and implement a Recreation Plan with provisions to provide an additional day use park on Lake Harris to include amenities for swimming, picnicking, and a boat ramp. Depending on siting, the addition of a new recreation site would cause a disruption of the Lake Harris shoreline and associated terrestrial resources. Land clearing activities would be conducted to accommodate the new day use park. Native vegetation would be planted where possible following construction. In addition, short-term displacement of wildlife in the area would occur during construction activities.

[39] Or 50 horizontal feet from 793-feet msl, whichever is less, but never less than 795-feet msl.

10.2.4 Lake Harris Wetlands

10.2.4.1 Continued Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. Continuing to lower the winter pool 8 feet from December through March would not affect the existing wetlands that are compatible with the existing operating curve.

10.2.4.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. This proposal would have negligible effects on water surface elevation fluctuations or changes in wetted perimeter at Lake Harris; therefore, there would be no effect on wetland resources.

10.2.4.3 Shoreline Management Plan

Alabama Power proposes to finalize and implement a SMP. Alabama Power encourages the use of alternative bank stabilization techniques other than seawalls. Such alternatives include, but are not limited to, riprap, bioengineering techniques, natural vegetation with riprap, and gabions. Alabama Power requires, as a condition of a permit, that any future seawall proposals include the placement of riprap, for fish and other semi-aquatic species habitat and increased stability, in front of the seawall. Only in very limited cases where the Alabama Power regional coordinator is convinced that riprap would not be an effective source of bank stabilization, or would be economically unfeasible, would seawalls without riprap be permitted. Alternative bank stabilization techniques and riprap would have a beneficial effect on wetlands around Lake Harris.

Alabama Power’s proposed SMP would designate identified wetlands as sensitive resources. This designation allows for protecting environmentally sensitive areas. Permitted activities in these areas, if applicable, may be highly restrictive or prohibited to avoid potential impacts. There are 14.98 acres of alluvial wetlands totaling 11.35 miles of shoreline along the Lake Harris Project Boundary (Cahaba Consulting 2018b). Implementation of the shoreline permitting program would have a beneficial effect on wetland resources by additional environmental review at the application stage of the permitting process.

10.2.4.4 Recreation Plan

Alabama Power is proposing to finalize and implement a Recreation Plan with provisions to provide an additional recreation site on Lake Harris to include a day use park with amenities for swimming, picnicking and a boat ramp. Alabama Power would develop this site outside of known wetlands, thus eliminating any adverse effects to wetlands along the reservoir shoreline.

10.2.5 Tallapoosa River Downstream of Harris Dam Wildlife and Terrestrial Resources

10.2.5.1 Continued Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. No impacts to wildlife and terrestrial resources in the Tallapoosa River downstream of Harris Dam are expected compared to baseline.

10.2.5.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. This proposal would result in a more stable riverine environment downstream of Harris Dam compared to the Green Plan (baseline) operation of releasing periodic pulse flows downstream. Under Alabama Power's proposed minimum flow, percent wetted area would increase, while fluctuation in water surface elevation would decrease (Figure 10-3 and Figure 10-4). A more stable water surface elevation results in greater uniformity among the environment and shallow breeding sites for early spring breeding amphibians. Therefore, the proposed continuous minimum flow of approximately 300 cfs would have a beneficial effect on wildlife habitat in the Tallapoosa River between Harris Dam and Horseshoe Bend. Changes in wetted perimeter, wetted perimeter fluctuation, and water surface elevation would have a beneficial effect on the littoral habitat between Harris Dam and Horseshoe Bend. No other habitat type, such as upland habitats, are expected to be affected by these changes.

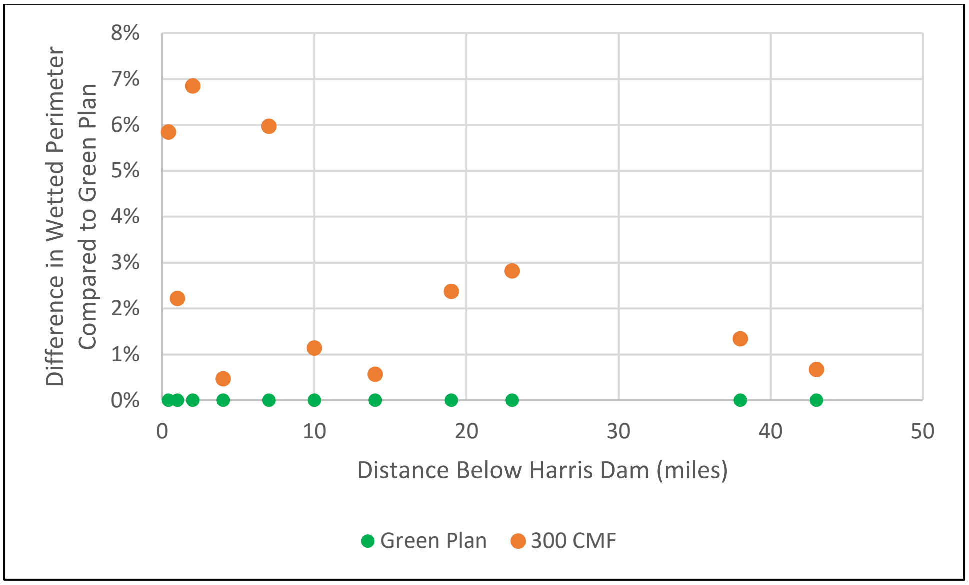

Figure 10-3 Wetted Perimeter Change Compared to Green Plan (Baseline) Operations

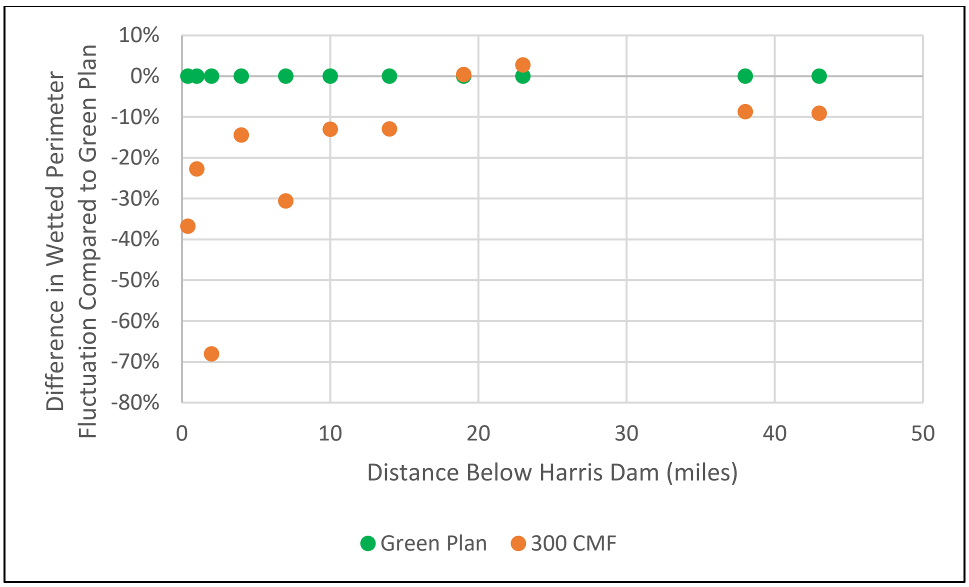

Figure 10-4 Wetted Perimeter Fluctuation Change Compared to Green Plan (Baseline) Operations

10.2.5.3 Recreation Plan

Alabama Power is proposing to finalize and implement a Recreation Plan with provisions to install and maintain recreation access for canoes/kayaks at the existing Harris Tailrace Fishing Pier within the Project Boundary below Harris Dam. The new recreation access area would cause temporary disturbance of the Tallapoosa River shoreline and associated terrestrial resources. Land clearing activities would occur to accommodate the new access area and canoe/kayak launch; however, land clearing would be conducted to the least extent possible and would include BMPs such as soil and erosion control plans and native re-vegetation. In addition, short-term displacement of wildlife in the area would occur during construction activities.

10.2.6 Tallapoosa River Downstream of Harris Dam Wetlands

10.2.6.1 Continued Operations (Normal, Flood, Drought)

Alabama Power's proposal to continue operating the Harris Project according to the existing operating curve, flood control procedures, and ADROP would have no effect on wetland resources in the Tallapoosa River downstream of Harris Dam compared to baseline.

10.2.6.2 Continuous Minimum Flow

Alabama Power's proposal to implement a continuous minimum flow of approximately 300 cfs would result in a more stable riverine environment in the Tallapoosa River downstream of Harris Dam. Changes in wetted perimeter, wetted perimeter fluctuation, and water surface elevation would have a minor beneficial effect on the littoral habitat between Harris Dam and Horseshoe Bend by providing more stable flows and wetted perimeter.

10.2.6.3 Recreation Plan

Alabama Power is proposing to finalize and implement a Recreation Plan with provisions to install and maintain recreation access for canoes/kayaks below Harris Dam at the existing Harris Tailrace Fishing Pier within the Project Boundary. Alabama Power would develop this site outside of existing wetlands and minimize shoreline disruption to the extent possible during construction. No adverse effects to downstream wetland resources are anticipated.

10.3 Unavoidable Adverse Impacts

10.3.1 Skyline

During timber management activities, there may be short-term adverse effects on terrestrial and wildlife resources from timber harvests immediately following these management actions. Implementing specific management BMPs and procedures would reduce or eliminate adverse impacts to these resources.

10.3.2 Lake Harris

Similar to Skyline, during timber management activities around Lake Harris, there may be short-term adverse impacts to terrestrial and wildlife resources from timber harvests immediately following these management actions. Following specific management BMPs and procedures would reduce or eliminate adverse impacts to these resources. In addition, construction of recreation access/facilities on Lake Harris may result in a short-term adverse effect on terrestrial resources. Construction may cause short-term disturbance to the terrestrial environment due to deployment of construction machinery. Implementing construction BMPs and procedures would reduce or eliminate adverse impacts to terrestrial resources.

10.3.3 Tallapoosa River Downstream of Harris Dam

Short-term, unavoidable adverse impacts associated with the proposed installation of a minimum flow unit at Harris Dam and downstream recreation site include disturbance to the terrestrial environment due to deployment of construction machinery. Construction BMPs would reduce or eliminate potential effects. These impacts would be temporary during construction periods and would not impact the Tallapoosa River once construction is complete.

10.4 Recommended PME Measures Not Adopted

In response to the PLP, resource agencies, NGOs, and other stakeholders recommended specific PME measures that may affect wildlife and terrestrial resources. Some of the recommended PME measures are incorporated in Alabama Power's proposal. This section briefly describes the stakeholder recommended PME measures that Alabama Power is not including in its relicensing proposal.

10.4.1 Unit Ramping

The ADCNR and various downstream stakeholders recommend that Alabama Power consider ramping the generators during peaking operations. Ramping would involve incrementally increasing the flow through the turbines up to best/full gate. Ramping would not change the overall magnitude of water surface fluctuations experienced downstream, resulting in a negligible effect on wildlife and terrestrial resources and wetlands downstream of Harris Dam. Ramping would reduce the rapid change between baseline flow and either one- or two-unit generation and may provide a slight increase in time for aquatic or riparian dwelling wildlife to move to higher ground prior to the water rising.

Rapid change between baseflow and either one- or two-unit generation would have very little effect on wetlands compared to baseline. Because the turbines at Harris Dam were not designed to run at flows less than best/full gate, they would be subject to mechanical damage and therefore, Alabama Power would not operate the units in this manner.

10.4.2 Seasonal Minimum Flows

The ADCNR recommends that Alabama Power consider a minimum flow that varies seasonally and more closely mimics an unregulated system. As mentioned, Alabama Power's proposed 300 cfs minimum flow unit is the largest that can practically be installed in the available space. The existing units are not capable of operating at levels less than best gate. Alabama Power notes that seasonality in releases from the Harris Dam is already inherent due to the nature of existing climate and hydrology, with higher flow periods typically occurring in late winter and early spring, and lower flow periods typically occurring in summer and early fall.

11.0 THREATENED AND ENDANGERED SPECIES

11.1 Affected Environment

Research conducted through the USFWS's *Information for Planning and Consultation* (IPaC) identified 20 federally protected species that are present in counties where the Harris Project is located. The USFWS's Environmental Conservation Online System (ECOS) was used to specifically determine the location of species' ranges and areas of critical habitat relative to the Project Boundary. Alabama Power conducted a desktop analysis that developed GIS overlays of habitat information and maps to determine if further evaluation (i.e., field surveys) of any identified species and their habitat was warranted. Results of the desktop analysis are included in the *Final Threatened and Endangered Species Study Report* (Kleinschmidt 2021c).

Consultation with the USFWS, ADCNR, and the Alabama Natural Heritage Program (ALNHP) confirmed the need for field surveys to determine the presence or absence of certain listed species. Field surveys were performed for the Red-cockaded Woodpecker (RCW) (*Picoides borealis*), Palezone Shiner, Finelined Pocketbook (*Hamiota altilis*), White Fringeless Orchid (*Platanthera integrilabia*), and Price's Potato-bean (*Apios priceana*) to determine if there are existing specimens or habitats within the Harris Project Boundary. The five species and general survey locations are listed in Table 11-1 and described below.

Table 11-1 Threatened and Endangered Species Field-Surveyed at Skyline and Lake Harris

Species	Surveys Conducted at Skyline	Surveys Conducted at Lake Harris
Red-cockaded Woodpecker		*
Palezone Shiner	*	
Finelined Pocketbook		*
White Fringeless Orchid	*	*
Price's Potato-bean	*	

Source: Kleinschmidt 2021c

The Gray Bat (*Myotis grisescens*) is likely present within the Skyline Project Boundary, and the Indiana Bat (*Myotis sodalis*) and Northern Long-eared Bat (*Myotis septentrionalis*) are likely present within both the Skyline and Lake Harris Project Boundaries; however, the

USFWS did not recommend surveys for any bat species because Alabama Power uses is coordinating with USFWS to develop a plan for timber harvest that is protective of these bats and because no areas of critical habitat occur within or adjacent to the Project Boundary (Kleinschmidt 2021c). Furthermore, the American Hart's-tongue Fern (*Asplenium scolopendrium var. americanum*) was listed as threatened in 1989 but was not reported by IPaC as a species present in counties where the Harris Project is located at the time the *Final Threatened and Endangered Species Study Report* (Kleinschmidt 2021c) was developed. The Monarch Butterfly (*Danaus plexippus*) was listed as a candidate species in 2020 and is not yet listed or proposed for listing. It was therefore not included in the *Final Threatened and Endangered Species Study Report* (Kleinschmidt 2021c).

On September 28, 2021, FERC filed a letter[40] requesting that all 20 species from the *Final Threatened and Endangered Species Study Report* be included in the analysis of species that may occur within the Project Vicinity or be affected by the Project. In addition, FERC requested that the threatened American Hart's-tongue Fern and the candidate Monarch Butterfly be included in environmental analysis. General species information on Palezone Shiner, Spotfin Chub (*Erimonax monachus*), Alabama Lampmussel (*Lampsilis virescens*), Cumberland Bean (*Venustaconcha trabalis*), Fine-rayed Pigtoe (*Fusconaia cuneolus*), Pale Lilliput (*Toxolasma cylindrellus*), Rabbitsfoot (*Theliderma cylindrica*), Snuffbox (*Epioblasma triquetra*), Shiny Pigtoe (*Fusconaia cor*), Slabside Pearlymussel (*Pleuronaia dolabelloides*), Indiana Bat, Northern Long-eared Bat, Gray Bat, White Fringeless Orchid, Price's Potato-bean, Morefield's Leather Flower (*Clematis morefieldii*), American Hart's-tongue Fern, and Monarch Butterfly is presented in the Skyline section of the Affected Environment. General species information on the Red-cockaded Woodpecker, Finelined Pocketbook, Southern Pigtoe (*Pleurobema georgianum*), and Little Amphianthus (*Gratiola amphiantha*) is presented in the Lake Harris section of the Affected Environment. Any surveys conducted for these species at both or either Skyline or Lake Harris are presented in those sections, respectively.

A table of state protected species is presented in Appendix E.

[40] Accession No. 20210928-3028

11.1.1 Skyline

11.1.1.1 Palezone Shiner

The federally endangered Palezone Shiner is a small, slender minnow species with a pointed snout and large eyes. It has a small, dark, wedge-shaped spot at the base of the caudal fin and may exhibit a light-yellow color at the base of its pectoral fins during breeding. Historically, this species was found in the Tennessee and Cumberland River systems; however, the only known extant populations occur in the Paint Rock River watershed (Tennessee River tributary), and the Little South Fork of the Cumberland River, both of which are outside of Skyline Project Boundary (Kleinschmidt 2021c). Palezone Shiner are found in runs and pools of large creeks and small rivers with clean bedrock, cobble, gravel, and sand. Spawning likely occurs between May and July, peaking in June. Limited distribution makes this species vulnerable to extinction.

The USFWS has both a Recovery Plan (USFWS 1997a) and a Five-Year Review (USFWS 2014). The IPAC and Federal Register do not list the Palezone Shiner as occurring in the counties where the Lake Harris Project Boundary is located. Habitat range for this species is located immediately to the west of the Skyline Project Boundary (Figure 11-1).

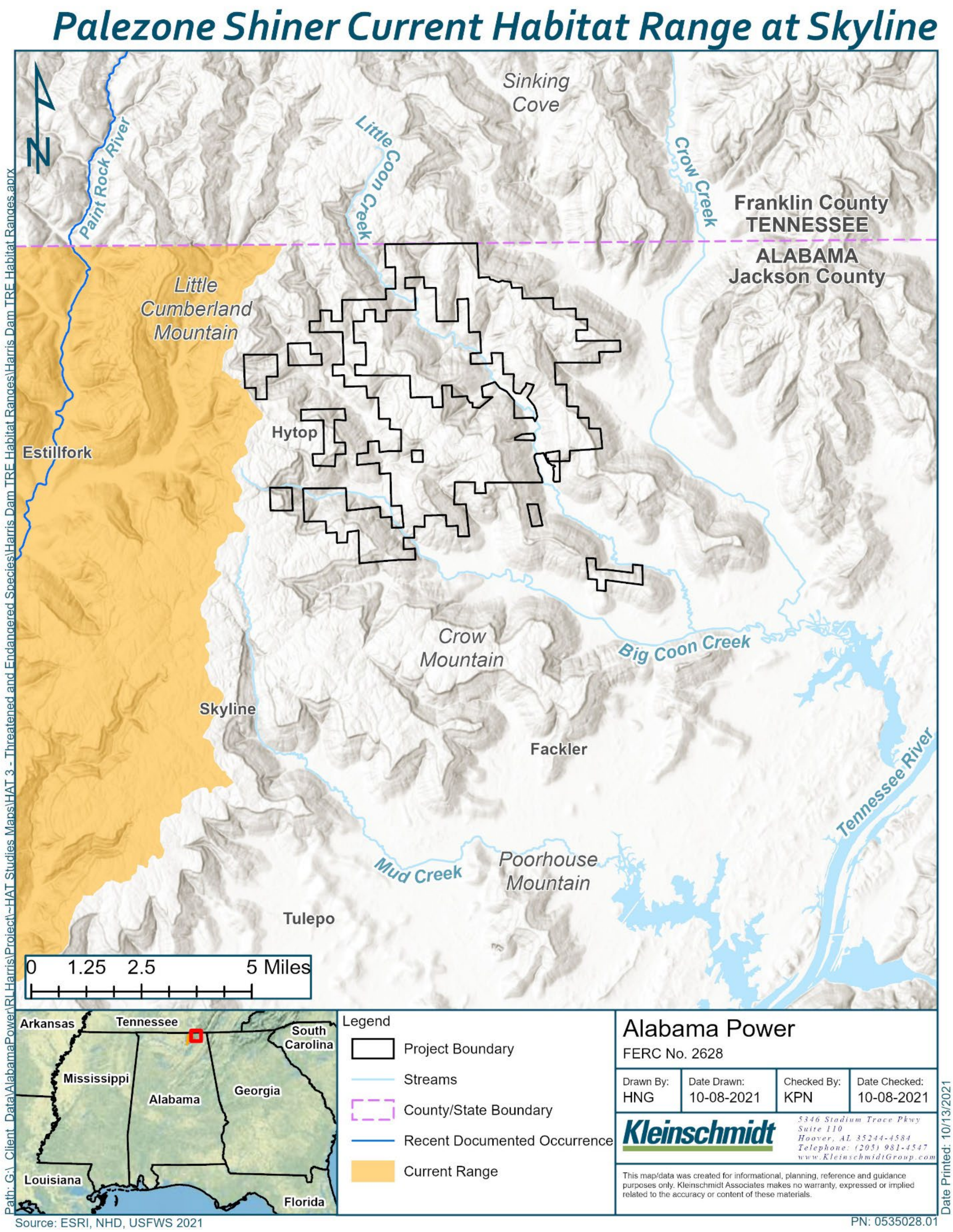

Figure 11-1 Palezone Shiner Current Habitat Range at Skyline

USFWS recommended surveys for Palezone Shiner due to the possible presence of them in tributaries within Skyline. On June 10-11, 2020, Alabama Power conducted surveys for Palezone Shiner at four locations on Little Coon Creek (Table 11-2).

Table 11-2 Palezone Shiner Survey Locations

SITE NUMBER	MILES UPSTREAM OFMOUTH OF LITTLE COON CREEK	DESCRIPTION
1	1.8	County Road 53
2	7.0	County Road 566
3	8.6	County Road 567
4	10.8	County Road 54

Source: Kleinschmidt 2021c

Alabama Power and ADEM surveyors performed fish IBI sampling according to methods in O'Neil and Shepard (2010). Sites were sampled by backpack electrofishing and seining and stratified over riffle, run, pool, and shoreline habitats. Sampling efforts were expended proportionally in each of the riffle, run, and pool habitat types (30 efforts total) and two efforts were expended along stream shorelines. All captured fish were identified to species and released. No Palezone Shiners were collected or observed at any of the four survey sites (Kleinschmidt 2021c) (Figure 11-2).

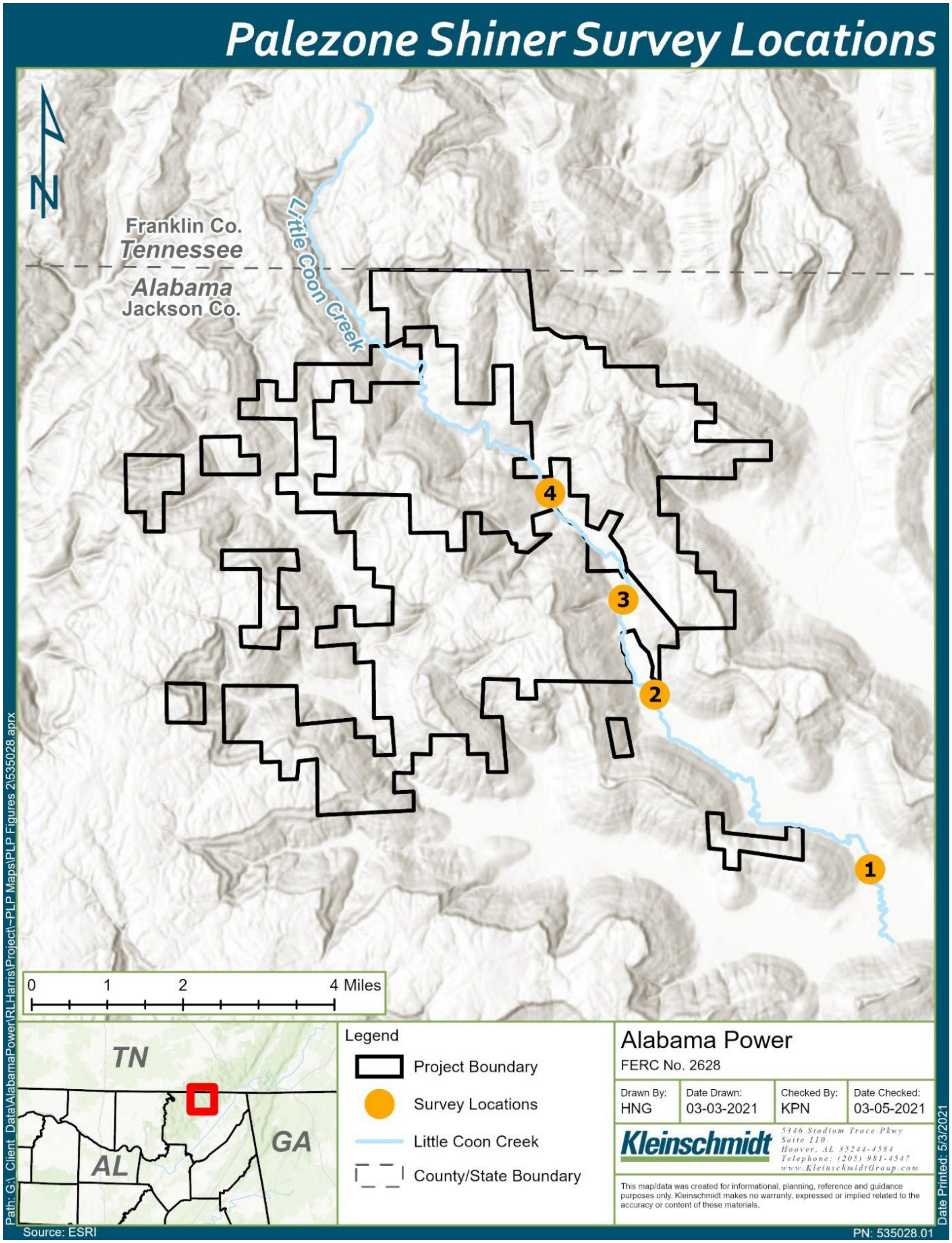

Figure 11-2 Palezone Shiner Survey Locations

11.1.1.2 Spotfin Chub

The Spotfin Chub was listed as threatened in 1977. The Spotfin Chub is an elongate minnow species with dusky green coloration above the lateral line and silver below. Breeding males develop a metallic blue coloration and white fin margins. Historically, this species was endemic to upland habitats in the Tennessee River drainage including parts of Alabama; however, it is presumed to be extirpated in Alabama and Georgia. The Spotfin Chub is found in clear, large creeks and medium-sized rivers with moderate current over bedrock and gravel substrates. Spawning probably occurs between May and August. Threats to this species include habitat loss and degradation.

The USFWS has both a Recovery Plan (USFWS 1983) and Five-Year Review (USFWS 2019a) for the Spotfin Chub. The IPAC and Federal Register do not list the Spotfin Chub as occurring in the counties where the Lake Harris Project Boundary is located. Habitat range for this species is located immediately to the west of Skyline (Figure 11-3), but there are no published reports of occurrences of this species within the Skyline Project Boundary.

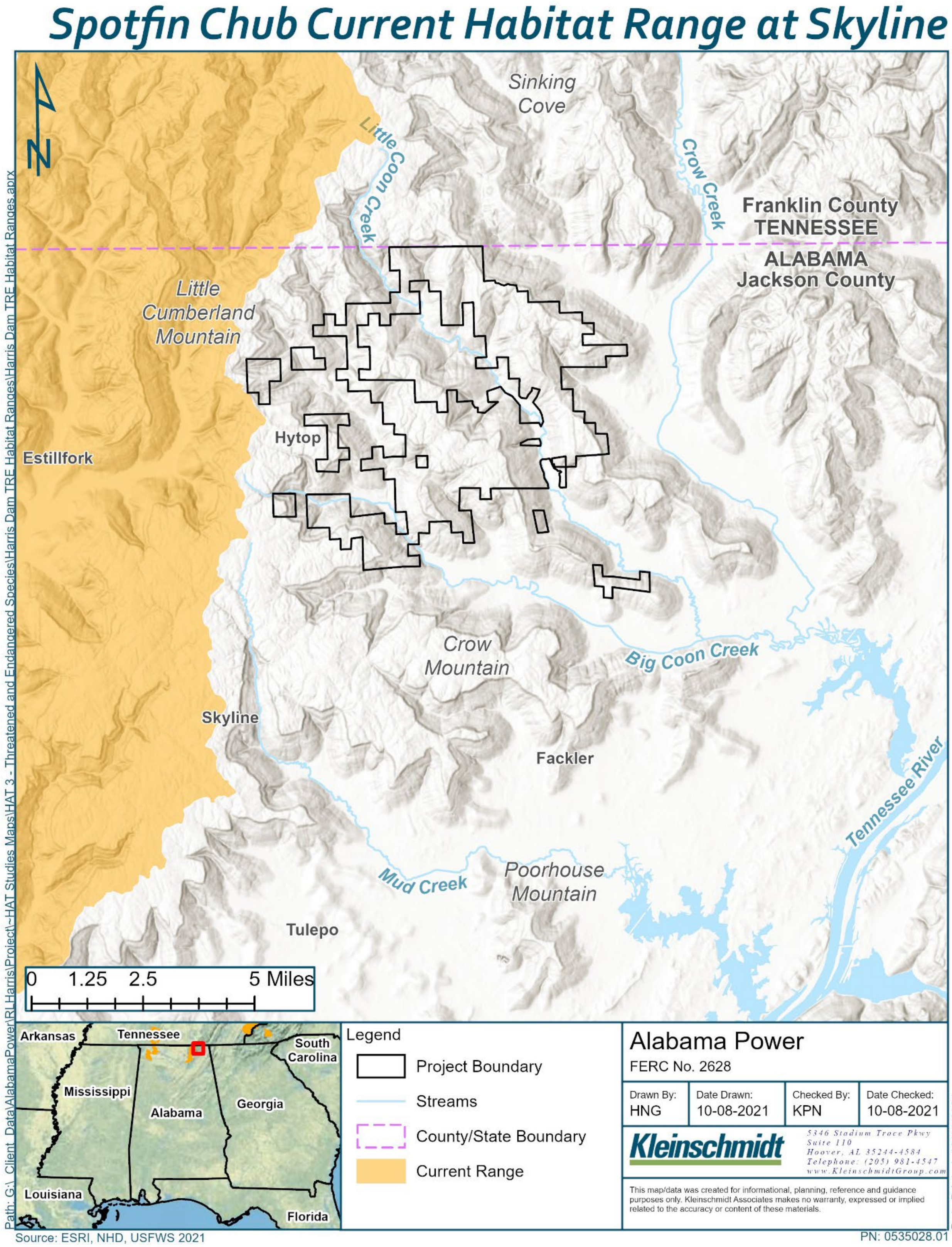

Figure 11-3 Spotfin Chub Current Habitat Range at Skyline

11.1.1.3 Alabama Lampmussel

The Alabama Lampmussel was listed as endangered in 1976 (Mirarchi et al. 2004) and is found in shoals in small to medium rivers (Parmalee and Bogan 1998). The Alabama Lampmussel is endemic to the Tennessee River system and historically occurred from its headwaters downstream to Muscle Shoals (Ortmann 1925, Parmalee and Bogan 1998). Now, it is only known to occur in upper reaches of the Paint Rock River system, Jackson County, Alabama (Halted 1995) (Figure 11-4). The ADCNR and USFWS is currently reintroducing the Alabama Lampmussel into suitable historical habitats within the state (USFWS 2012). The Alabama Lampmussel has a moderately thin shell with a maximum length of 2 ¾ inches, elliptical to long ovate in outline, and somewhat inflated. Although unknown, this species is thought to be a long-term brooder (Mirarchi et al. 2004). In laboratory trials Alabama Lampmussel glochidia have been found to utilize Rock Bass (*Ambloplites rupestris*), Green Sunfish (*Lepomis cyanellus*), Bluegill, Smallmouth Bass (*Micropterus dolomieu*), Spotted Bass (*Micropterus punctulatus*), Largemouth Bass, and Redeye Bass (*Micropterus coosae*) as host fish and that Banded Sculpin appear to be marginal hosts (Williams et al. 2008).

This species is imperiled due to water quality degradation primarily caused by agricultural runoff, severely restricted distribution, rarity, and vulnerability to habitat degradation (USFWS 2012). Habitat degradation is the leading cause of the decline for this species (USFWS 2012). Unauthorized removal of gravel from the Paint Rock River drainage basin results in degradation of Alabama Lampmussel habitat (USFWS 2012). Factors that have the potential to affect this species' persistence include droughts, toxic spills, and fish barriers which restrict freshwater mussel distribution (USFWS 2012).

The USFWS has both a Recovery Plan (USFWS 1985) and Five-Year Review (USFWS 2012) for the Alabama Lampmussel. The IPaC and Federal Register do not list the Alabama Lampmussel as occurring in the counties where the Lake Harris Project Boundary is located. Habitat range for Alabama Lampmussel is located immediately to the west of Skyline (Figure 11-4) but there are no published reports of occurrences of this species within the Skyline Project Boundary.

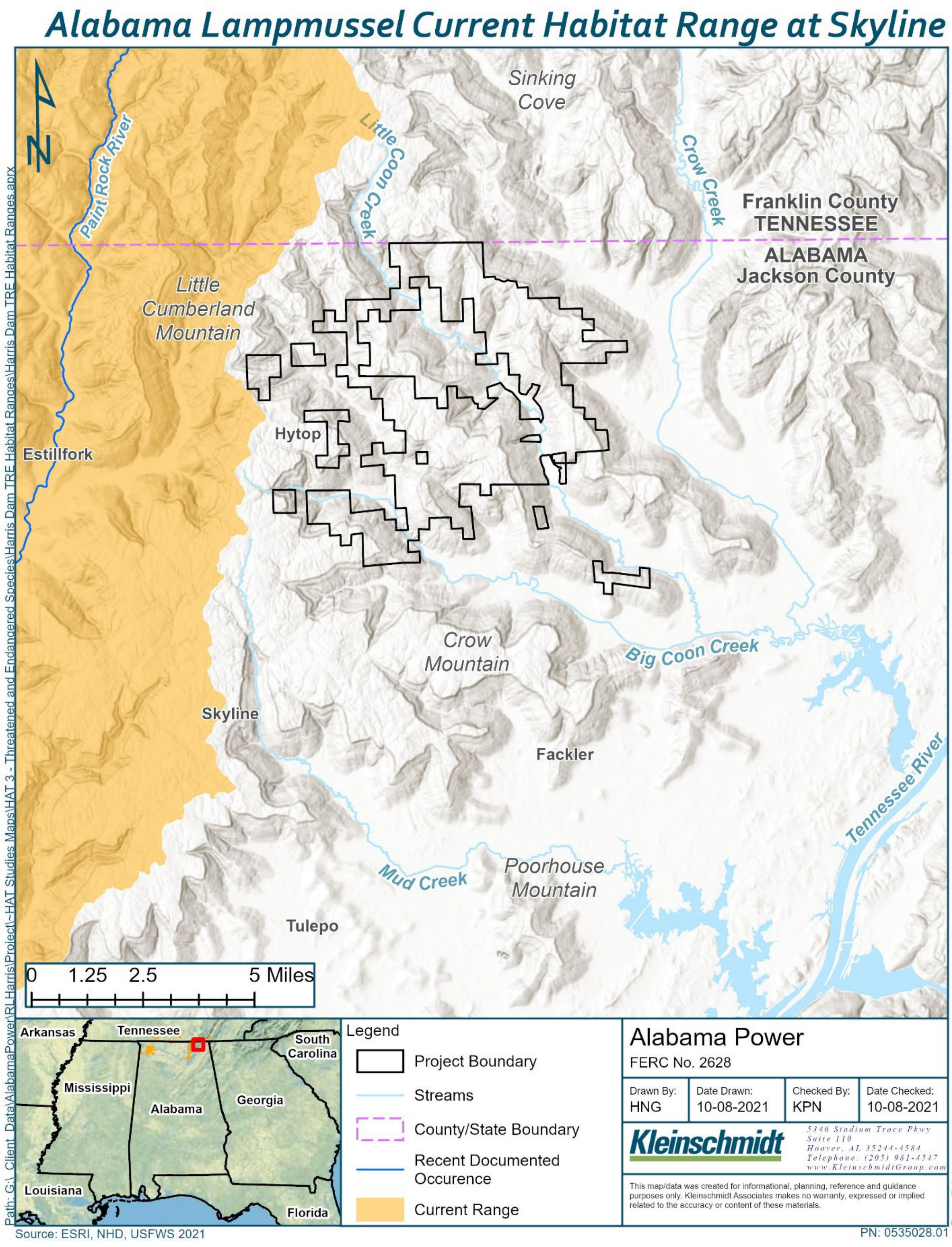

Figure 11-4 Alabama Lampmussel Current Habitat Range at Skyline

11.1.1.4 Cumberland Bean

The USFWS listed the Cumberland Bean as endangered in 1976 (USFWS 2016b). This species can be found in swift riffles of small rivers and streams with gravel or mixture of sand and gravel substrate (Parmalee and Bogan 1998). This species is endemic to the upper Cumberland River system in Kentucky and the Tennessee River system from headwaters downstream to Muscle Shoals, Alabama (Figure 11-5). The Cumberland Bean has not been reported in Alabama since impoundment of the Tennessee River and is considered extirpated (Parmalee and Bogan 1998, Mirarchi et al. 2004). The ADCNR and USFWS is currently reintroducing the Cumberland Bean into suitable historical habitats within the state (USFWS 2020a). This species has a solid, elongated shell with a maximum length of 2 ⅛ inches. Females grow slightly larger than males (Mirarchi et al. 2004). Host fish for the Cumberland Bean glochidia include Barcheek (*Etheostoma obeyense*), Fantail (*Etheostoma flabellare*), Johnny (*Etheostoma nigrum*), Rainbow (*Etheostoma caeruleum*), Snubnose (*Etheostoma simoterum*), Dirty (*Etheostoma olivaceum*), Striped (*Etheostoma virgatum*), and Stripetail (*Etheostoma kennicotti*) Darters (Parmalee and Bogan 1998). Factors contributing to the decline of this species includes impoundments, siltation, and pollution (USFWS 2020a). Limited distribution and rarity make it vulnerable to extinction (USFWS 2020a). Factors that have the potential to affect this species' persistence include changes in land use, pollution, contaminant spills, resource extraction, and siltation (USFWS 2020a).

The USFWS has both a Recovery Plan (USFWS 1984a) and Five-Year Review (USFWS 2010) for the Cumberland Bean. The IPaC and Federal Register do not list the Cumberland Bean as occurring in the counties where the Lake Harris Project Boundary is located. Habitat range for the Cumberland Bean is located immediately to the west of Skyline (Figure 11-5), but there are no published reports of occurrences of this species within the Skyline Project Boundary.

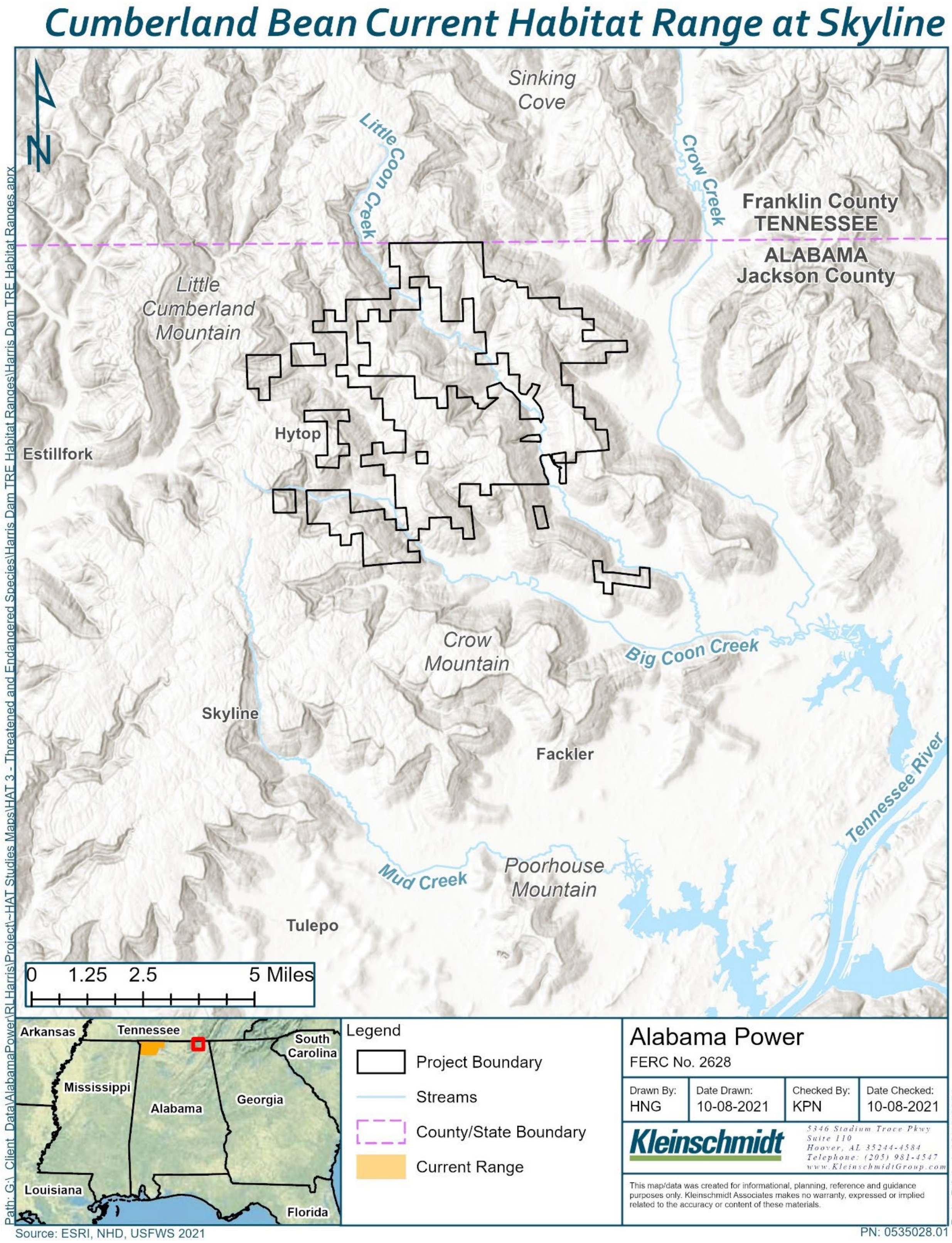

Figure 11-5 Cumberland Bean Current Habitat Range at Skyline

11.1.1.5 Fine-rayed Pigtoe

The USFWS listed the Fine-rayed Pigtoe mussel as endangered in 1976. This species occurs in shoal habitat of medium to large rivers. Typically, the Fine-rayed Pigtoe lives in stable, mixed substrate, with particle sizes ranging from sand to cobble (Neves 1991). Endemic to the Tennessee River system, this species historically occurred from the Virginia headwaters, downstream to Muscle Shoals, Alabama, and in some tributaries (Parmalee and Bogan 1998) (Figure 11-6). This species was extirpated from Tennessee River proper (Garner and McGregor 2001). A population in Paint Rock River, Jackson County, Alabama (Ahlstedt 1995), appears to be the only extant population in Alabama. The Fine-rayed Pigtoe mussel shell is solid, somewhat inflated, with a maximum length of 3 ⅛ inches, subtriangular to rhomboidal in outline (Mirarchi et al. 2004). This species is a short-term brooder, spawning in May, with females gravid until late July (Ortmann 1925, Bruenderman and Neves 1993). This mussel distributes glochidia; hosts include River Chub (*Nocomis micropogon*), Central Stoneroller (*Campostoma anomalum*), Fathead Minnow (*Pimephales promelas*), Mottled Sculpin (*Cottus bairdii*), and Whitetail (*Cyprinella galactura*), White (*Luxilus albeolus*), Telescope (*Notropis telescopus*), and Tennessee (*Notropis leuciodus*) Shiners (Bruenderman and Neves 1993). Factors contributing to the decline of this species includes impoundment, siltation, and pollution (USFWS 2013a). The Fine-rayed Pigtoe's small population size and limited geographic distribution make it vulnerable to stochastic disturbances and decreased fitness from reduced genetic diversity (USFWS 2013a). Factors that have the potential to affect this species' persistence include accidental chemical releases and spills and other human-induced changes (USFWS 2013a).

The USFWS has both a Recovery Plan (USFWS 1984b) and Five-Year Review (USFWS 2013a) for the Fine-rayed Pigtoe. The IPaC and Federal Register do not list the Fine-rayed Pigtoe as occurring in the counties where the Lake Harris Project Boundary is located. Habitat range for the Fine-rayed Pigtoe is located immediately to the west of Skyline (Figure 11-6), but there are no published reports of occurrences of this species within the Skyline Project Boundary.

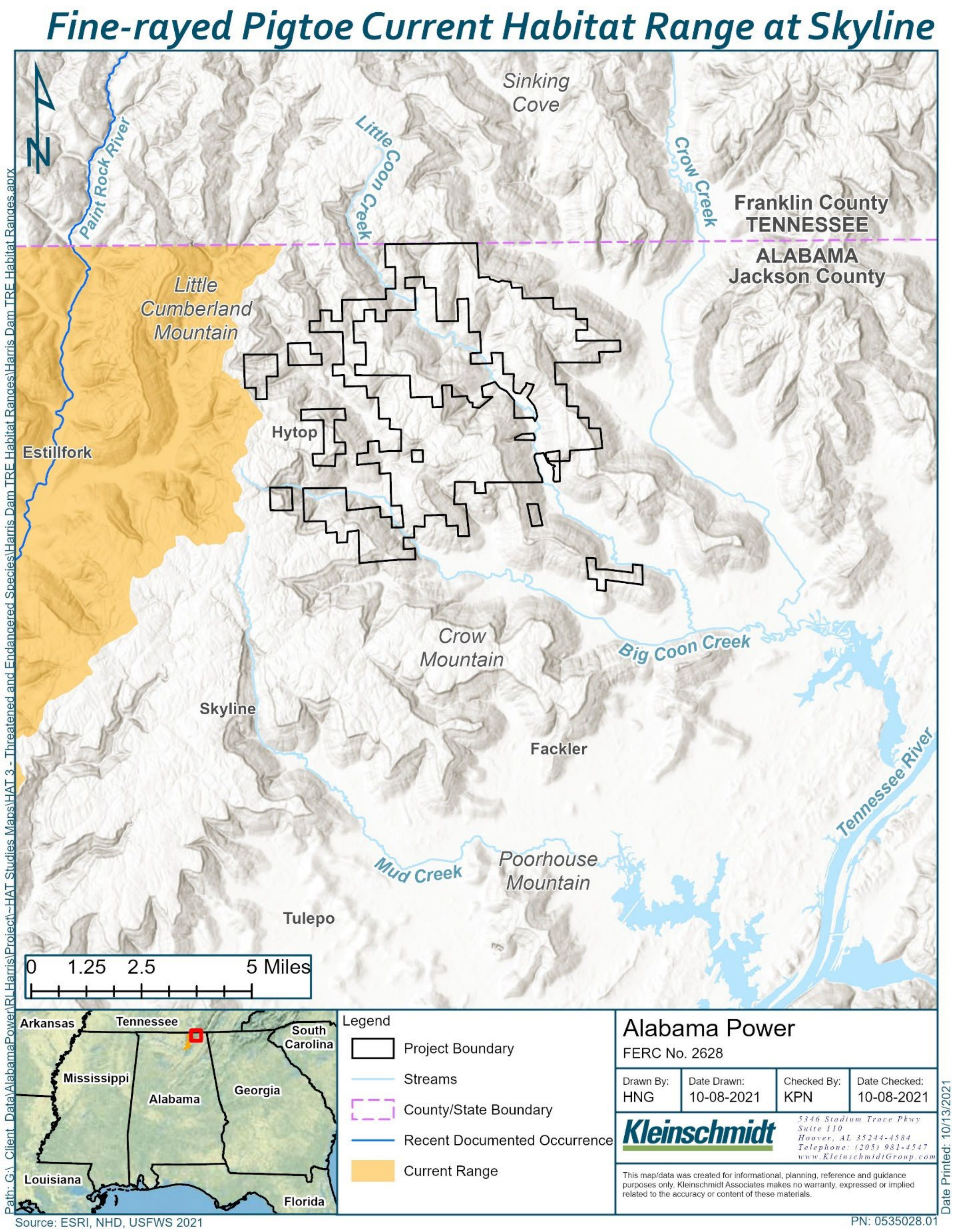

Figure 11-6 Fine-rayed Pigtoe Current Habitat Range at Skyline

11.1.1.6 Pale Lilliput

The USFWS listed the Pale Lilliput mussel as endangered in 1976. This species is found in large creeks and small rivers, typically in gravel and in moderate current (Parmalee and Bogan 1998). This species was thought to be eliminated, except in the Paint Rock River system, Jackson County, Alabama, where it is rare (Ahlstedt 1995) (Figure 11-7). The ADCNR and USFWS is currently reintroducing the Pale Lilliput Mussel into suitable historical habitats within the state (USFWS 2011). The shell is moderately solid with a maximum length of 1 ⅜ inches, elongate and elliptical in outline, and inflated in some older species (Mirarchi et al. 2004). It is thought to be a long-term brooder. In laboratory trials by ADCNR, Pale Lilliput glochidia have been found to utilize Northern Studfish (*Fundulus catenatus*), Blackspotted Topminnow (*Fundulus olivaceus*) and Blackstripe Topminnow (*Fundulus notatus*) as primary hosts (Fobian et al. 2015). The Paint Rock River system, where the only extant population of the Pale Lilliput persists, is strained from human-related activities and development (USFWS 2011). The Pale Lilliput mussel is vulnerable to extinction due to extremely limited distribution, rarity, and susceptibility to habitat degradation (USFWS 2011). Unauthorized removal of gravel from the Paint Rock River drainage basin results in degradation of Pale Lilliput habitat (USFWS 2011). Factors that have the potential to affect this species' persistence include droughts, toxic spills, and fish barriers which restrict freshwater mussel distribution (USFWS 2011).

The USFWS has both a Recovery Plan (USFWS 1984c) and a Five-Year Review for the Pale Lilliput (USFWS 2011). The IPaC and Federal Register do not list the Pale Lilliput as occurring in the counties where the Lake Harris Project Boundary is located. Habitat range for the Pale Lilliput is located immediately to the west of Skyline Figure 11-7, but there are no published reports of occurrences of this species within the Skyline Project Boundary.

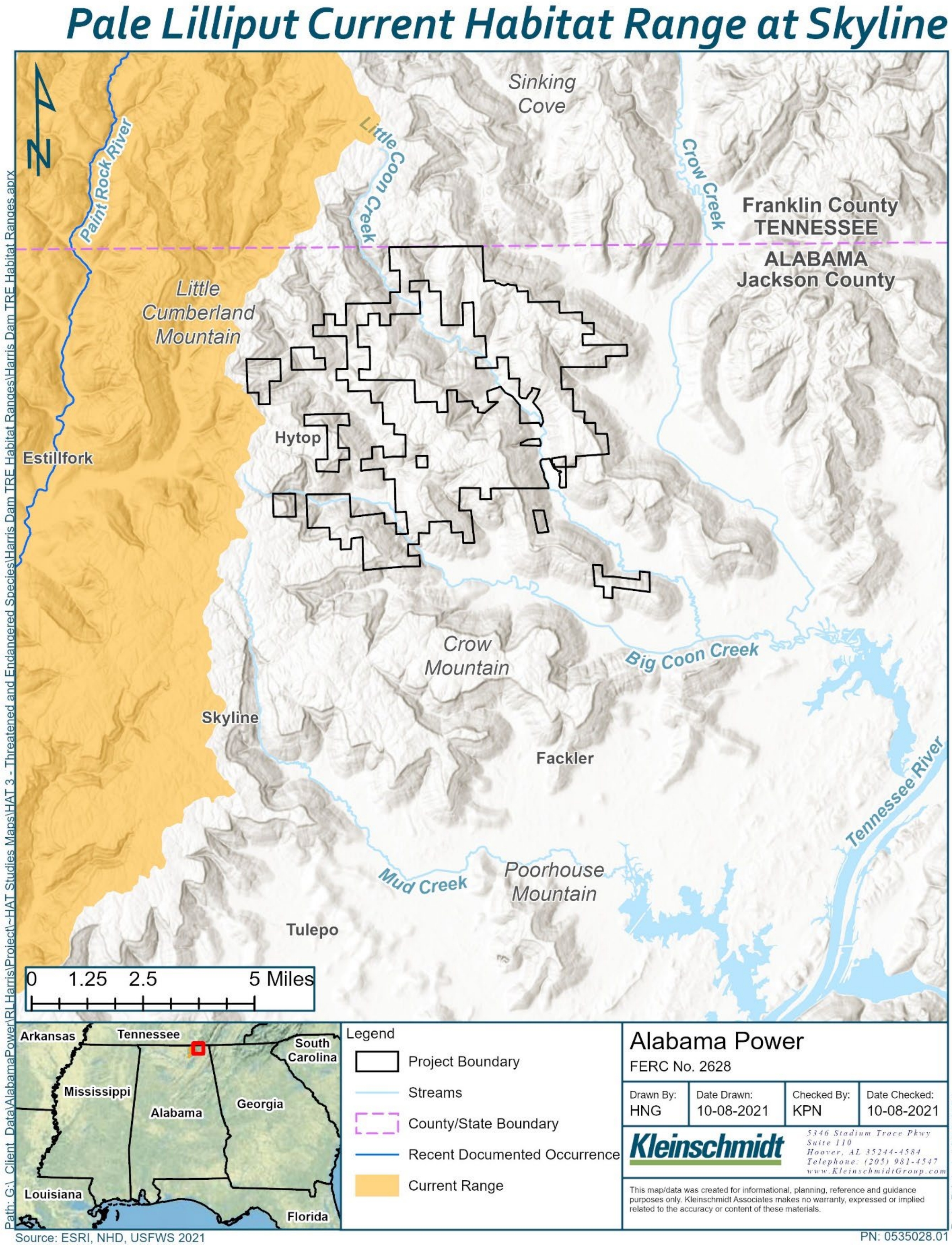

Figure 11-7 Pale Lilliput Current Habitat Range at Skyline

11.1.1.7 Rabbitsfoot

The USFWS listed the Rabbitsfoot mussel as threatened in 2013 (USFWS 2015). The Rabbitsfoot mussel is found in creeks and small rivers along margins of riffles and runs. In lotic reaches of larger rivers, this species may be found at depths greater than 19 ¾ feet, as well as upon marginal shelves in shallower waters (Mirarchi et al. 2004). In Alabama, extant populations are known to exist only in the Paint Rock River system, Jackson County, Alabama (Ahlstedt 1995), and a short reach of Bear Creek, Colbert County (Mirarchi et al. 2004) (Figure 11-8). The ADCNR and USFWS is currently reintroducing the Rabbitsfoot into suitable historical habitats statewide (ADCNR 2020b). This species has a solid shell with a maximum length of 4 ¾ inches, elongated and rhomboidal to rectangular in outline. The Rabbitsfoot mussel is a short-term brooder. Suitable fish hosts for Rabbitsfoot populations west of the Mississippi River include Blacktail Shiner (*Cyprinella venusta*) from the Black and Little Rivers and Cardinal (*Luxilus cardinalis*), Red (*Cyprinella lutrensis*), Spotfin (*Cyprinella spiloptera*), and Bluntface Shiners (*Cyprinella camura*) from the Spring River, but host suitability information is lacking for most of the eastern range (Fobian 2007). A host study conducted by ADCNR in 2011 found Scarlet Shiner (*Lythrurus fasciolari*), Whitetail Shiner and Striped Shiner to be sympatric hosts with Rabbitsfoot from Paint Rock River, AL. Marginal minnow hosts from studies have included Central Stoneroller, Emerald Shiner (*Notropis atherinoides*), Rosyface Shiner (*Notropis rubellus*), Bullhead Minnow (*Pimephales vigilax*) and Rainbow Darter, but not in all stream populations tested (Fobian 2007, Watters et al. 2009). Widespread distribution reductions, rarity, and declining population trends make it vulnerable to extirpation (Mirarchi et al. 2004).

The USFWS designated critical habitat for the Rabbitsfoot in 2015 (USFWS 2015). In April 2019, the USFWS initiated the Five-Year Review of the Rabbitsfoot. The IPaC and Federal Register do not list the Rabbitsfoot as occurring in the counties where the Lake Harris Project Boundary is located. Habitat range for the Rabbitsfoot is located immediately to the west of Skyline (Figure 11-8), and designated critical habitat exists to the southwest of the Skyline Project Boundary in the Paint Rock River. However, there are no published reports of Rabbitsfoot occurrences within the Skyline Project Boundary.

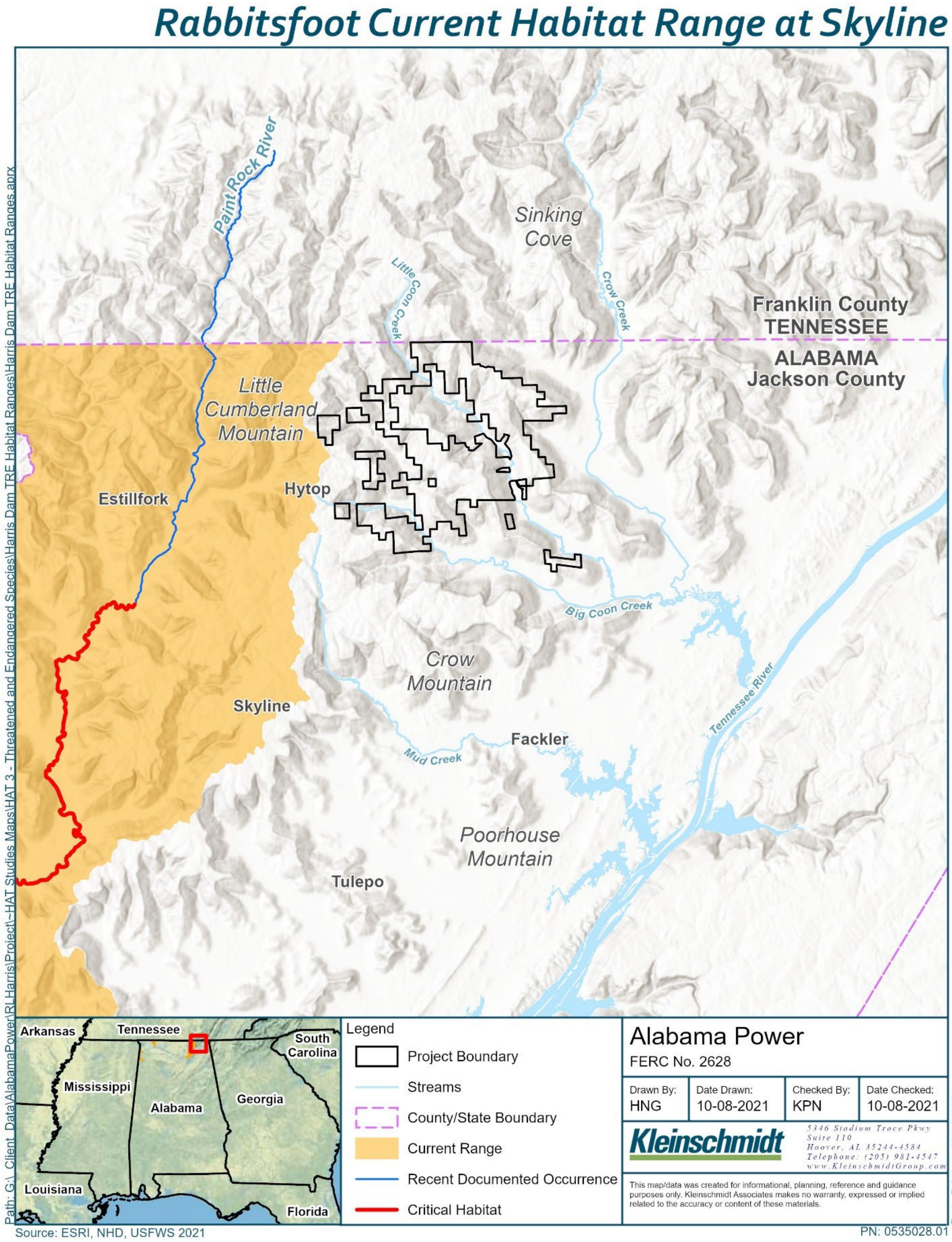

Figure 11-8 Rabbitsfoot Current Habitat Range at Skyline

11.1.1.8 Snuffbox

The USFWS listed the Snuffbox mussel as endangered in 2012. It is found in large creeks to large rivers, generally in gravel and sand substrate in shoal and riffle habitats. Individual mussels often are completely buried or with only their posterior slopes exposed (Parmalee and Bogan 1998). In Alabama, the Snuffbox mussel once occurred in the Tennessee River and several of its tributaries. However, the Snuffbox mussel is assumed to persist only in the Paint Rock River system, Jackson County (Mirarchi et al. 2004) (Figure 11-9). The Snuffbox mussel is a long-term brooder with gravid females observed from September to May, with glochidial discharge in late May (Ortmann 1919). Hosts include Common Logperch (*Percina caprodes*), Roanoke Darter (*Percina roanoka*), and Banded and Black Sculpins (*Cottus baileyi*) (Yeager and Saylor 1995). This species' initial and current imperilment is caused by adverse effects from construction impoundments, including destruction, modification, and curtailment of habitat range (USFWS 2018a). Since its listing, five dams have been removed on streams inhabited by Snuffbox mussel, but status improvements have not been documented in restored reaches of inhabited streams (USFWS 2018a). Other factors that continue to effect Snuffbox populations are water quality degradation caused by agricultural runoff, municipal effluents, industrial sources, and spills (USFWS 2018a). Reduction in Snuffbox range include dredging and channelization, oil and gas production, and development (USFWS 2018a).

The USFWS has a Five-Year Review for the Snuffbox mussel (USFWS 2018a). The Snuffbox mussel does not have a Recovery Plan or designated critical habitat at this time. The IPaC and Federal Register do not list the Snuffbox mussel as occurring in the counties where the Lake Harris Project Boundary is located. Habitat range for the Snuffbox is located immediately to the west of Skyline (Figure 11-9, but there are no published reports of occurrences of this species within the Skyline Project Boundary.

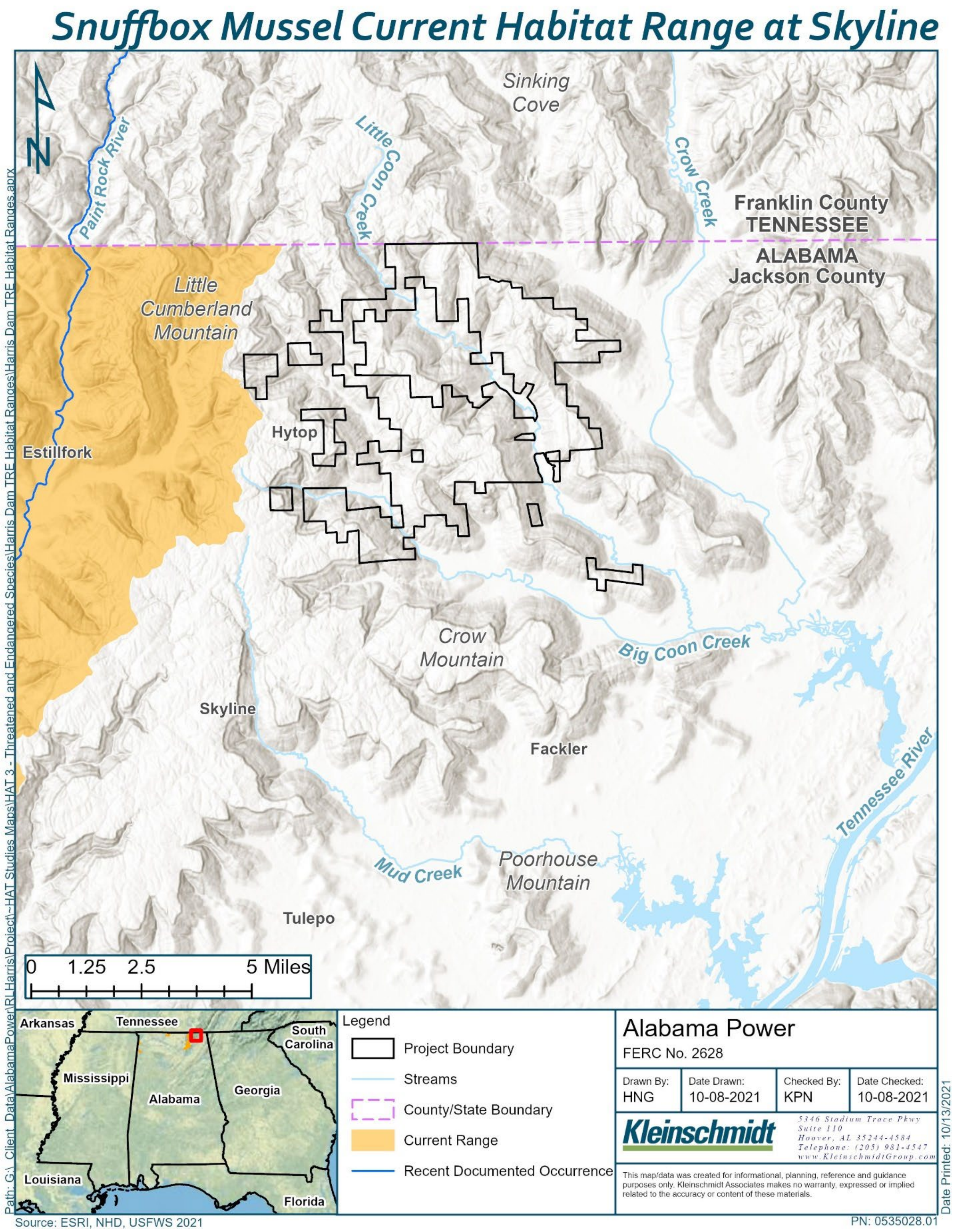

Figure 11-9 Snuffbox Current Habitat Range at Skyline

11.1.1.9 Shiny Pigtoe

The USFWS listed the Shiny Pigtoe mussel as endangered in 1976 (Mirarchi et al. 2004). The Shiny Pigtoe mussel lives in shoal and riffle habitat of medium to large rivers. Endemic to the Tennessee River system, this mussel historically occurred from the headwaters downstream to Muscle Shoals, Alabama, and in some of its large tributaries (Parmalee and Bogan 1998). Although this mussel was extirpated from the Tennessee River proper (Garner and McGregor 2001), it still occurs in several tributaries, including Paint Rock River, Jackson County, Alabama (Ahlstedt 1995) (Figure 11-10). The Shiny Pigtoe mussel has a solid and somewhat inflated shell with a maximum length of 3 ⅛ inches, subtriangular in outline, with anterior margin broadly rounded and somewhat obliquely truncate above, and posterior margin nearly straight but obliquely angled; doral and ventral margins nearly straight (Mirarchi et al. 2004). This species is a short-term brooder, spawning from late May to early June and gravid from mid-May to mid-July (Ortmann 1921; Kitchel 1985). Glochidia use fish in the shiner family (Cyprinidae), including Telescope, Warpaint (*Luxilus coccogenis*), and Common Shiners (*Luxilus cornutus*) as hosts (Kitchel 1985). This species is imperiled due to impoundments, siltation, and pollution caused by coal mining, urbanization, agriculture, and toxic chemical spills (USFWS 2013b). The Shiny Pigtoe's small population size and limited geographic distribution make it vulnerable to stochastic disturbances and decreased fitness from reduced genetic diversity (USFWS 2013b).

The USFWS has both a 1984 Recovery Plan (USFWS 1984b) and a Five-Year Review (USFWS 2013b) for the Shiny Pigtoe. The IPaC and Federal Register do not list the Shiny Pigtoe as occurring in the counties where the Lake Harris Project Boundary is located. Habitat range for the Shiny Pigtoe is located immediately to the west of Skyline (Figure 11-10), but there are no published reports of occurrences of this species within the Skyline Project Boundary.

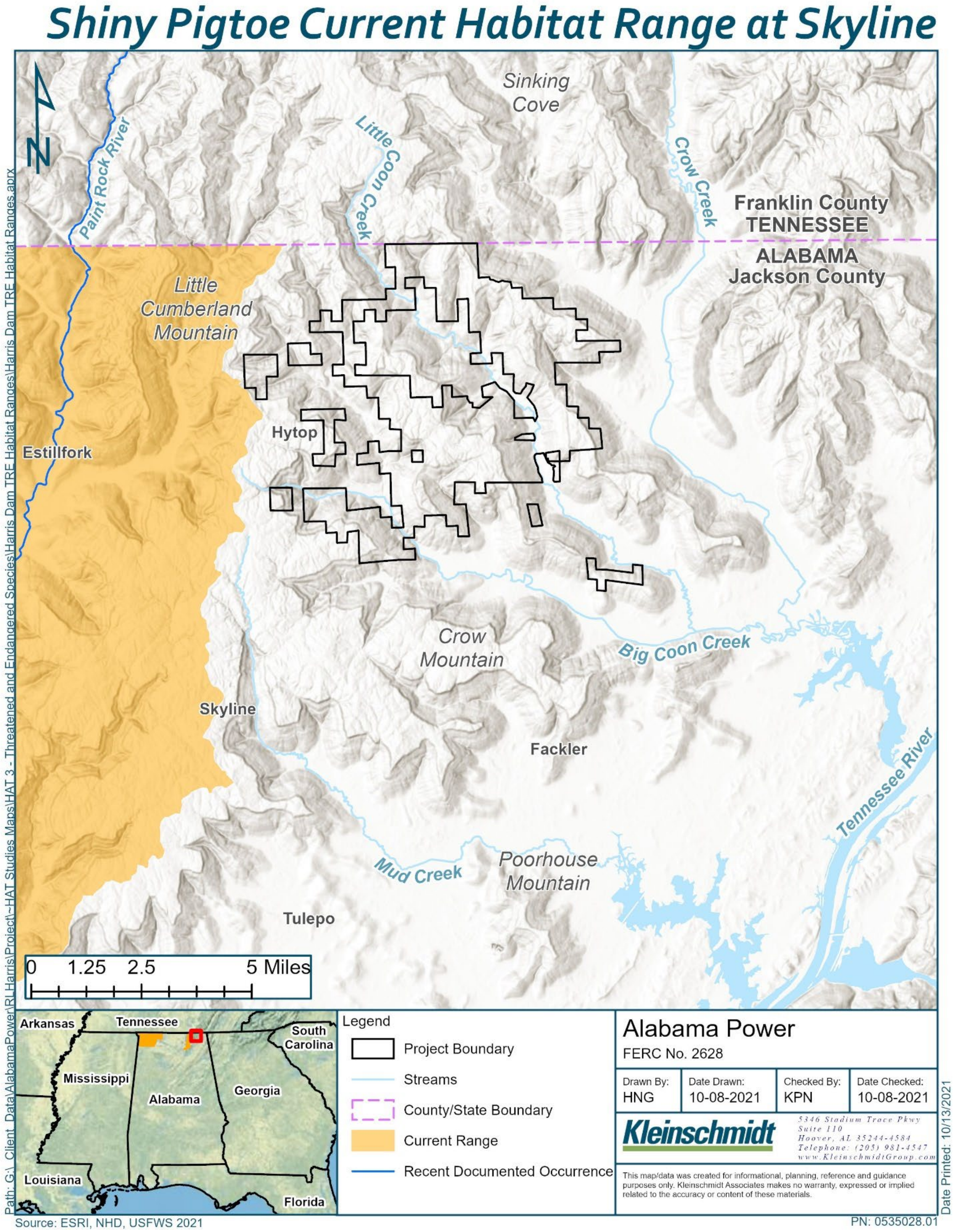

Figure 11-10Shiny Pigtoe Current Habitat Range at Skyline

11.1.1.10 Slabside Pearlymussel

The USFWS listed the Slabside Pearlymussel as endangered with critical habitat designated in 2013 (USFWS 2016c). The Slabside Pearlymussel historically occurred in Alabama in the Tennessee River and several of its tributaries. This species is subtriangular in shape, reaches an average length of 3.5 inches, and has dense, moderately inflated valves and a white nacre. This species typically inhabits large creeks and rivers in shallow riffles comprised of sand, gravel, and cobble substrates with moderate current. The Slabside Pearlymussel is a short-term, summer brooder that is known to use several species in the family Cyprinidae as glochidial hosts (USFWS 2013c). The U.S. Department of Interior designated 13 critical habitat units encompassing approximately 970 miles of stream channel in Alabama, Mississippi, Tennessee, and Virginia for the Slabside Pearlymussel. In Jackson County, the designated critical habitat includes the Paint Rock River, Larkin Fork, Estill Fork, and Hurricane Creek (Figure 11-11). Decline of this species is attributed primarily to habitat loss and degradation associated with impoundments, gravel and coal mining, sedimentation, water pollution, and stream channel alterations (USFWS 2013c).

The USFWS designated critical habitat for the Slabside Pearlymussel in 2013 (USFWS 2013c). There is no Recovery Plan or Five-Year Review for the Slabside Pearlymussel. The IPaC and Federal Register do not list the Slabside Pearlymussel as occurring in the counties where the Lake Harris Project Boundary is located. Habitat range for the Slabside Pearlymussel is located immediately to the west of Skyline (Figure 11-11), and designated critical habitat exists to the west of the Skyline Project Boundary in the Paint Rock River and Hurricane Creek. However, there are no published reports of Slabside Pearlymussel occurrences within the Skyline Project Boundary.

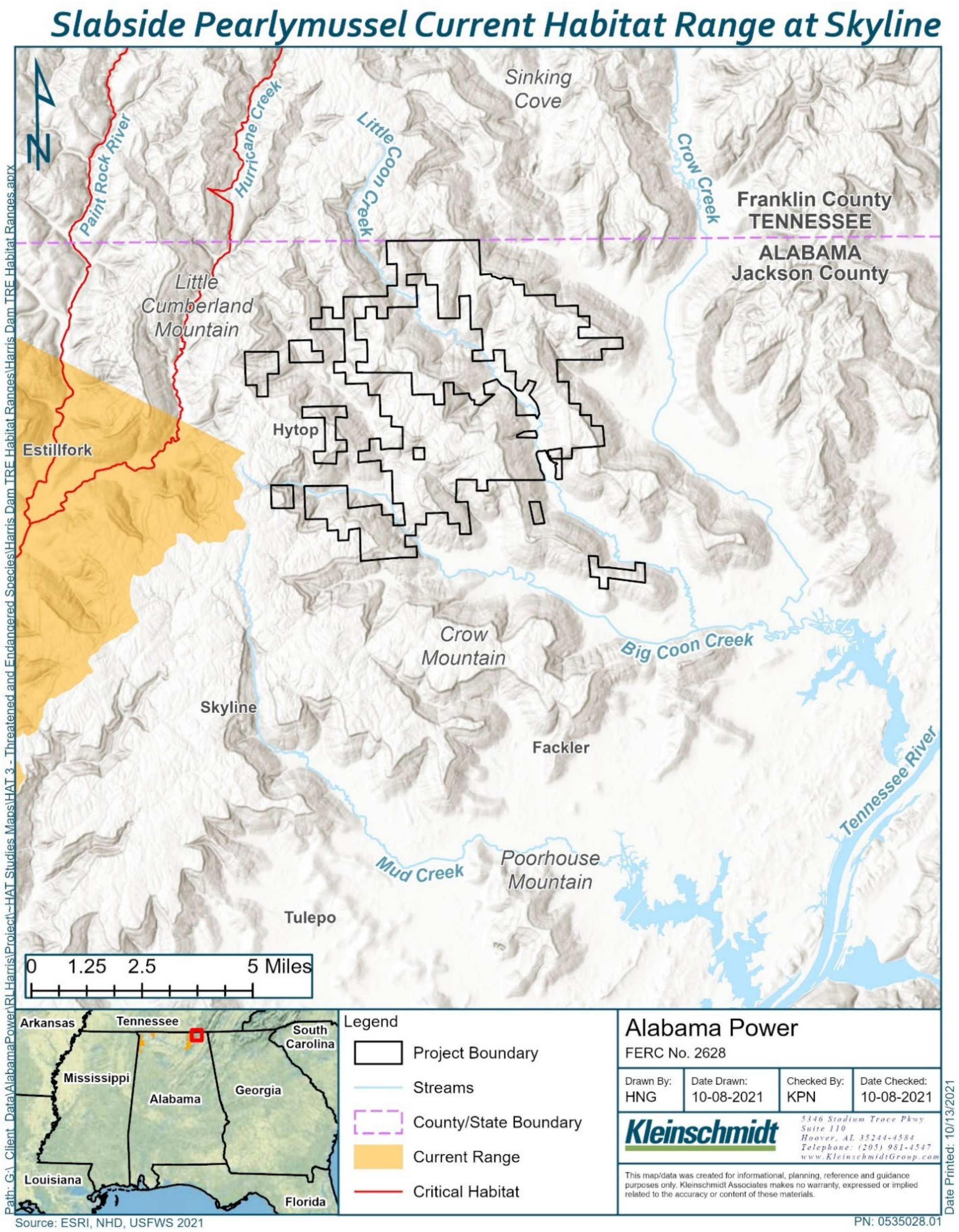

Figure 11-11 Slabside Pearlymussel Current Habitat Range at Skyline

11.1.1.11 Indiana Bat

The USFWS listed the Indiana Bat as an endangered species in1976. Habitat conducive to the Indiana Bat is located in the central to north and eastern portions of Alabama (Figure 11-12 and Figure 11-13). This species hibernates in caves, mostly in tight clusters. In the summer, females form small maternity colonies in tree hollows and behind loose bark. A single pup is born in June or early July and weaned in 25-35 days. The diet of this species includes small, soft-bodied insects, including moths, flies, and beetles (Mirarchi et al. 2004). The Indiana Bat is vulnerable to extinction due to habitat loss and White Nose Syndrome, a fungal disease. The USFWS has a 2007 Draft Recovery Plan (USFWS 2007b) for the Indiana Bat, as well as a 1977 final correction and augmentation of critical habitat (USFWS 1977). Designated critical habitat does not occur within the Project Boundary.

While the Lake Harris and Skyline Project Boundaries fall within the range of the current habitat range of the Indiana Bat, there have been no reports of overwintering or summer roosting occurrences at either location. A large portion (66.5 percent) of the Harris Project is comprised of forested cover that likely provides some suitable summer roosting habitat for the Indiana Bat (Figure 11-12). In addition, Skyline has 10,782 acres of karst geology conducive to cave formation (Figure 11-13); however, no known hibernacula have been reported within the Skyline Project Boundary. Furthermore, no known Priority hibernacula have been identified within established buffer distances relative to the Project Boundary.

The Indiana Bat could potentially use the forests within the Lake Harris and Skyline Project Boundaries for roosting during the summer months and could potentially use the Skyline WMA year-round because of the presence of potentially suitable habitat (i.e., karst geology).

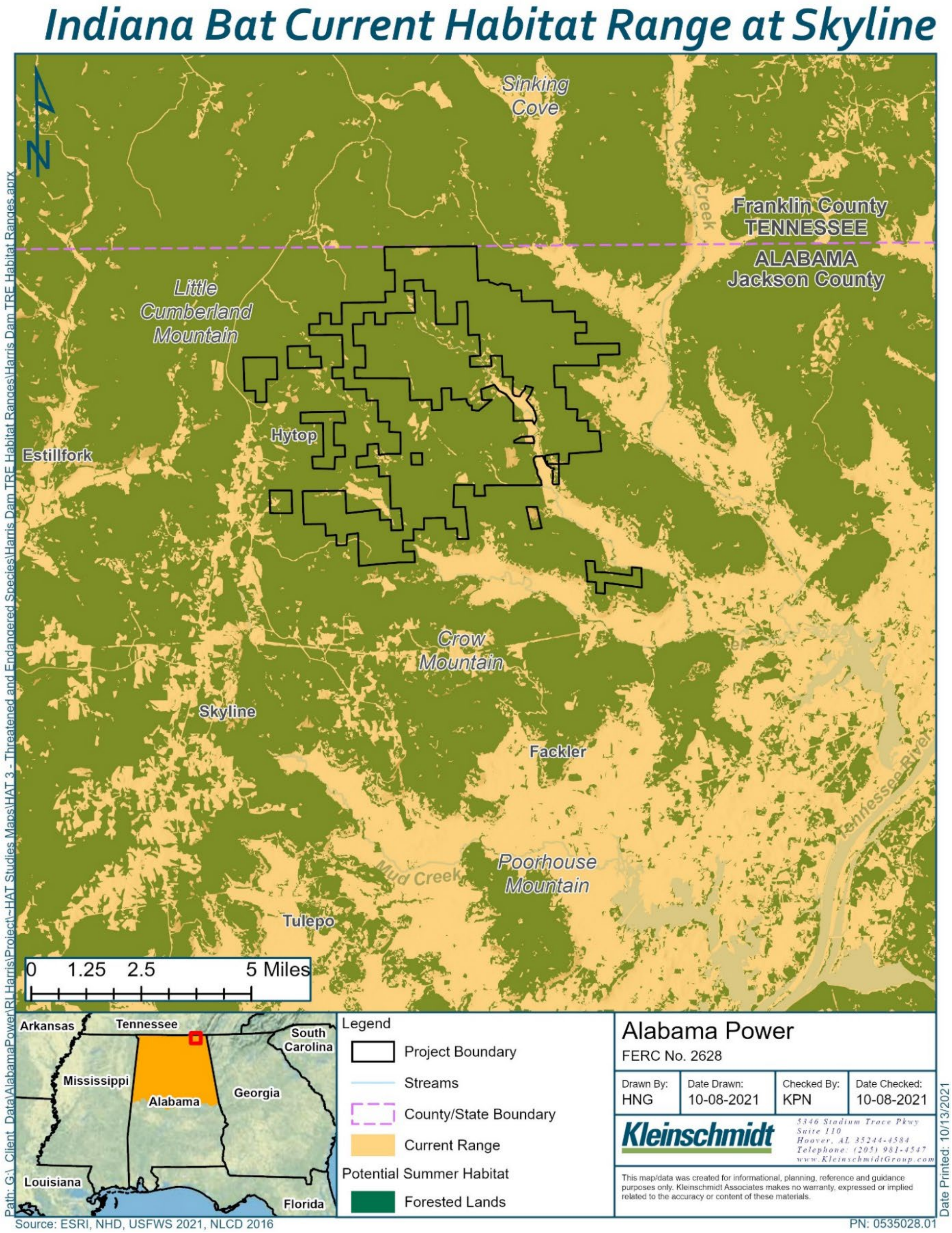

Figure 11-12 Indiana Bat Current Habitat Range and Forested Lands at Skyline

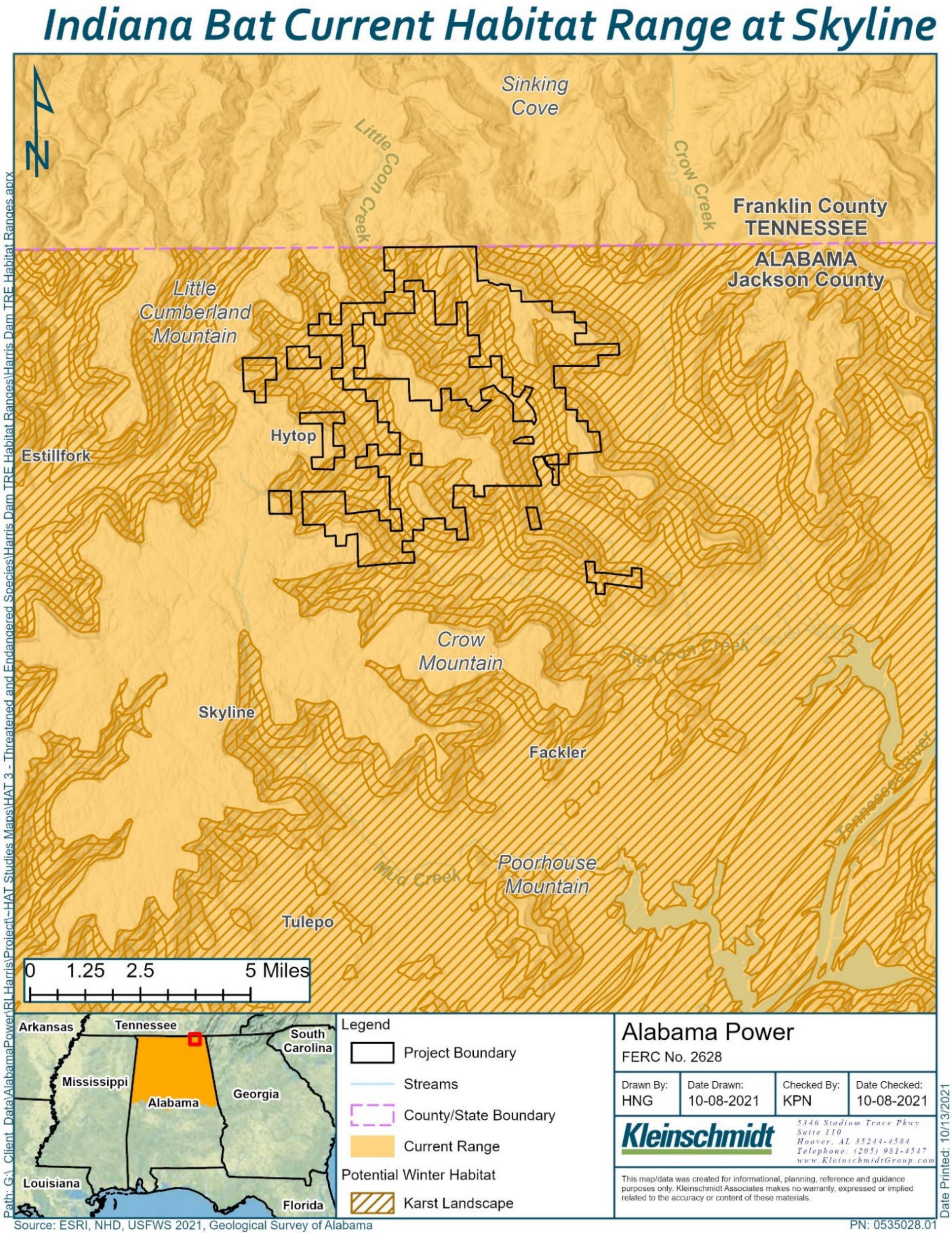

Figure 11-13 Indiana Bat Current Habitat Range and Karst Landscape at Skyline

11.1.1.12 Northern Long-eared Bat

The USFWS listed the Northern Long-eared Bat as threatened on April 2, 2015, with a final rule published in the Federal Register on January 14, 2016. On April 27, 2016, the USFWS determined that the designation of critical habitat for the species was not prudent; therefore, critical habitat has not been established for the Northern Long-eared Bat (USFWS 2016e). The Northern Long-eared Bat was historically distributed statewide; however, there is only low occurrence, if at all, in the southwestern region of Alabama (Mirarchi et al. 2004). The Northern Long-eared Bat feeds on invertebrates and is known to glean prey from vegetation and water surfaces. The Northern Long-eared Bat winters in groups in underground caves and cave-like structures during summer, it roosts singularly or in small colonies in cavities, under bark, or in hollows of live and dead trees typically greater than 3 inches in diameter. Suitable roosting trees possess exfoliating bark, cavities, or cracks (USFWS 2016e). The Northern Long-eared Bat has a single pup born in late spring or early summer with the offspring weaned approximately one month after birth (Mirarchi et al. 2004). The primary threat to the Northern Long-eared Bat is White Nose Syndrome, a fungal disease (USFWS 2016e). The USFWS does not have a Recovery Plan, Five-Year Review, or designated critical habitatfor the Northern Long-eared Bat.

While the Skyline and Lake Harris Project Boundaries fall within the current habitat range of the Northern Long-eared Bat, there have been no reports of overwintering or summer roosting occurences at either location. A large portion (66.5 percent) of the Harris Project is comprised of forested cover that likely provides some suitable summer roosting habitat for the Northern Long-eared Bat (Figure 11-14). In addition, Skyline has 10,782 acres of karst geology conducive to cave formation; however, no known hibernacula or maternity roost trees have been reported in or within 0.25 miles and 150 feet[41] of the Project Boundary, respectively.

The Northern Long-eared Bat could potentially use the forests within the Skyline and Lake Harris Project Boundaries for roosting during the summer months and could potentially use the Skyline WMA year-round because of the presence of potentially suitable habitat (i.e., karst geology) (Figure 11-15).

[41] The USFWS's Northern Long-eared Bat 4(d) rule prohibits incidental take that may occur from tree removal activities within 0.25 miles of hibernacula at any time or within 150 feet of roost trees during the months of June and July.

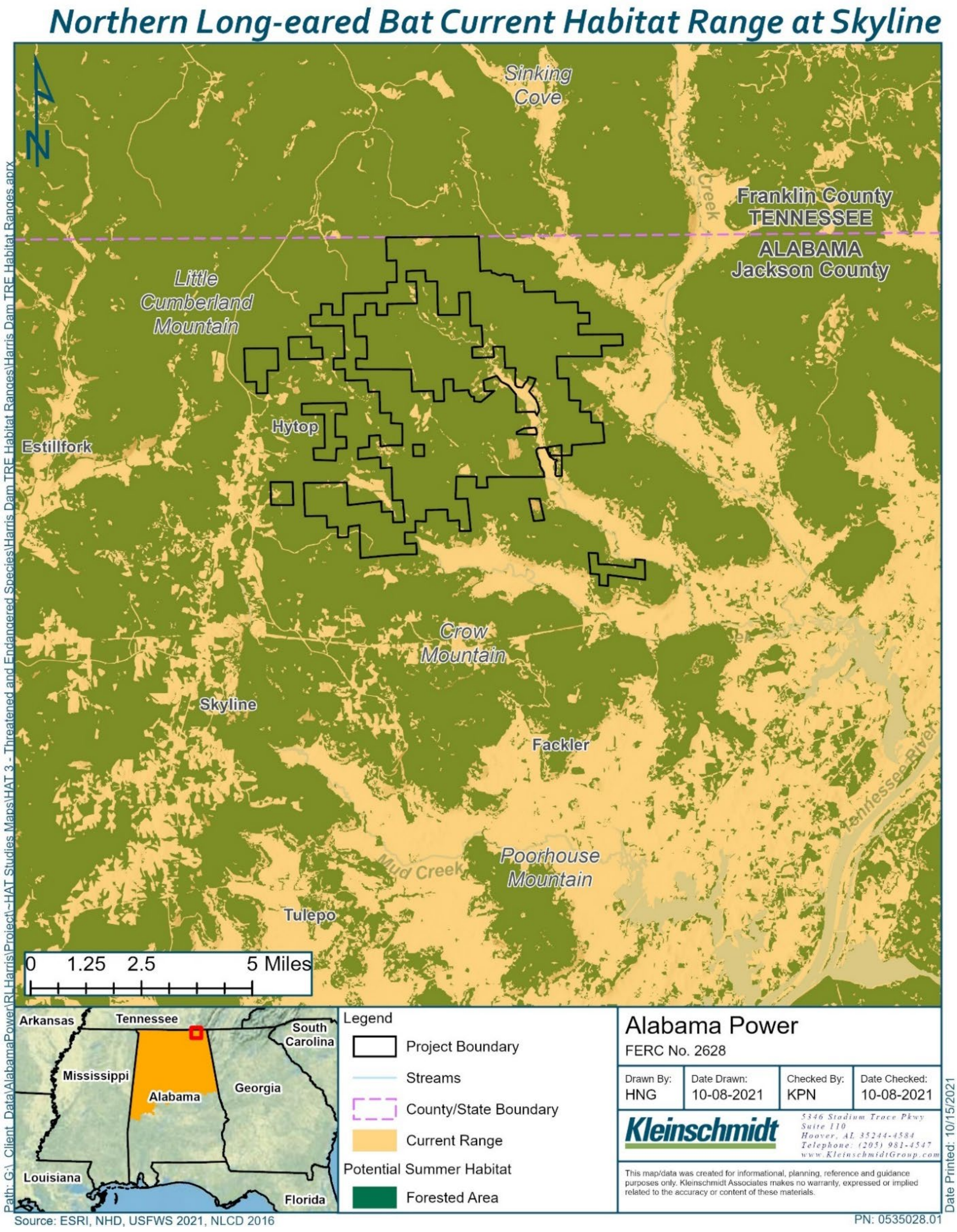

Figure 11-14 Northern Long-eared Bat Current Habitat Range and Forested Lands at Skyline

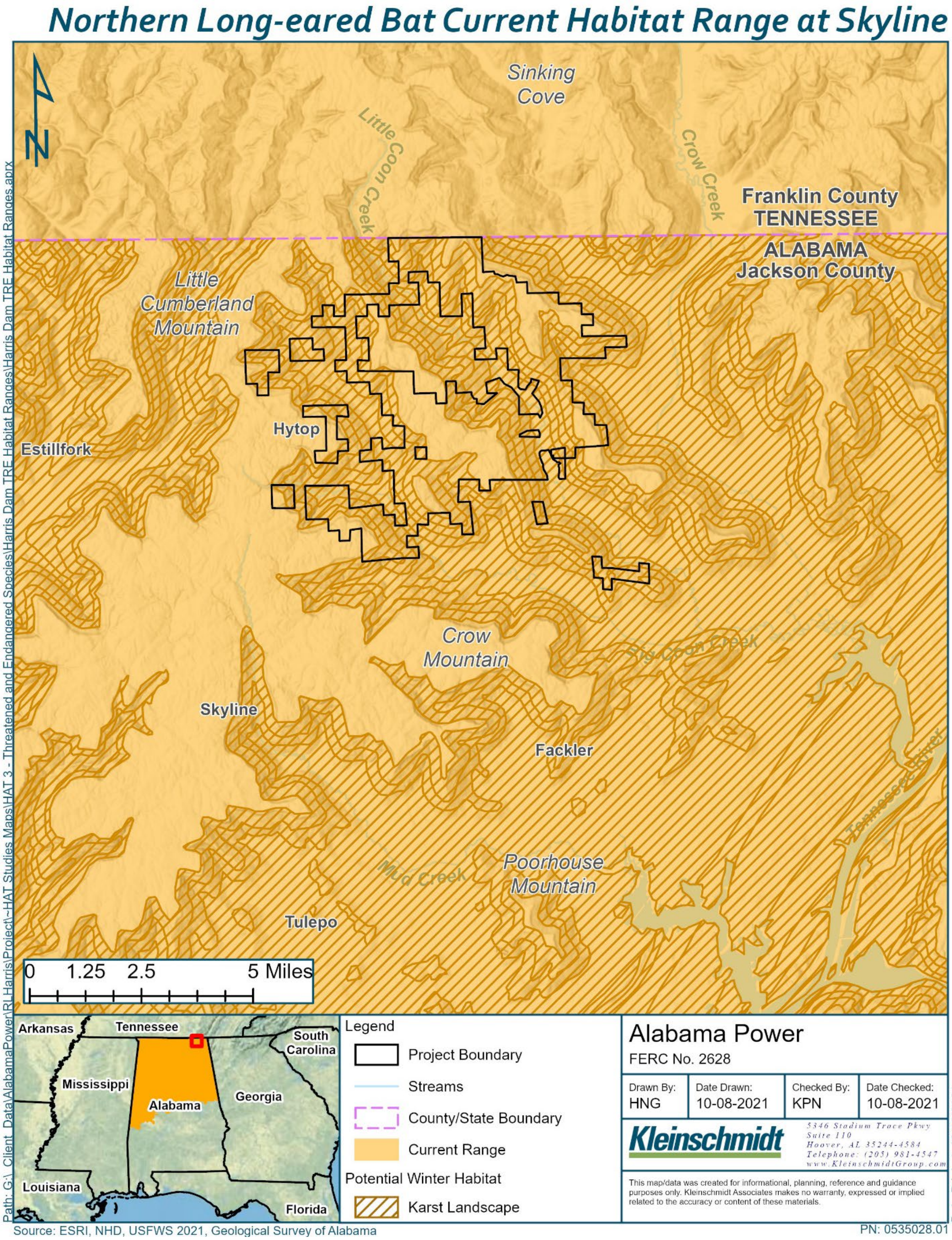

Figure 11-15 Northern Long-eared Bat Current Habitat Range and Karst Landscape at Skyline

11.1.1.13 Gray Bat

The Gray Bat was listed as endangered on April 28, 1976. The Gray Bat is distinguished from other bats by the uni-colored fur on its back. This species molts in the summer, when its dark gray fur turns to a chestnut brown (USFWS 1997b). This species can be found in caves year-round, using them both in the summer roosting and winter hibernating periods (Figure 11-16). Typically, these caves are scattered along rivers or lakes where the Gray Bat feeds on flying aquatic and terrestrial insects (USFWS 1997b). Breeding takes place in the fall, with a single pup born in late May or early June (Mirarchi et al. 2004, USFWS 1997b). According to its Five-Year Review, the main threat to Gray Bat populations is human disturbance in unprotected caves (USFWS 2009). The USFWS has both a Recovery Plan (USFWS 1982) and Five-Year Review (USFWS 2009) for the Gray Bat; however, the IPaC and Federal Register do not list the Gray Bat as occurring in the counties where the Lake Harris Project Boundary is located.

Skyline falls within the current habitat range of the Gray Bat and has approximately 10,782 acres of karst geology (Figure 11-16). Although the Gray Bat uses caves for both winter hibernaculum and summer roosting, there have been no reports of overwintering or summer roosting occurrences within the Skyline Project Boundary.

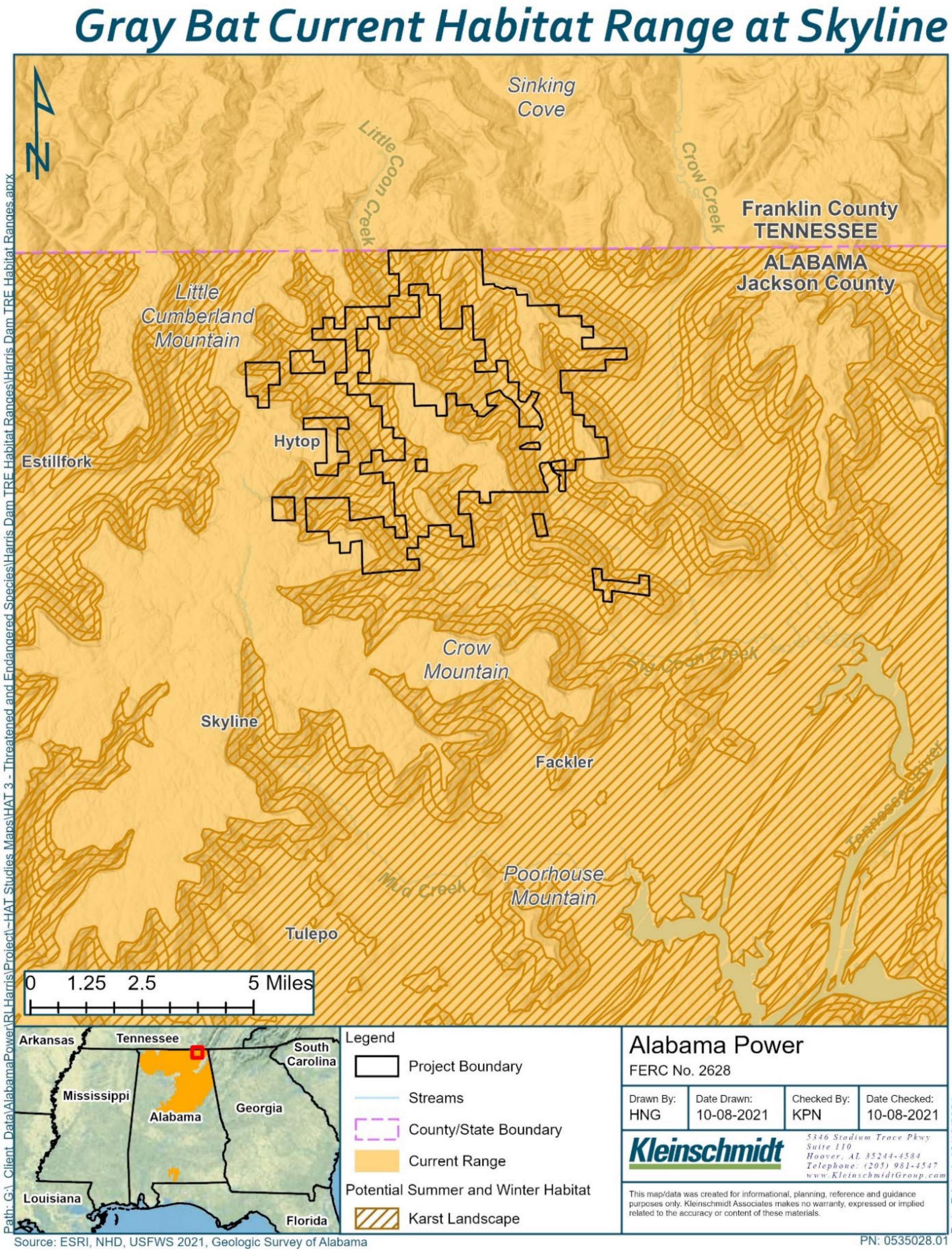

Figure 11-16 Gray Bat Current Habitat Range and Karst Landscape at Skyline

11.1.1.14 White Fringeless Orchid

The White Fringeless Orchid was listed as threatened under the Endangered Species Act (ESA) in September 2016 (USFWS 2016a). Two extant populations were identified in Clay and Cleburne counties in the Talladega National Forest (Kleinschmidt 2021c) (Figure 11-17). This species is a slender, erect, perennial herb that grows in colonies. The fragrant, white flowers grow in loose, round to elongated, terminal clusters with 6 to 15 flowers in each cluster. The stem is light green, smooth, and can grow up to 3.6 inches. The orchid blooms from late July to early September with fruits maturing in October. White Fringeless Orchid typically occurs in wet, flat, or boggy areas with acidic muck or sand. This plant prefers partially shaded areas at the heads of streams or seepage slopes. The primary threat to this species is the destruction and alteration of its habitat including excessive shading, soil disturbance, altered hydrology, and the spread of invasive species. Other threats include unauthorized collection for recreational or commercial purposes, herbivory, and small population sizes.

A Recovery Plan has not been completed for this species. The habitat range of the White Fringeless Orchid overlaps the Skyline and Lake Harris Project Boundaries; however, there are no published reports of White Fringeless Orchid occurrences within the Skyline or Lake Harris Project Boundaries (Kleinschmidt 2021c). Although this species uses wetland habitats, the NWI is not detailed enough to identify wetlands containing the plant's unique habitat characteristics; however, consultation with the ALNHP determined that suitable habitat was likely present within the Skyline and Harris Project Boundaries[42].

[42] Reference emails dated July 24, 2020 and August 4, 2020 between the ALNHP and Alabama Power as included in the T&E Consultation filed with the Final T&E Study Report .

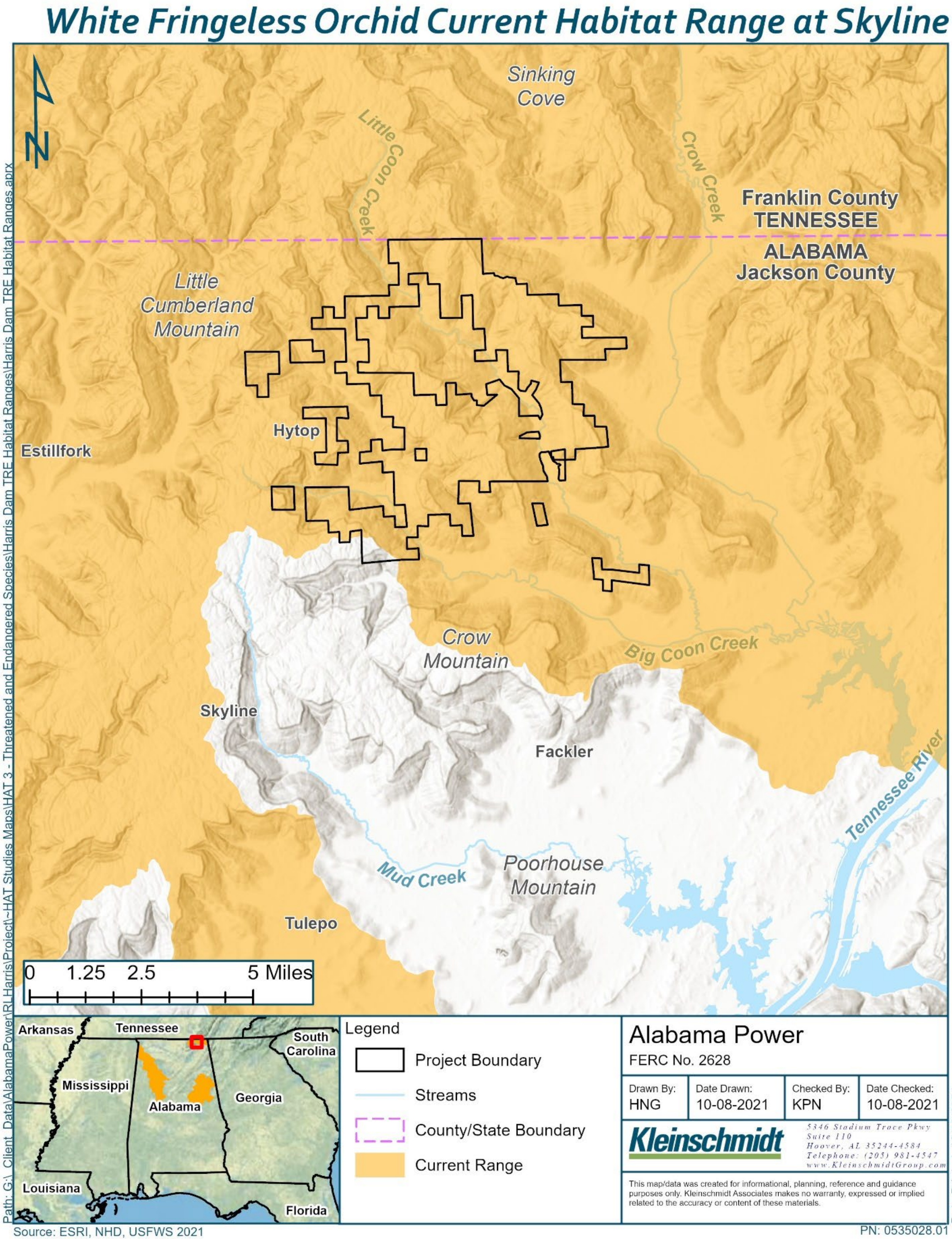

Figure 11-17 White Fringeless Orchid Current Habitat Range at Skyline

On September 2 and 3, 2020, Alabama Power and Kleinschmidt surveyed eight sites at Skyline containing springs, ponds, or wetlands (Table 11-3). Although survey sites were selected in consultation with USFWS and ALNHP based on potential habitat (i.e., wetlands, springs, and ponds) surveyors found that much of this habitat was unsuitable due to shade from thick canopies, disturbance, soil type, inundation, vegetation community (lack of common associates), and steep slopes. Survey at a ninth site at Skyline (Site 9) was attempted, but the area was blocked by private property and did not contain suitable habitat, at least within the Skyline Project Boundary, upon closer inspection in the field. No White Fringeless Orchid specimens were collected or observed at any of the Skyline survey sites Kleinschmidt 2021c) (Figure 11-18).

Table 11-3 Skyline Survey Sites

SITE NUMBER	SURVEY DATE	SITE DESCRIPTION	HABITAT SUITABILITY*
1	September 2, 2020	Spring	U
2	September 2, 2020	Pond	M
3	September 2, 2020	Spring	U
4	September 2, 2020	Spring	U
5	September 2, 2020	Pond	M
6	September 2, 2020	Pond	M
7	September 3, 2020	Pond	U
8	September 3, 2020	Pond	M
9**	September 3, 2020	Forested wetland	U

Source: Kleinschmidt 2021c

*Habitat Suitability: Marginal = M, unsuitable = U
**This site was not surveyed due to private property restrictions.

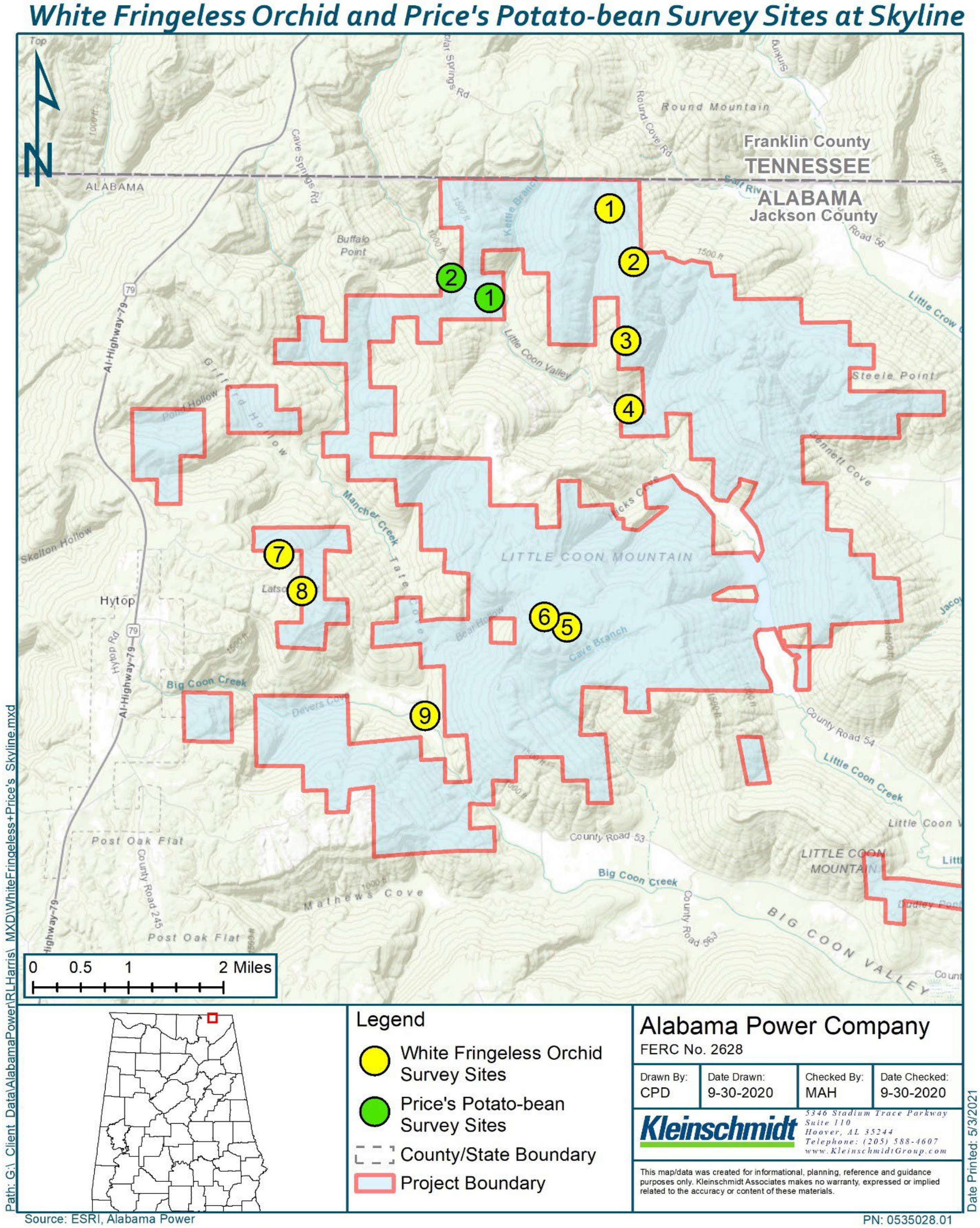

Figure 11-18 White Fringeless Orchid and Price's Potato-bean Survey Sites at Skyline

11.1.1.15 Price's Potato-bean

Price's Potato-bean was listed as threatened in 1990. A member of the pea family (*Fabaceae*), this species' historic range included Alabama, Illinois, Kentucky, Mississippi, and Tennessee. Price's Potato-bean is a twining, herbaceous, perennial vine that grows from a tuber and has greenish-white or brownish-pink flowers. This species is found in open, bottom areas near or along the banks of streams and rivers, sometimes near the base of limestone bluffs (Kleinschmidt 2021c). The IPaC and Federal Register do not list Price's Potato-bean as occurring in the counties where the Lake Harris Project Boundary is located. Since publication of this species' Recovery Plan, many new populations have been discovered. Twenty of the 25 populations included in the Recovery Plan are still extant and apparently stable (USFWS 1993b). According to the Five-Year Review, there are currently 16 extant populations of Price's Potato-bean in Alabama distributed among nine counties: Autauga (2), Butler (1), Dallas (2), Jackson (2), Lawrence (1), Madison (5), Marshall (1), Monroe (1), and Wilcox (1)[43] (Figure 11-19). The populations in Jackson County occur on Sauta Cave National Wildlife Refuge, and near Little Coon Creek in the Skyline WMA (Kleinschmidt 2021c). One of these extant populations intersects the Skyline Project Boundary and comprises 11 percent of the extant population occurring at Little Coon Creek; however, 89 percent of this single population occurs outside of the Project Boundary. According to its Five-Year Review, 7 of the 16 populations of Price's Potato-bean in Alabama face one or more of the following threats: incompatible logging, excessive shading by canopy trees, road and right-of-way interference, and competition with non-native, invasive species (USFWS 2016f).

[43] A 100-foot stream buffer within limestone landscape was included in this figure to highlight low areas along or near the banks of streams and rivers, which this species seems to prefer. The buffer indicated on the figure is not regulatory. It is meant to depict areas where this species could potentially occur based on known habitat preferences.

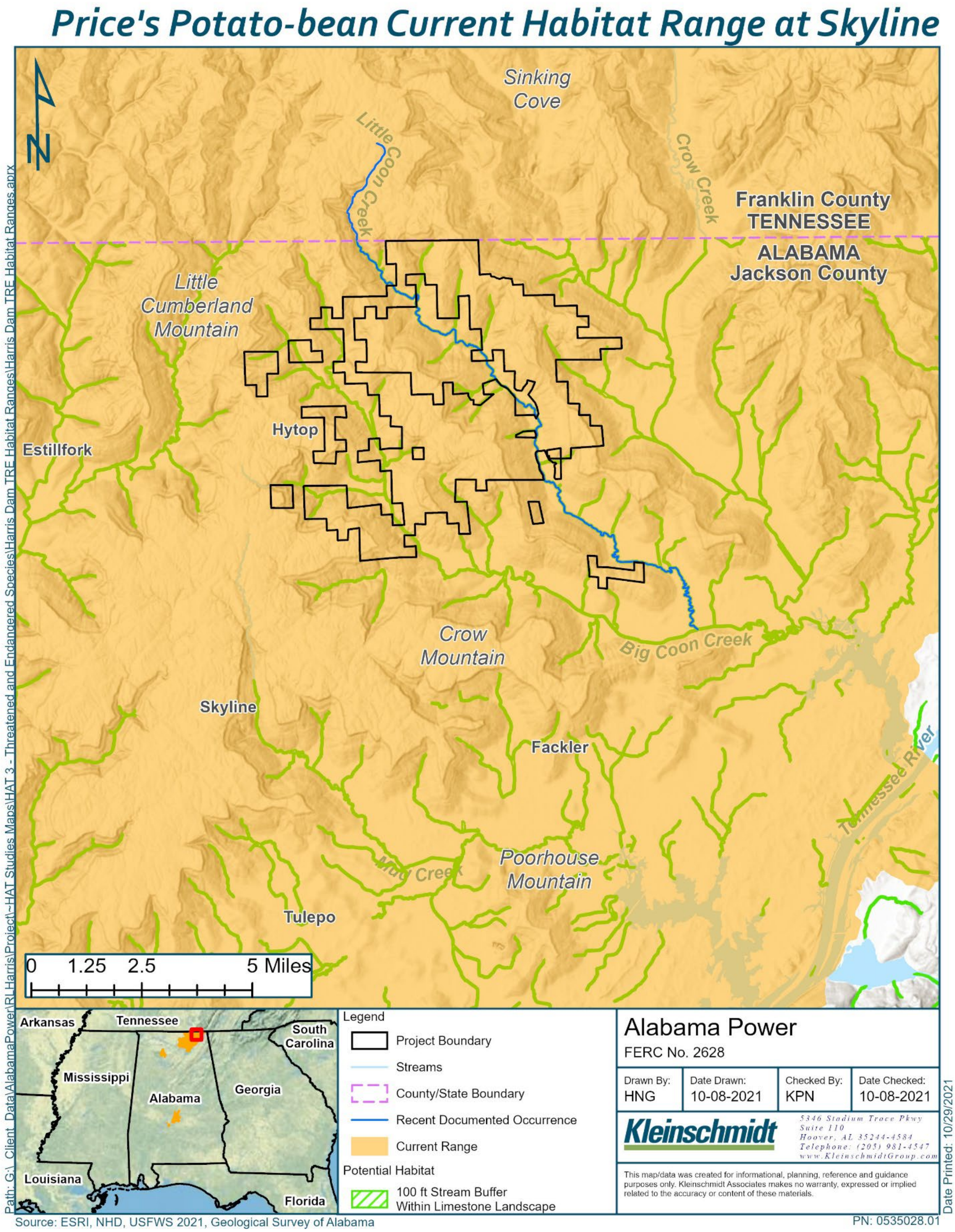

Figure 11-19 Price's Potato-bean Current Habitat Range at Skyline

Although the USFWS did not formally recommend surveys for Price's Potato-bean, Alabama Power conducted surveys in late summer of 2020. During the White Fringeless Orchid surveys conducted at Skyline on September 2 and 3, 2020, Price's Potato-bean was passively searched, and on September 3, Alabama Power and Kleinschmidt searched for Price's Potato-bean at and in the proximity of the known population located within the Skyline WMA but outside of the Project Boundary. No specimens were observed, potentially due to dense canopy cover in areas that otherwise may support Price's Potato-bean populations. On September 29, 2020, surveyors from Alabama Power returned to survey two sites with suitable habitat, but no specimens were observed (Kleinschmidt 2021c) (Figure 11-18).

11.1.1.16 Morefield's Leather Flower

Morefield's Leather Flower, a perennial vine in the buttercup family (Ranunculaceae), was listed as endangered in 1992. This species has urn-shaped flowers that are pinkish in color and typically present from May to July. Morefield's Leather Flower typically occurs near seeps and springs in rocky limestone woods on south and southwest facing slopes of mountains (Figure 11-20). According to the Five-Year Review, there are currently 10 extant populations in Alabama in the counties of Madison and Jackson (USFWS 2018b) (Figure 11-20). Populations are imperiled by residential development, logging, and/or roadway interference (USFWS 2018b). There are no published reports of Morefield's Leather Flower within the Skyline Project Boundary.

The IPaC and Federal Register do not list Morefield's Leather Flower as occurring in the counties where the Lake Harris Project Boundary is located. The current habitat range of Morefield's Leather Flower intersects the Skyline Project Boundary (Figure 11-20); however, the habitat range did not intersect the Skyline Project during or immediately following the development of the *Final Threatened and Endangered Species Study Report* (Kleinschmidt 2021c). Therefore, no field surveys have been conducted for Morefield's Leather Flower at the Harris Project to date.

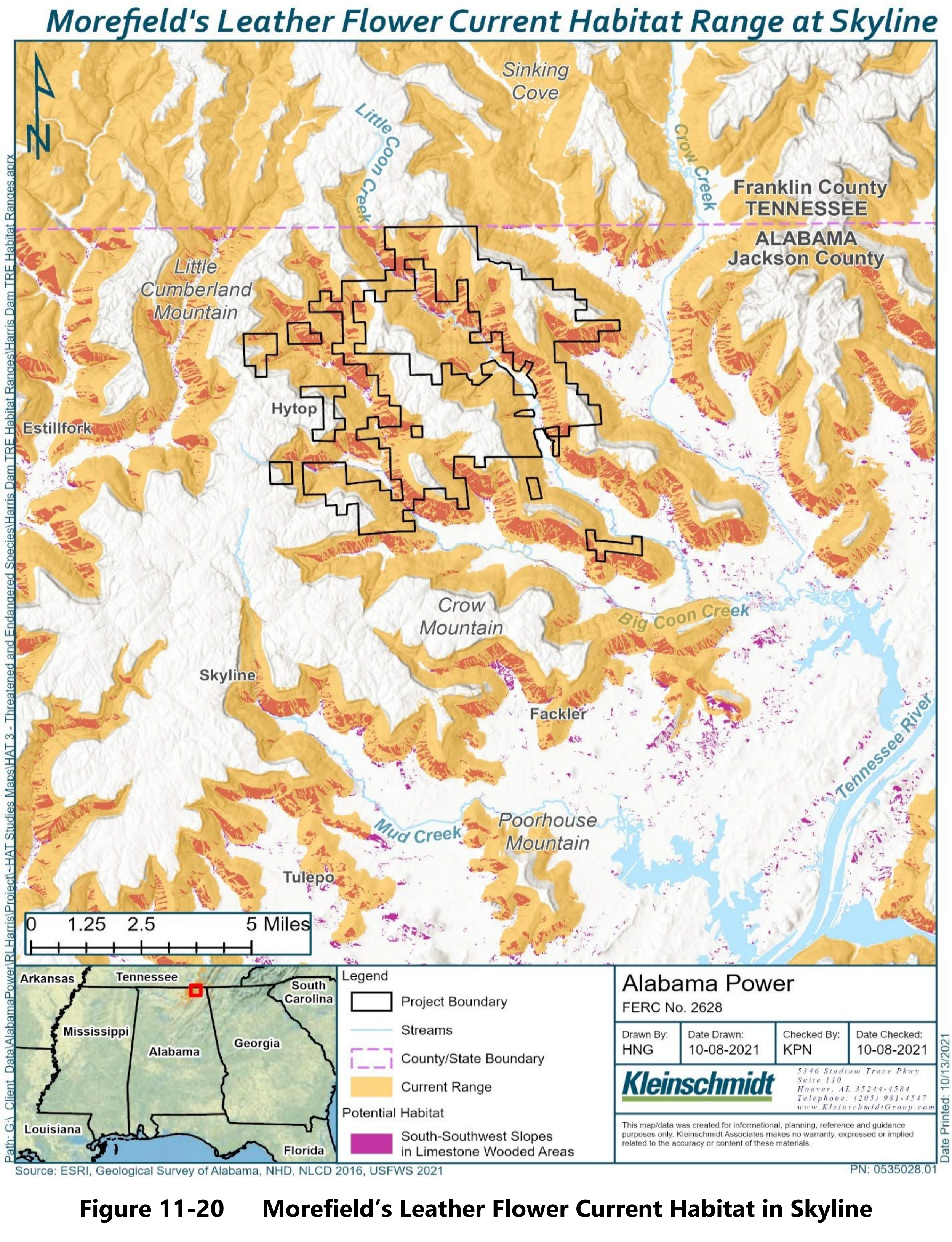

Figure 11-20 Morefield's Leather Flower Current Habitat in Skyline

11.1.1.17 American Hart's-tongue Fern

The USFWS listed American Hart's-tongue Fern as a threatened species in 1989. The American Hart's-tongue Fern is an evergreen fern with strap-shaped fronds that range from 35 to 40 cm in length and 2 to 4.5 cm wide and taper to an acute tip. The frond rises from a vertical rhizome covered with cinnamon-colored scales (USFWS 2019b). This species has a historical range which includes Alabama, Michigan, New York, and Tennessee. American Hart's-tongue Fern is typically found growing in close association with dolomitic limestone in the northern part of its range but is only found near the entrances of well-shaded limestone pit caves characterized by cold air and high humidity (USFWS 1993a). American Hart's-tongue Fern occupies cliff faces, sinkholes, and ravine walls, and wind is the primary mechanism for spore dispersal. Alternative spore dispersal mechanisms include ingestion by slugs and snails or transport on various mammals (USFWS 2019b). Threats to American Hart's-tongue Fern include trampling, logging, and development within and near its habitat (USFWS 1993a).

The USFWS has both a Recovery Plan (USFWS 1993a) and a Five-Year Review (Federal Register 2018) for the American Hart's-tongue Fern. The current habitat range of the American Hart's-tongue Fern intersects the Skyline Project Boundary (Figure 11-21). IPaC did not list the American Hart's-tongue Fern as occurring near the Skyline Project Boundary during or immediately following the development of the *Final Threatened and Endangered Species Study Report* (Kleinschmidt 2021c). There are two known locations of American Hart's-tongue Fern in Alabama, both of which occur outside the Project Boundary (USFWS 2019b). The IPaC and Federal Register do not list Morefield's Leather Flower as occurring in the counties where the Lake Harris Project Boundary is located.

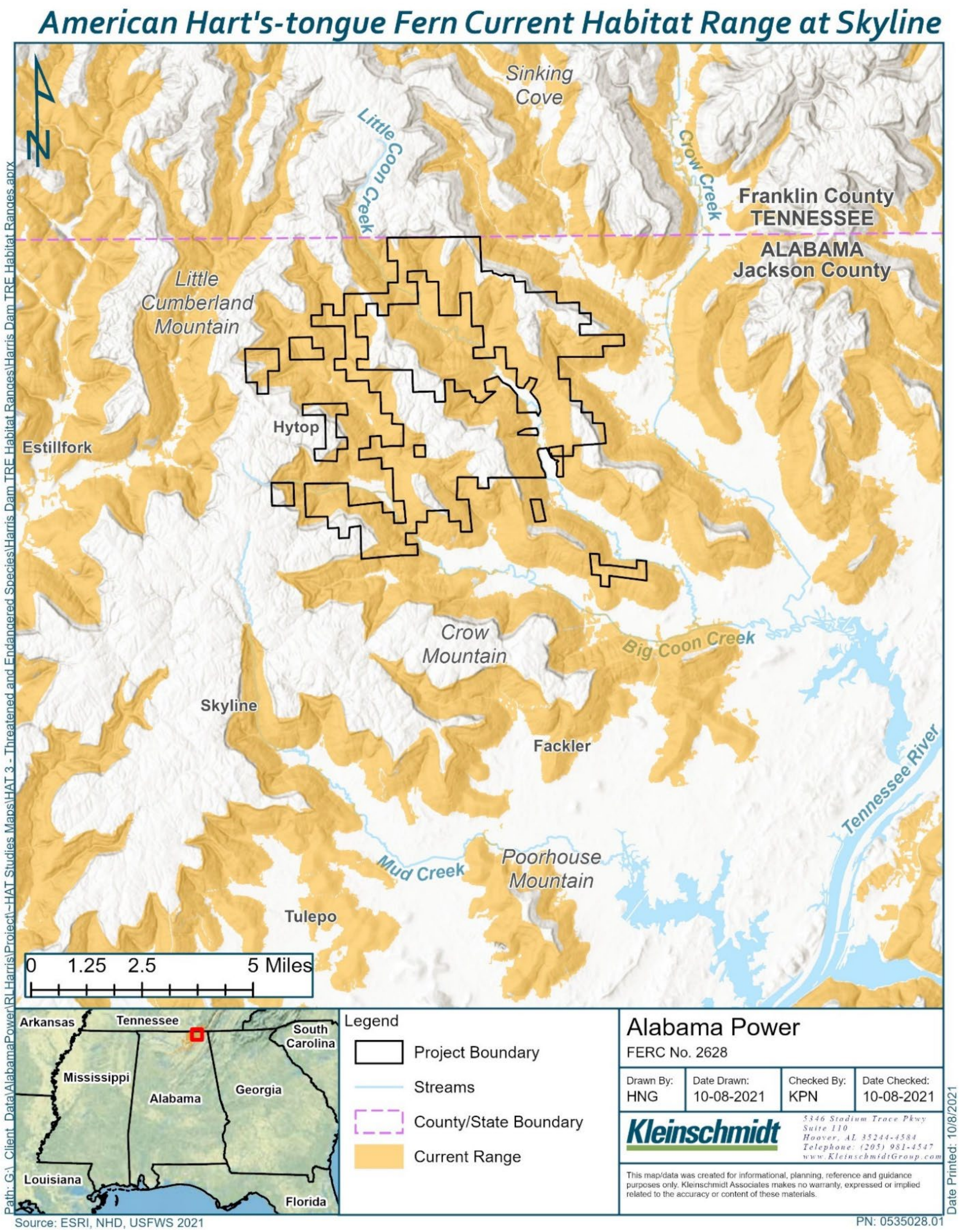

Figure 11-21 American Hart's-tongue Fern Current Habitat Range at Skyline

11.1.1.18 Monarch Butterfly

The USFWS identified the Monarch Butterfly as a candidate for federal listing on December 17, 2020 (Federal Register 2020). This species has not yet been listed or proposed for listing, so there are no Section 7 requirements regarding this species, no recovery plan or Five-Year Review. The Monarch Butterfly has bright orange wings with black veins surrounded by a black border with a double row of white spots inside the border on the upper side of the wings. During breeding season, Monarch Butterflies lay their eggs on milkweed leaves, and larvae emerge within two to five days. Between nine and 18 days, the larvae develop through five larval instars while feeding on the milkweed and sequestering toxins as defense against predators. The larvae then pupate into chrysalises and emerge 6-14 days later as adult butterflies (USFWS 2020b). Long term census data suggests populations of Monarch Butterfly are in decline due to loss and degradation of habitat, exposure to insecticides, and the effects of climate change. Loss of migratory populations can impair the species' ability to adapt to changes in the future (USFWS 2020b).

Due to the migratory nature of the Monarch Butterfly, this species' current habitat range covers the entirety of both the Skyline and Lake Harris Project Boundaries. Occurrences within the Project Boundary are most likely during fall and spring migration and during the spring breeding period (USFWS 2020b).

11.1.2 Lake Harris

11.1.2.1 Red-cockaded Woodpecker

The RCW is a federally listed endangered species that potentially occurs in Clay and Randolph counties (Figure 11-22). The RCW requires open pine woodlands and savannahs with large old pines which are used as cavity trees for nesting and roosting habitat. The cavity trees are located in open stands with little or no hardwood mid-story and few or no over-story hardwoods. The excavated cavities within inactive heartwood are free of resin,which can entrap the birds (USFWS 2016d). The resin produced by the tree from outer vascular tissue, after excavation, may provide protection for RCWs against climbing snakes or other predators. However, the excavated cavities that are not free of resin, can entrap RCWs (USFWS 2006).

RCWs require abundant native bunchgrass and groundcovers suitable for foraging within their habitat (USFWS 2016d). The two primary factors threatening RCWs are habitat loss and habitat degradation (USFWS 2006).

The USFWS has both a Recovery Plan (USFWS 2003) and a Five-Year Review (USFWS 2006) for the RCW. The IPaC and Federal Register do not list the RCW as occurring in Jackson County where the Skyline Project Boundary is located. There are no published reports of RCWs occurring within the Lake Harris Project Boundary; however, the species habitat range does overlap with the Lake Harris Project Boundary. The Lake Harris Project Boundary contains 3,068 acres of coniferous forest; however, the land use data is not specific enough to determine if these forests contain the more specific habitat characteristics to be suitable for RCWs (Kleinschmidt 2021c). Consultation with USFWS and ADCNR determined the need to conduct field surveys for RCW habitat due to the potential for suitable habitat in mature pine stands with the Lake Harris Project Boundary (Kleinschmidt 2021c).

On September 22, 2020, Alabama Power performed habitat assessment for the RCW at six locations around Lake Harris (Figure 11-23). Suitable nesting habitat was not observed at any of the sites during the survey, including three high priority (oldest tracts) search areas (Table 11-4). Results suggest that RCW is not likely to use the habitat along Lake Harris for foraging (Kleinschmidt 2021c).

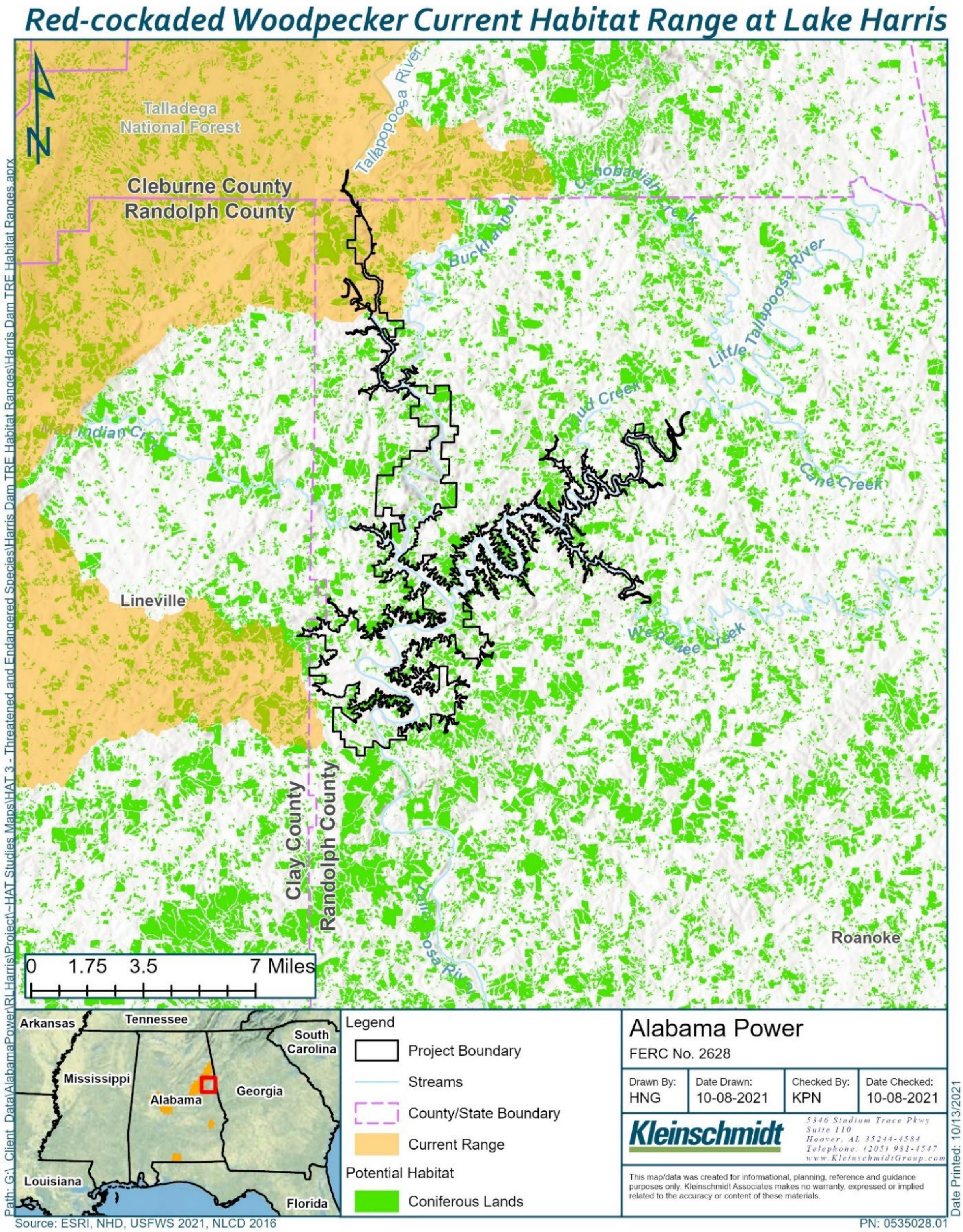

Figure 11-22 Red-cockaded Woodpecker Current Habitat Range at Lake Harris

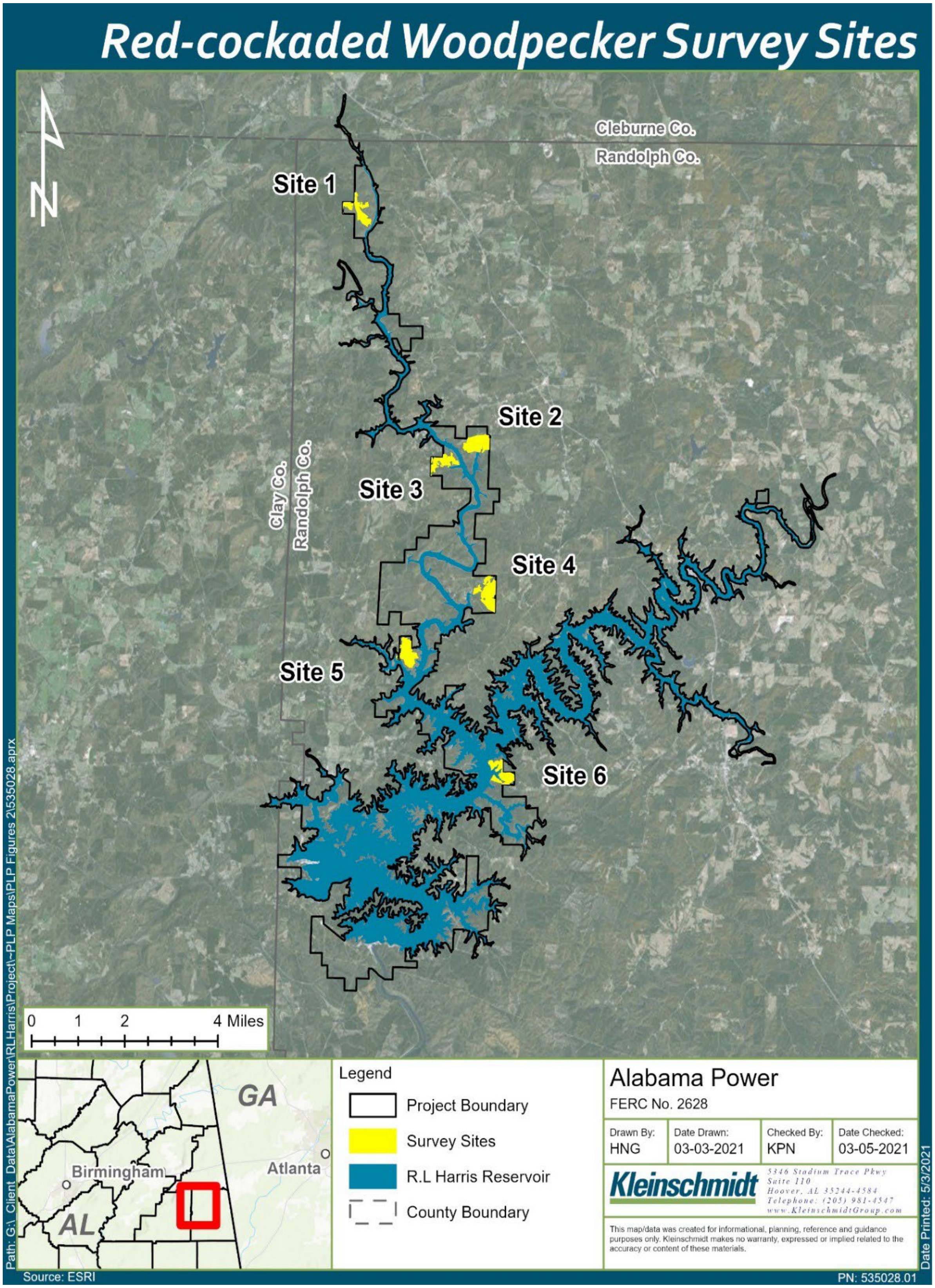

Figure 11-23 Red Cockaded Woodpecker Survey Sites on Lake Harris

Table 11-4 Lake Harris Red-cockaded Woodpecker Habitat Assessment Sites

Site Number	Site Size (Acres)	Site Location	Habitat Suitability
1*	84	33.474752, -85.620624	Unsuitable
2	105	33.407346, -85.574600	Unsuitable
3*	69	33.401295, -85.586397	Unsuitable
4	116	33.364561, -85.574204	Unsuitable
5	95	33.348224, -85.601981	Unsuitable
6*	85	33.307157, -85.563305	Unsuitable

Source: Kleinschmidt 2021c

*Considered a priority search area based on the age of the stand.

11.1.2.2 Finelined Pocketbook Mussel

The Finelined Pocketbook is a threatened mussel with a species range within the Lake Harris Project Boundary (Kleinschmidt 2021c) (Figure 11-24). The Finelined Pocketbook is a sub-oval shaped mussel that has a maximum length of approximately 3⅜ inches (Mirarchi et al. 2004). This mussel lives in large to small streams in habitats primarily above the fall line having stable sand/gravel/cobble substrates and moderate to swift currents. Historically, this mussel existed in the Alabama, Tombigbee, Black Warrior, Cahaba, Tallapoosa, and Coosa Rivers, and their tributaries (USFWS 2004). The ADCNR and USFWS are currently reintroducing the Finelined Pocketbook into suitable historical habitats within the state (USFWS 2019c). During reproduction, the Finelined Pocketbook mussel releases glochidia as a super-conglutinate from March through June, with confirmed host species that include Blackspotted Topminnow, Redeye Bass[44], Spotted Bass[45], Largemouth Bass, and Green Sunfish (Mirarchi et al. 2004).

The historic construction of dams and impoundments along large reaches of river channels is the primary cause of the decline in Finelined Pocketbook's distribution and population size and continues to be a major threat to this species' persistence. This species continues to be imperiled due to a range of threats, including water withdrawal, water quality degradation including sedimentation released from dams and agricultural

[44] Identified as Tallapoosa Bass (*Micropterus tallapoosae*) in the Tallapoosa River Basin
[45] Identified as Alabama Bass (*Micropterus henshalli*) in the Tallapoosa River Basin

runoff, downstream flow alterations caused by hydropeaking dams, and climate change (USFWS 2019c).

The USFWS has both a Recovery Plan (USFWS 2000) and a Five-Year Review (USFWS 2019c) for the Finelined Pocketbook. Critical habitat was designated for this species in 2004. Although there are no critical habitat areas identified by the USFWS within the Lake Harris Project Boundary,critical habitat for this species is located immediately upstream of Lake Harris (USFWS 2004) (Figure 11-24). The USFWS recommended surveys for Finelined Pocketbook due to the proximity of critical habitat to the Lake Harris Project Boundary (Kleinschmidt 2021c). To date, no populations have been identified within the Lake Harris Project Boundary.

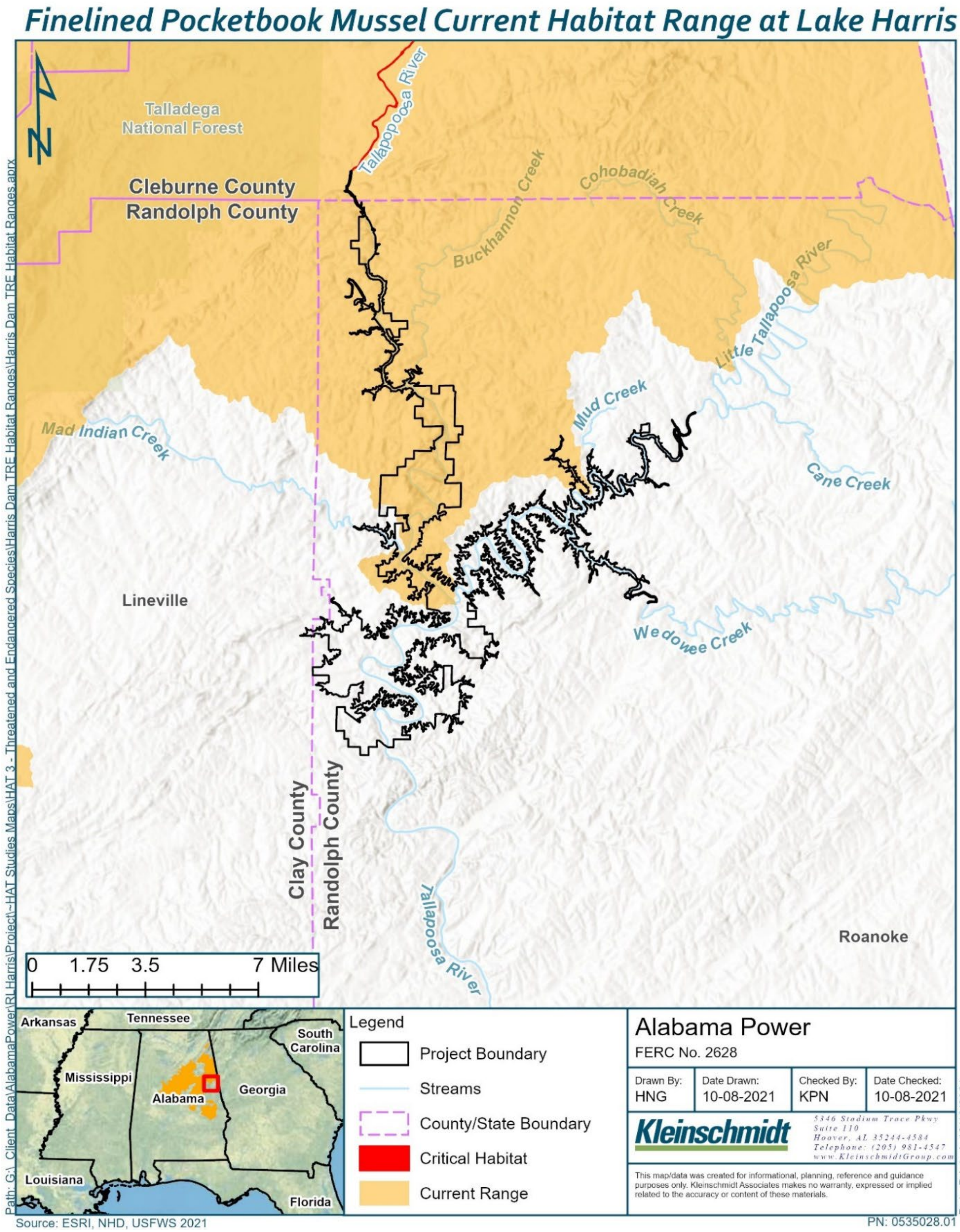

Figure 11-24 Finelined Pocketbook Mussel Current Habitat Range at Lake Harris

On November 21, 2019, Alabama Power, Kleinschmidt, and the USFWS surveyed the Tallapoosa River upstream of Lake Harris for Finelined Pocketbook (Table 11-5). Alabama Power and USFWS determined that additional efforts would be necessary in warmer conditions with lower water level to facilitate surveys. Additional surveys were conducted in the summer of 2020 by Alabama Power and ADCNR on the Tallapoosa River and four of its tributaries (Carr Creek, Ketchepedrakee Creek, Little Ketchepedrakee Creek, and Mad Indian Creek (Figure 11-25 through Figure 11-28) and the Little Tallapoosa and one of its tributaries (Pineywood Creek) (Table 11-5). During the surveys, critical habitat within the Tallapoosa River was observed to be degraded by siltation, and secondary tributaries depicted a similar lack of habitat (Kleinschmidt 2021c). Overall unionid diversity and density was low across sites (Table 11-6). (Kleinschmidt 2021c). Finelined Pocketbook was not collected at any site (Kleinschmidt 2021c) (Table 11-6).

Table 11-5 2019-2020 Finelined Pocketbook Survey Locations

Tributary	Site Number	Miles Upstream Of Confluence*	Description
Tallapoosa River	1	4.6	Downstream of Co. Rd. 36 crossing to just downstream of Hwy 431 crossing
	2	4.4	
	3	4.2	
	4	4.0	
	5	3.3	
	6	0.7	
Carr Creek	1	0.1	Upstream of Tallapoosa River Site 6
Ketchepedrakee Creek	1	1.8	Upstream (Site 1) and downstream (Site 2) of Co. Rd. 201 crossing
	2	1.1	
Little Ketchepedrakee Creek	1	1.9	Downstream of Co. Rd. 313 crossing
Mad Indian Creek	1	3.1	Upstream of Co. Rd. 113 crossing
Little Tallapoosa River	1	3.2	Downstream of Co. Rd. 59 crossing to upstream of reservoir
	2	1.3	
	3	0.6	
	4	0.1	
Pineywood Creek	1	2.5	Co. Rd. 270 crossing (Site 1) and Hwy 431 crossing (Site 2)
	2	1.9	

Source: Kleinschmidt 2021c

*The confluence of the tributaries with the Tallapoosa River, and the Tallapoosa River and Little Tallapoosa River in this table are where the R.L. Harris reservoir begins, at an elevation of 793-feet msl.

Table 11-6 2019-2020 Effort and Mollusk Species Collected at Each Survey Site

TRIBUTARY	SITE NUMBER	TOTAL EFFORT (MINUTES)	SPECIES COLLECTED
Tallapoosa River	1	120	*Elimia* spp., *Corbicula* spp.
	2	120	*Elimia* spp., *Corbicula* spp.
	3	30	None
	4	270	*Elimia* spp., *Corbicula spp.*
	5	480	*Elimia* spp., *Corbicula* spp., *Ellipto* spp. (relic), *Villosa lineosa*[57]
	6	60	*Corbicula* spp. (relics)
Carr Creek	1	200	*Elimia* spp., *Corbicula* spp. (relics)
Ketchepedrakee Creek	1	135	*Elimia* spp., *Corbicula* spp. (relics)
	2	60	*Corbicula* spp. (relic)
Little Ketchepedrakee Creek	1	60	*Corbicula* spp. (live and relics)
Mad Indian Creek	1	60	*Corbicula* spp. (live and relics)
Little Tallapoosa River	1	100	*Elimia* spp., *Corbicula* spp. (relics)
	2	110	*Elimia* spp., *Corbicula* spp. (relics), *Villosa lineosa* (relic)
	3	125	*Elimia* spp., *Corbicula* spp. (relics), *Toxolasma* sp.
	4	150	*Elimia* spp., *Corbicula* spp. (relics)
Pineywood Creek	1	90	*Corbicula* spp. (relics)
	2	90	*Corbicula* spp. (relics)

Source: Kleinschmidt 2021c

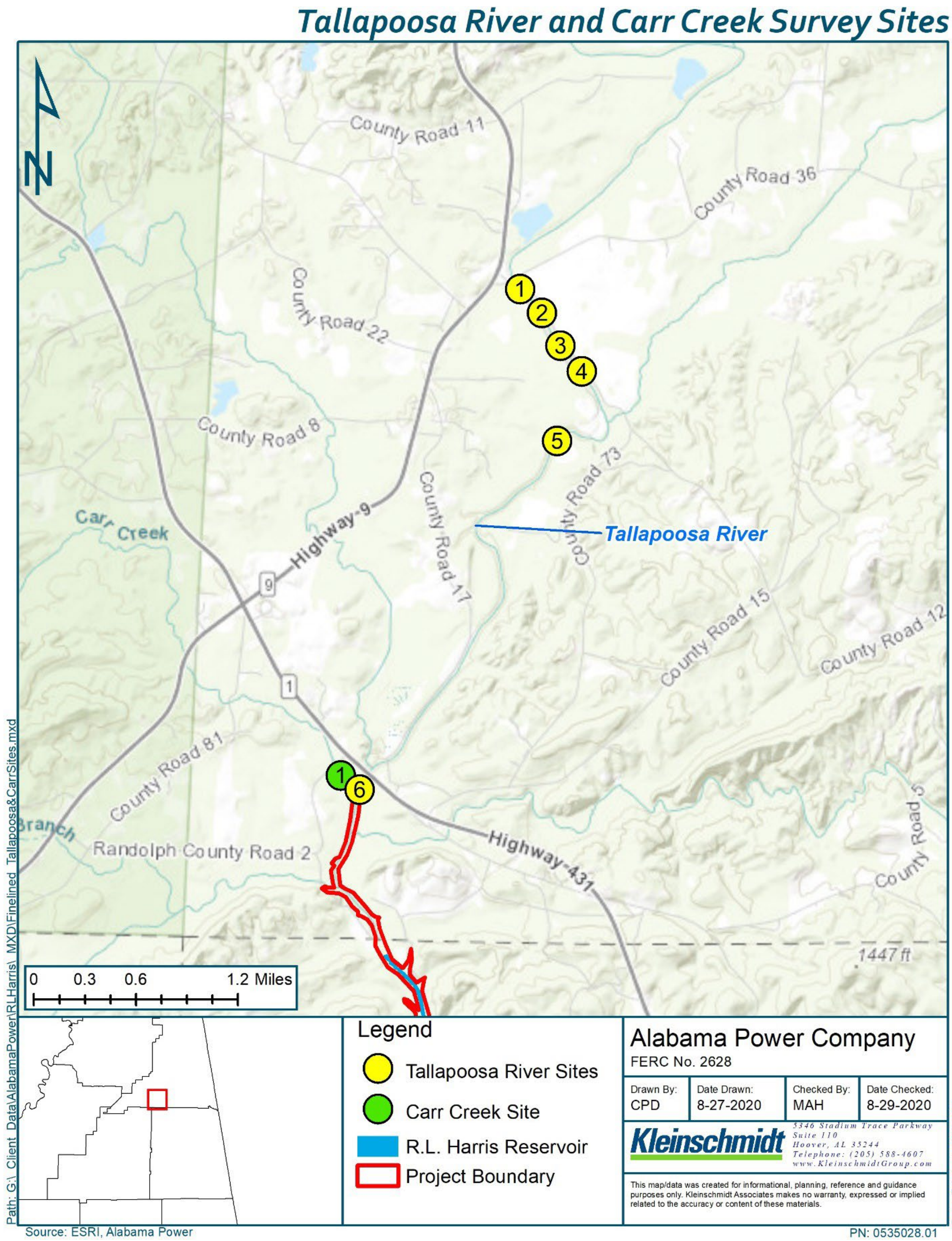

Figure 11-25 Finelined Pocketbook Survey Sites: Tallapoosa River and Carr Creek

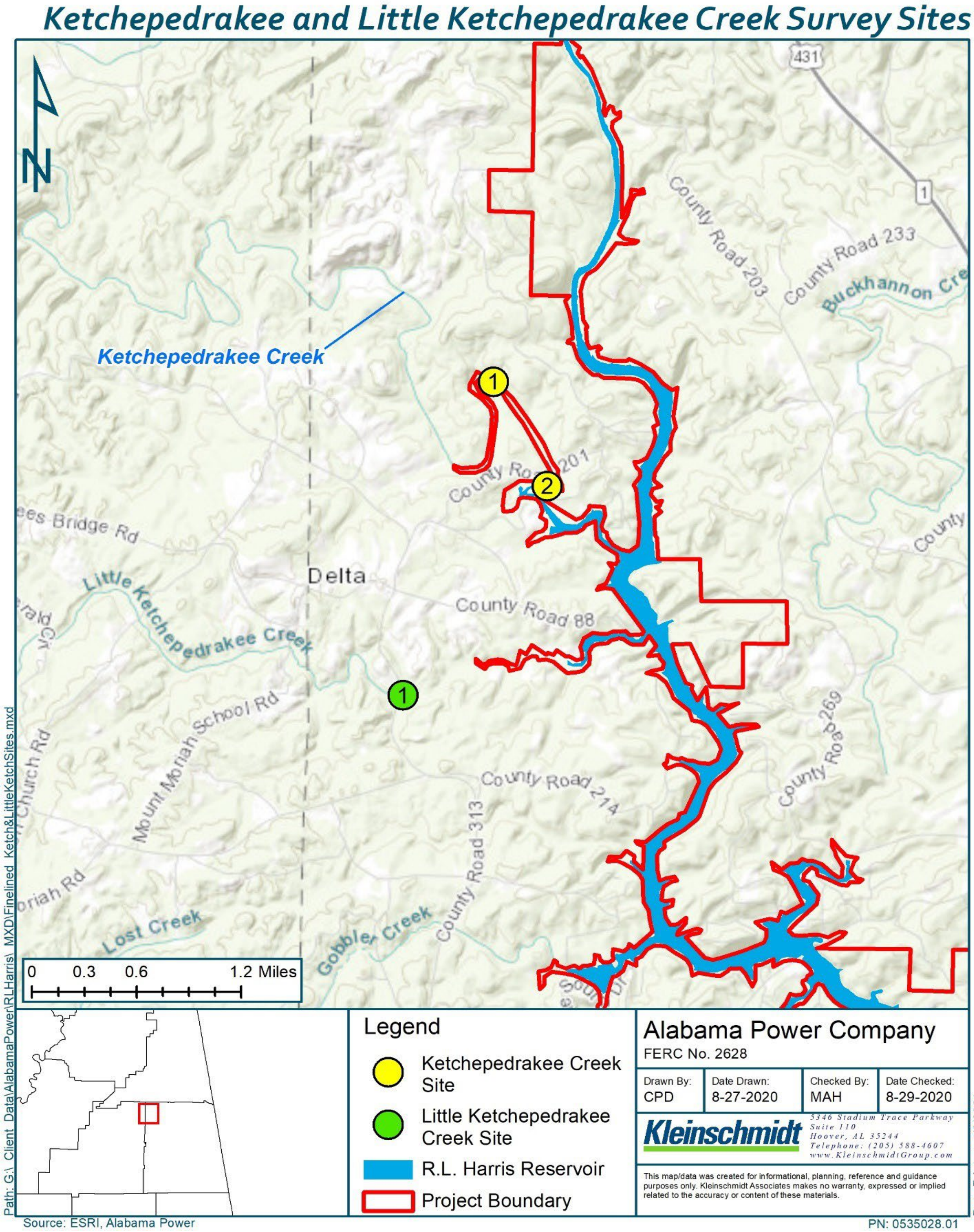

Figure 11-26 Finelined Pocketbook Survey Sites: Ketchepedrakee Creek and Little Ketchepedrakee Creek

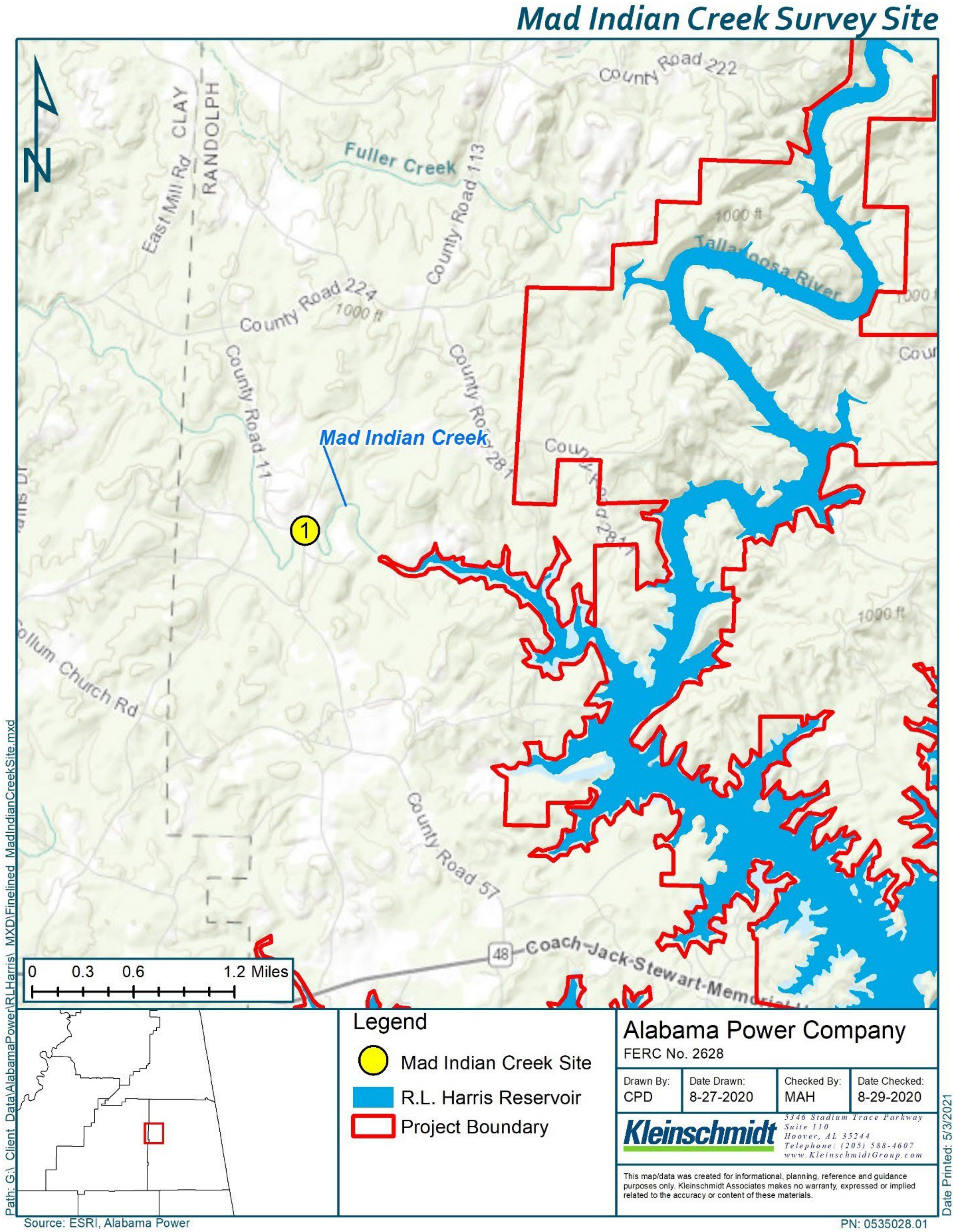

Figure 11-27 Pocketbook Survey Site: Mad Indian Creek

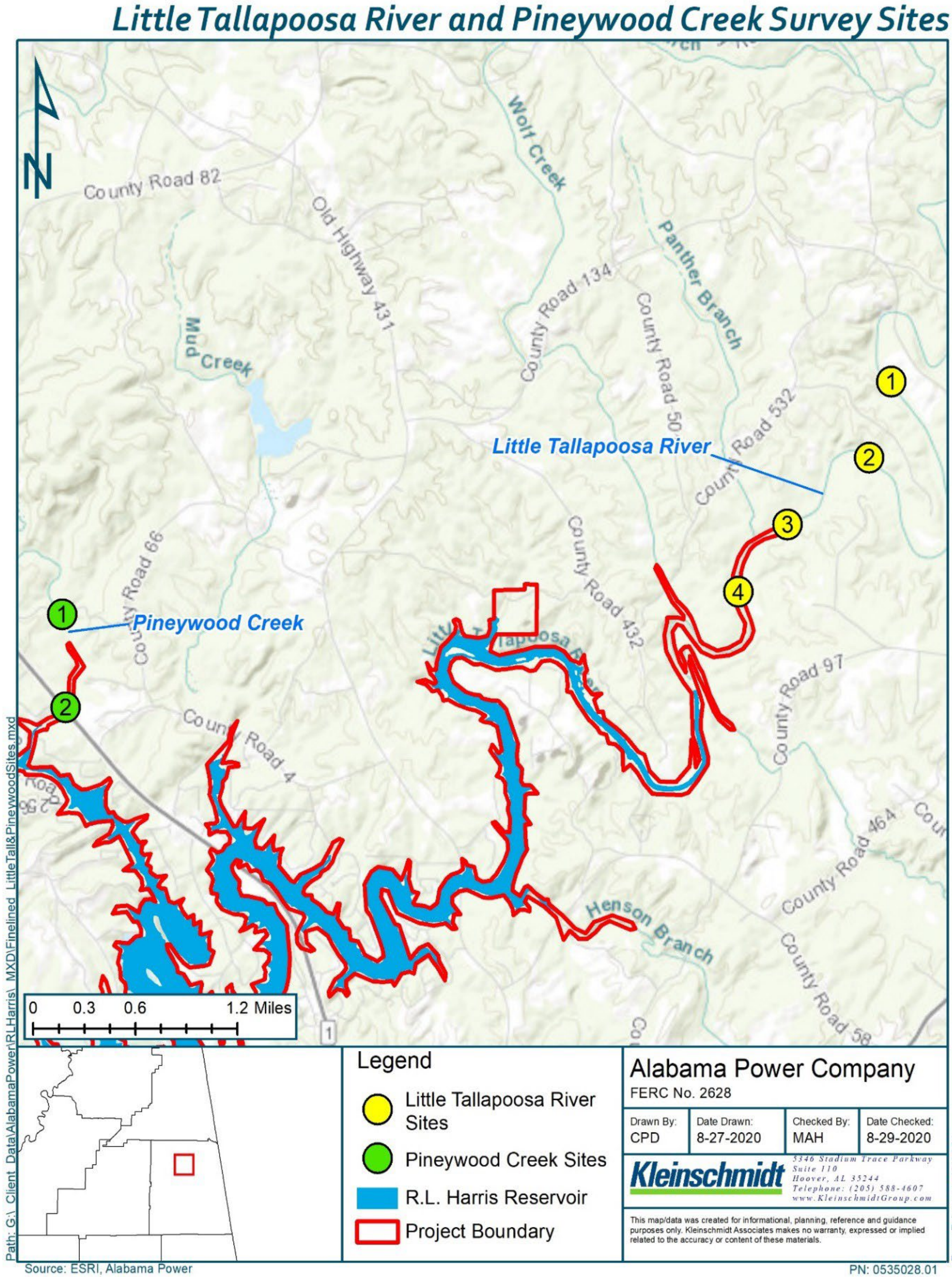

Figure 11-28 Finelined Pocketbook Survey Sites: Little Tallapoosa River and Pineywood Creek

11.1.2.3 Southern Pigtoe

The Southern Pigtoe is an endangered mussel found in Clay and Cleburne counties. The Southern Pigtoe is an elliptical to oval shaped mussel that has a maximum length of approximately 2.5 inches (USFWS 2019d). This mussel lives in medium streams to large rivers in habitats having sand/gravel substrates and moderate to swift currents. Historically, this mussel was found in Alabama, Georgia, and Tennessee and is endemic to the Coosa River system (USFWS 2019d, Mirarchi 2004) (Figure 11-29). Regarding reproduction, the Southern Pigtoe releases glochidia during spring and early summer and confirmed host species include Alabama Shiner (*Cyprinella callistia*), Blacktail Shiner, and Tricolor Shiner (*Cyprinella trichroistia*) (USFWS 2019d).

The historic construction of dams and impoundments along large reaches of river channels is the primary cause of the decline in Southern Pigtoe's distribution and population size and continues to be a major threat to this species' persistence (USFWS 2019d). This species continues to be imperiled due to water withdrawals, water quality degradation including sedimentation released from dams and agricultural runoff, downstream flow alterations caused by hydropeaking dams, and climate change (USFWS 2019d). The USFWS has a Five-Year Review (USFWS 2019d) for the Southern Pigtoe. Critical habitat was designated for this species in 2004, which includes 973 miles of stream channel in Alabama, Mississippi, Tennessee, and Virginia. The Lake Harris Project Area does not encompass critical habitat areas identified by the USFWS (USFWS 2004); no populations were identified during Finelined Pocketbook surveys at Carr Creek, where habitat range was noted for the Southern Pigtoe (Figure 11-29).

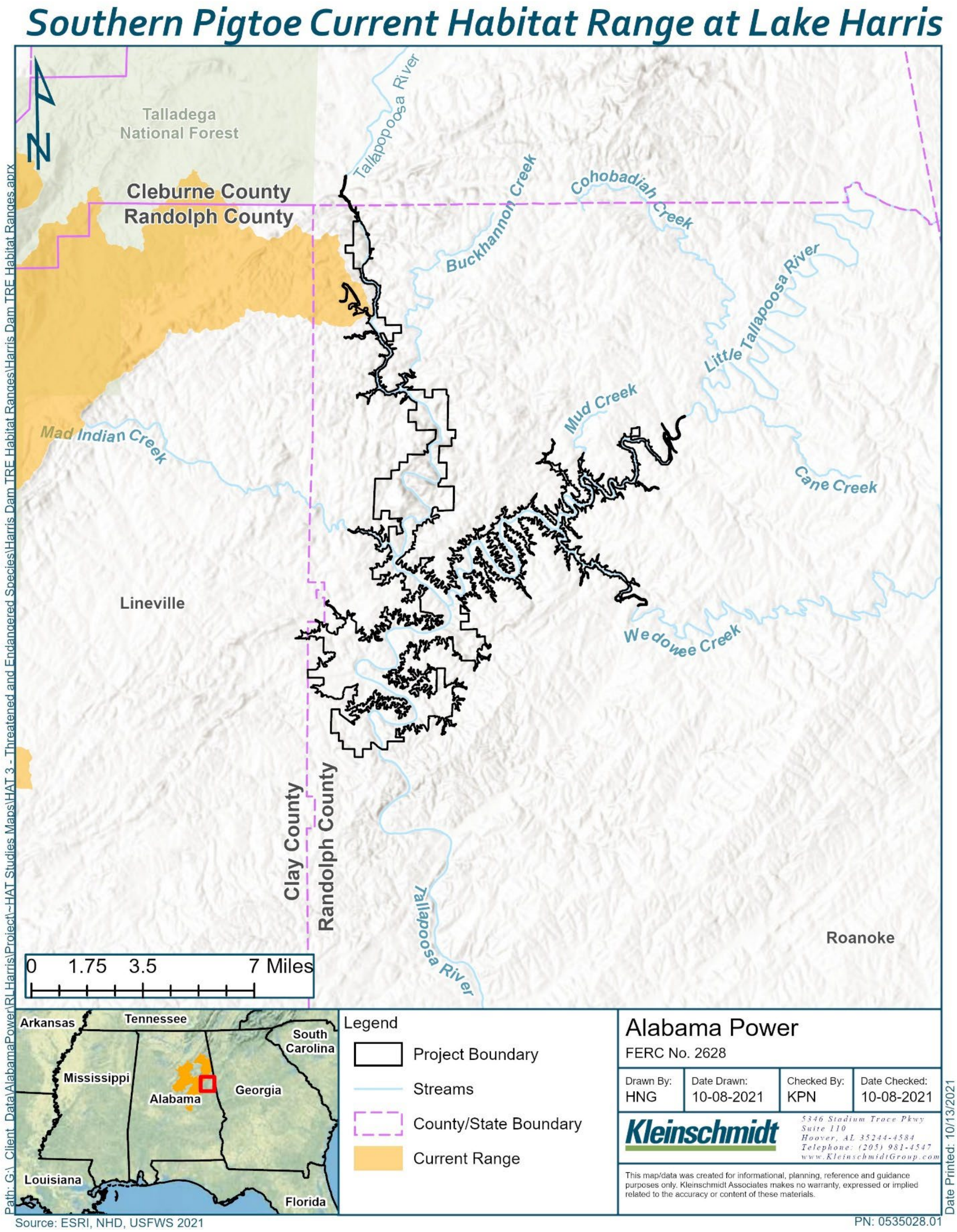

Figure 11-29 Southern Pigtoe Current Habitat Range at Lake Harris

11.1.2.4 Indiana Bat

Species information is presented in the Skyline Affected Environment Section above. While the Lake Harris Project Boundary falls within the range of the Indiana Bat, designated critical habitat does not occur within the Project Boundary. There have been no reports of overwintering or summer roosting occurrences. A large portion (66.5 percent) of the Harris Project is comprised of forested cover that likely provides some suitable summer roosting habitat for the Indiana Bat (Figure 11-30). The Indiana Bat could potentially use the forests within the Lake Harris Project Boundary for roosting during the summer months.

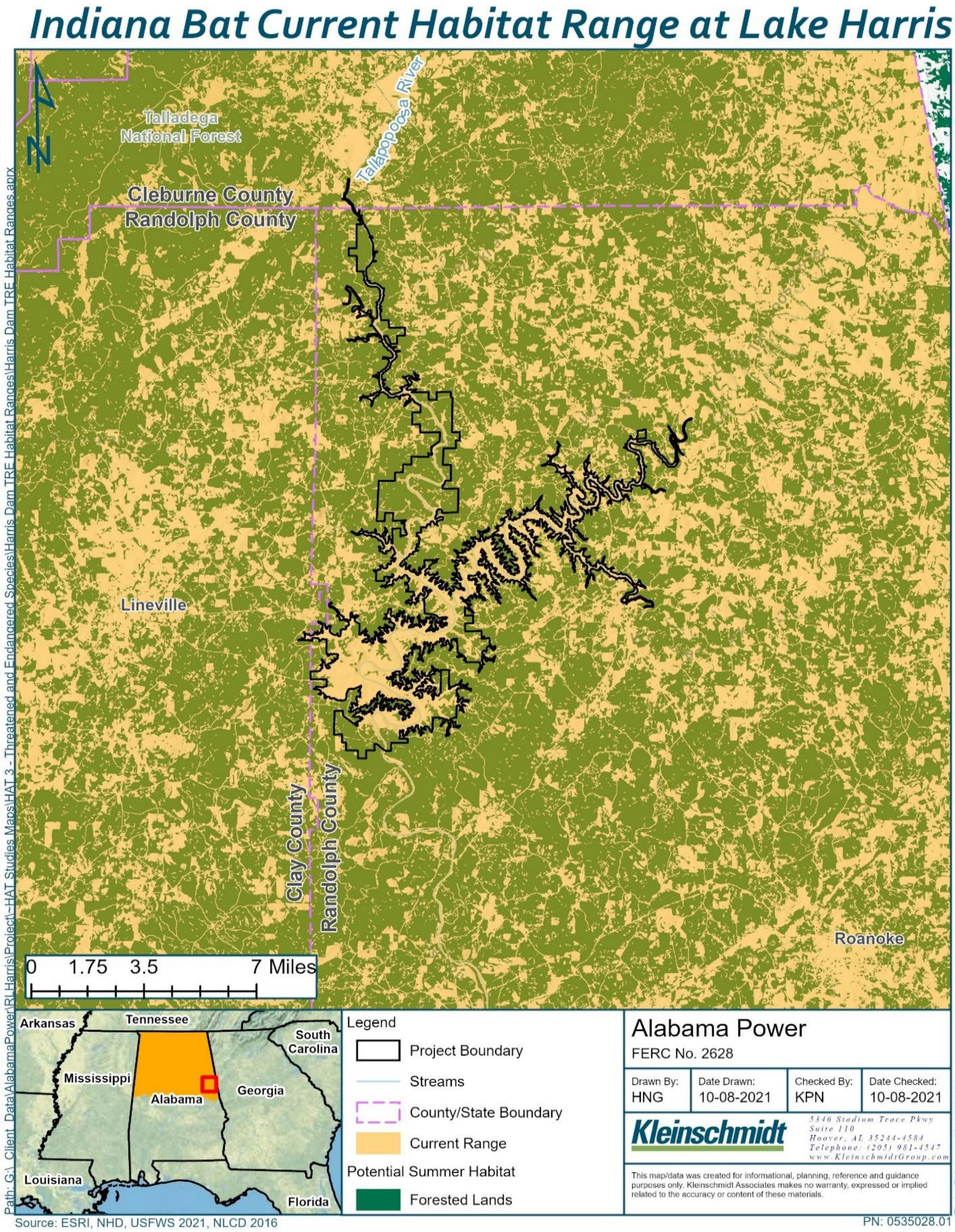

Figure 11-30 Indiana Bat Current Habitat Range and Forested Lands at Lake Harris

11.1.2.5 Northern Long-eared Bat

Species information is presented in in the Skyline Affected Environment Section above. While the Lake Harris Project Boundary falls within the range of the Northern Long-eared Bat (Figure 11-31), there have been no reports of overwintering or summer roosting occurrences. A large portion (66.5 percent) of the Harris Project is comprised of forested cover that likely provides some suitable summer roosting habitat for the Northern Long-eared Bat. The Northern Long-eared Bat could potentially use the forests within the Lake Harris Project Boundary for roosting during the summer months.

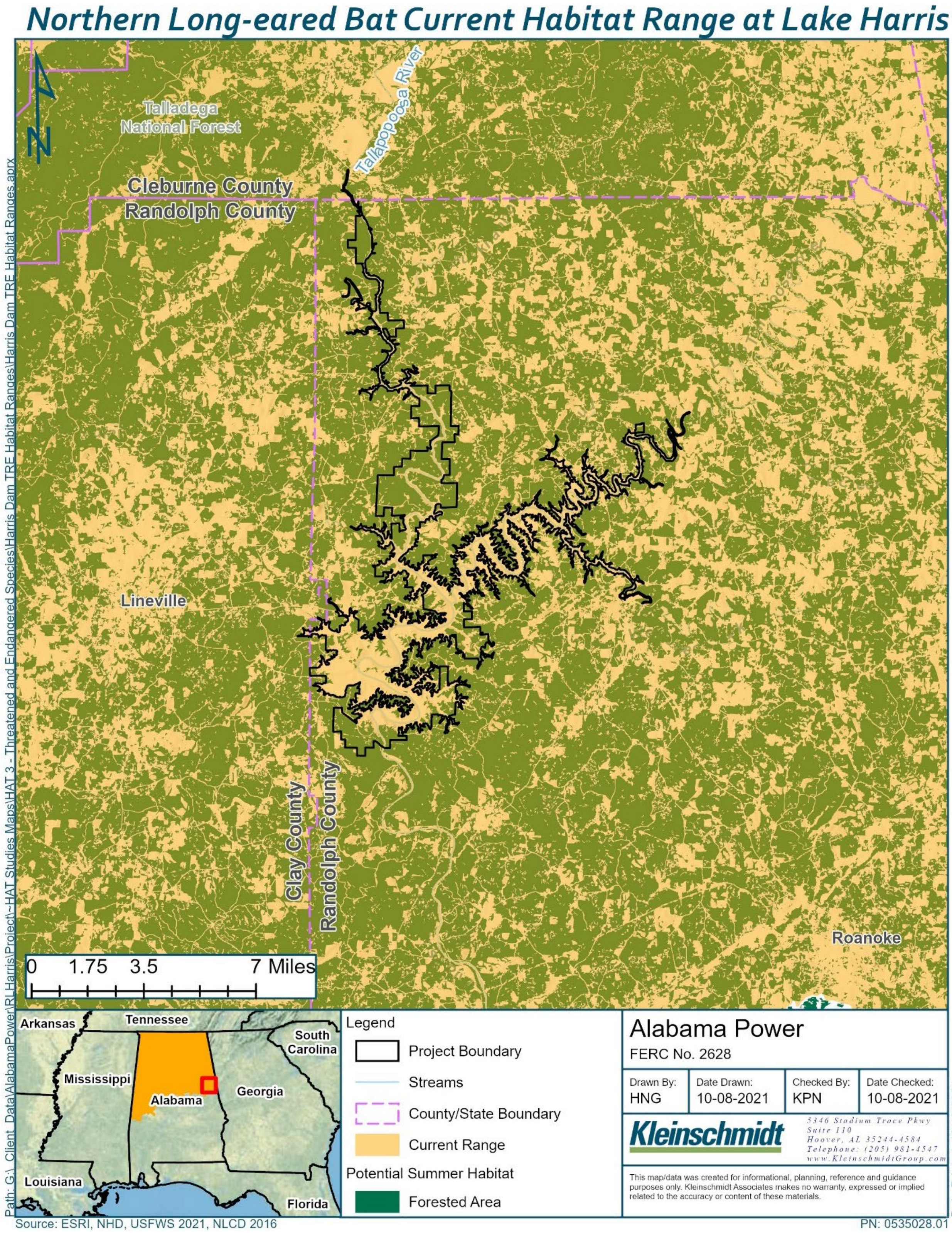

Figure 11-31 Northern Long-eared Bat Current Habitat Range and Forested Lands at Lake Harris

11.1.2.6 Little Amphianthus

The Little Amphianthus was listed as threatened in 1988 under the Endangered Species Act (ESA). Historically, this species is known to inhabit 57 sites in Georgia, Alabama, and South Carolina. In Alabama, limited populations occur in Randolph (two sites) and Chambers (one site) counties. The current habitat range previously intersected the Lake Harris Project Boundary during the development of the *Final Threatened and Endangered Species Study Report* (Kleinschmidt 2021c) but has since been updated to occur south of the Lake Harris Project Boundary (Figure 11-32). This species is a small, aquatic annual herb with floating and submerged leaves. The tiny white to pale purple flowers are found among both the floating and submerged leaves. An ephemeral species, the entire life cycle of this plant may be completed within three to four weeks in the spring. This species has a very specific habitat that is restricted to vernal pools on granite outcrops in the southeastern Piedmont. Optimal habitat has been described as a shallow, flat bottomed pool with a rock rim (NatureServe 2015). In 1993, the USFWS prepared a recovery plan (USFWS 1993c) which identified threats to the species including: quarrying activities; conversion of habitat to pasture for farm animals; dumping of waste material; vehicular traffic including off-road vehicles, motorbikes, automobiles, and logging equipment; recreation impacts including foot traffic, littering, or vandalism; and insufficient regulations. Little Amphianthus will be considered for delisting when 20 viable, geographically separate populations (at least two in Alabama) have been permanently protected. A population is considered viable when it has the reproductive fitness to maintain itself.

A Five-Year Review conducted in 2007 by the USFWS concluded that the population of Little Amphianthus is declining (USFWS 2007a). Surveys found that 44 of the 65 original populations are still known to be intact. Since the recovery plan has been implemented, sixteen (25 percent) of the populations have been extirpated, and four populations have become tremendously degraded, and are at risk of being extirpated (USFWS 2007a). The IPaC and Federal Register do not list Little Amphianthus as occurring in the county where the Skyline Project Boundary is located. One occurrence was reported within the Lake Harris Project Boundary, specifically in Flat Rock Park on March 17, 1995 (Diggs et al. 2020a), but subsequent surveys at Flat Rock Park did not detect the plant (Alabama Power 2020a), and it is assumed extirpated from the site. There are 138.4 acres of granite rock geology occurring within the western edge of the Project Boundary at Lake Harris that could contain outcroppings for Little Amphianthus. Desktop resources like the National

Wetland Inventory do not provide accurate enough detail to identify the specific habitat characteristics of Little Amphianthus, such as the presence of vernal pools; however, vernal pools were identified during the 2019 surveys at Flat Rock Park.

Consultation with the Alabama Natural Heritage Program (ALNHP) determined that the only suitable habitat for Little Amphianthus occurs at Flat Rock Park[46]; however, Little Amphianthus was not found during the botanical inventory of Flat Rock Park in 2018 and 2019. The USFWS did not recommend additional field surveys for this species.

[46] Reference email dated August 15, 2020 between the ALNHP and Alabama Power as included in the T&E Study Consultation record filed concurrently with Kleinschmidt (2021c).

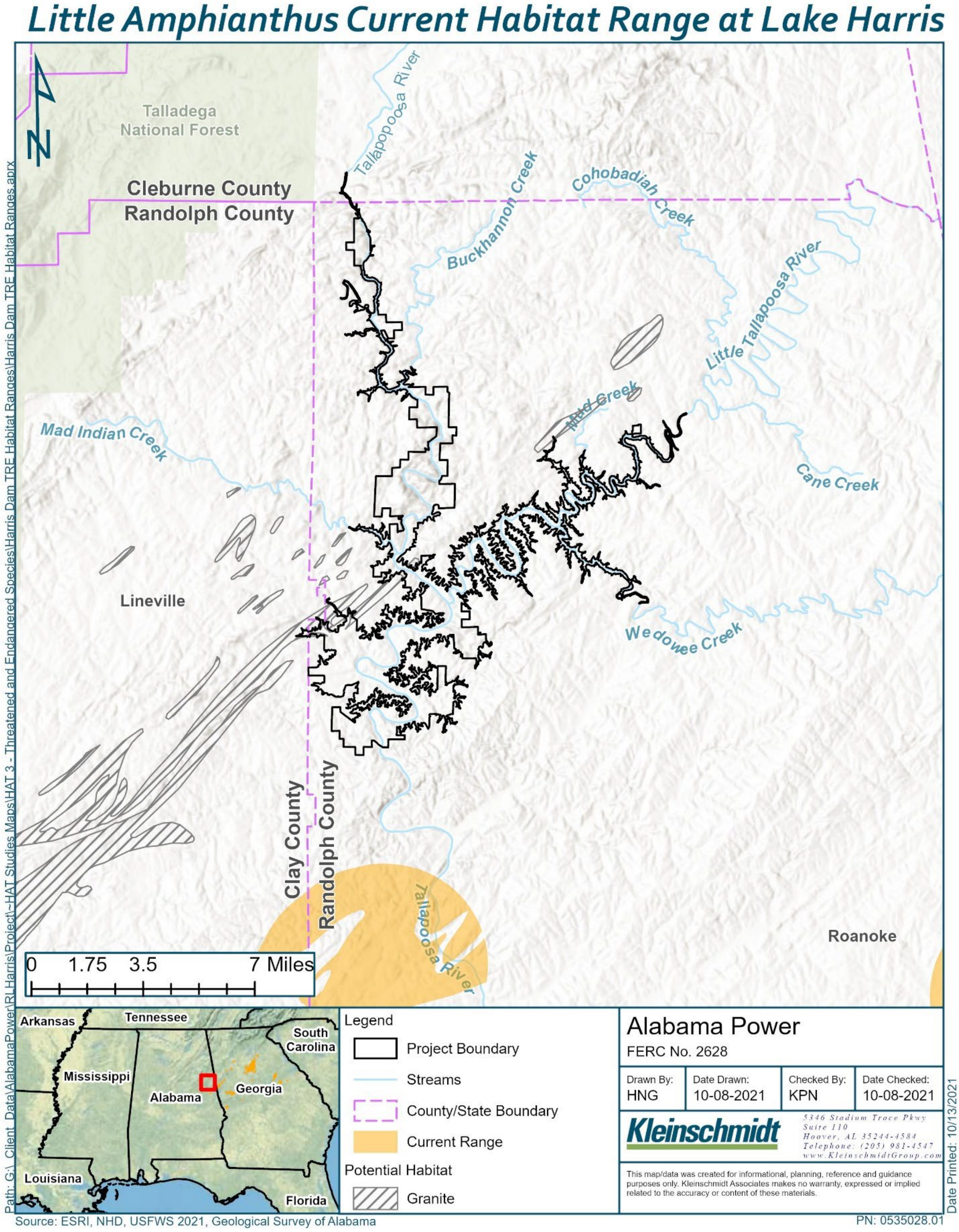

Figure 11-32 Little Amphianthus Current Habitat Range at Lake Harris

11.1.2.7 White Fringeless Orchid

Species information is the Skyline Affected Environment Section above. Habitat range for the White Fringeless Orchid at Lake Harris is shown in Figure 11-33.

On August 27, 2020, Alabama Power surveyed 12 sites at Lake Harris for White Fringeless Orchid (Figure 11-34). Although survey sites were selected based on potential habitat (i.e., wetlands) in consultation with USFWS and ALNHP, some survey sites fell outside of the current habitat range (Table 11-7), and surveyors found that much of this habitat was unsuitabledue to shade from thick canopies, disturbance, soil type, inundation, vegetation community (lack of common associates), and steep slopes. No White Fringeless Orchid specimens were collected or observed at any of the Lake Harris survey sites (Kleinschmidt 2021c).

Table 11-7 White Fringeless Orchid Survey Locations at Lake Harris

Site Number	Survey Date	Site Description	Habitat Suitability**
1	August 27, 2020	Forested/shrub wetland w/ TLROW*	S
2	August 27, 2020	Emergent wetland	U
3	August 27, 2020	Emergent wetland	U
4	August 27, 2020	Forested/shrub wetland	U
5	August 27, 2020	Forested/shrub wetland	U
6	August 27, 2020	Emergent wetland	U
7	August 27, 2020	Forested/shrub wetland	U
8	August 27, 2020	Emergent wetland	U
9	August 27, 2020	Emergent wetland	U
10	August 27, 2020	Emergent wetland	U
11	August 27, 2020	Forested/shrub wetland	U
12	August 27, 2020	Forested wetland	U

Source: Kleinschmidt 2021c

*Transmission line right-of-way = TLROW
**Habitat Suitability: Suitable = S, unsuitable = U

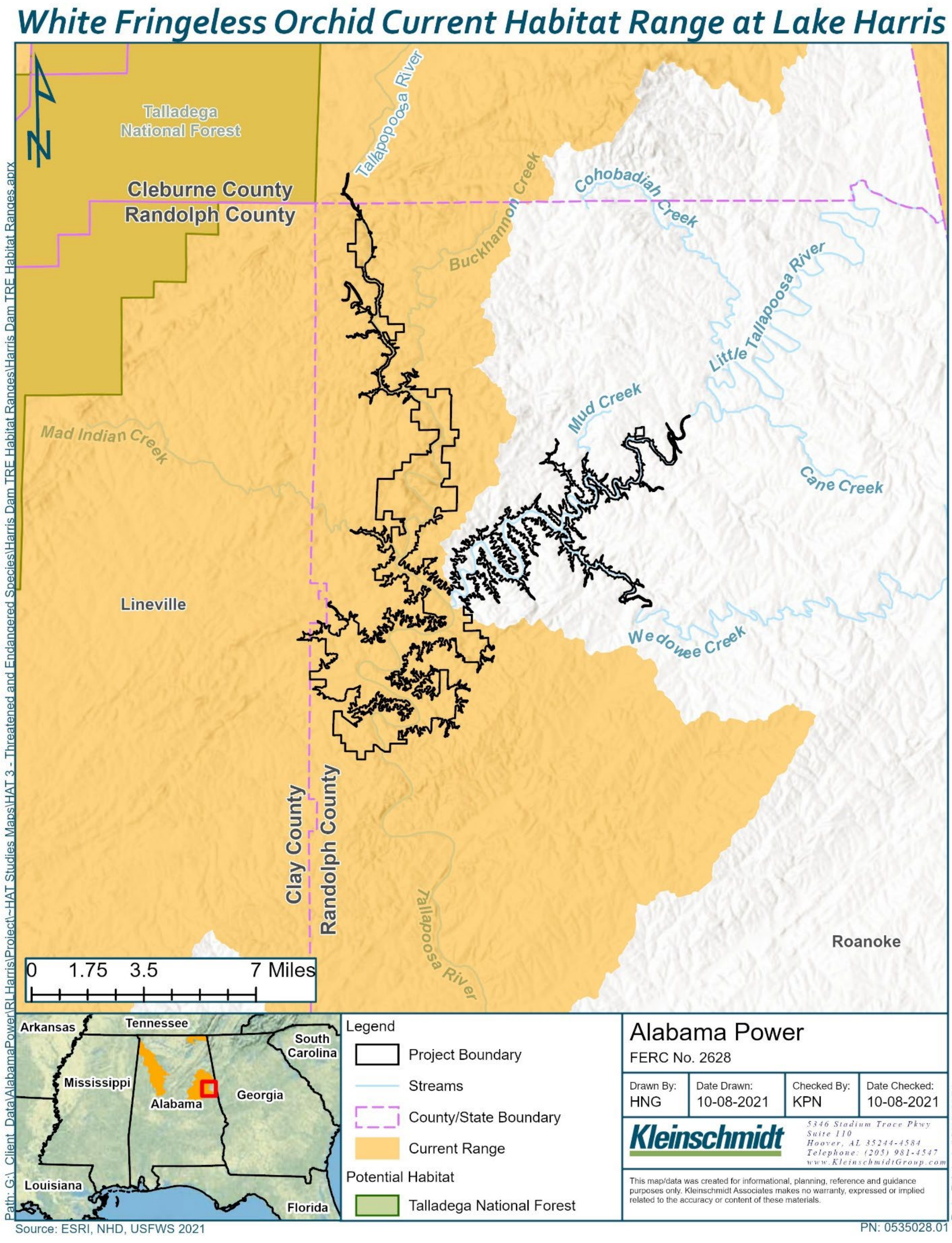

Figure 11-33 White Fringeless Orchid Current Habitat Range at Lake Harris

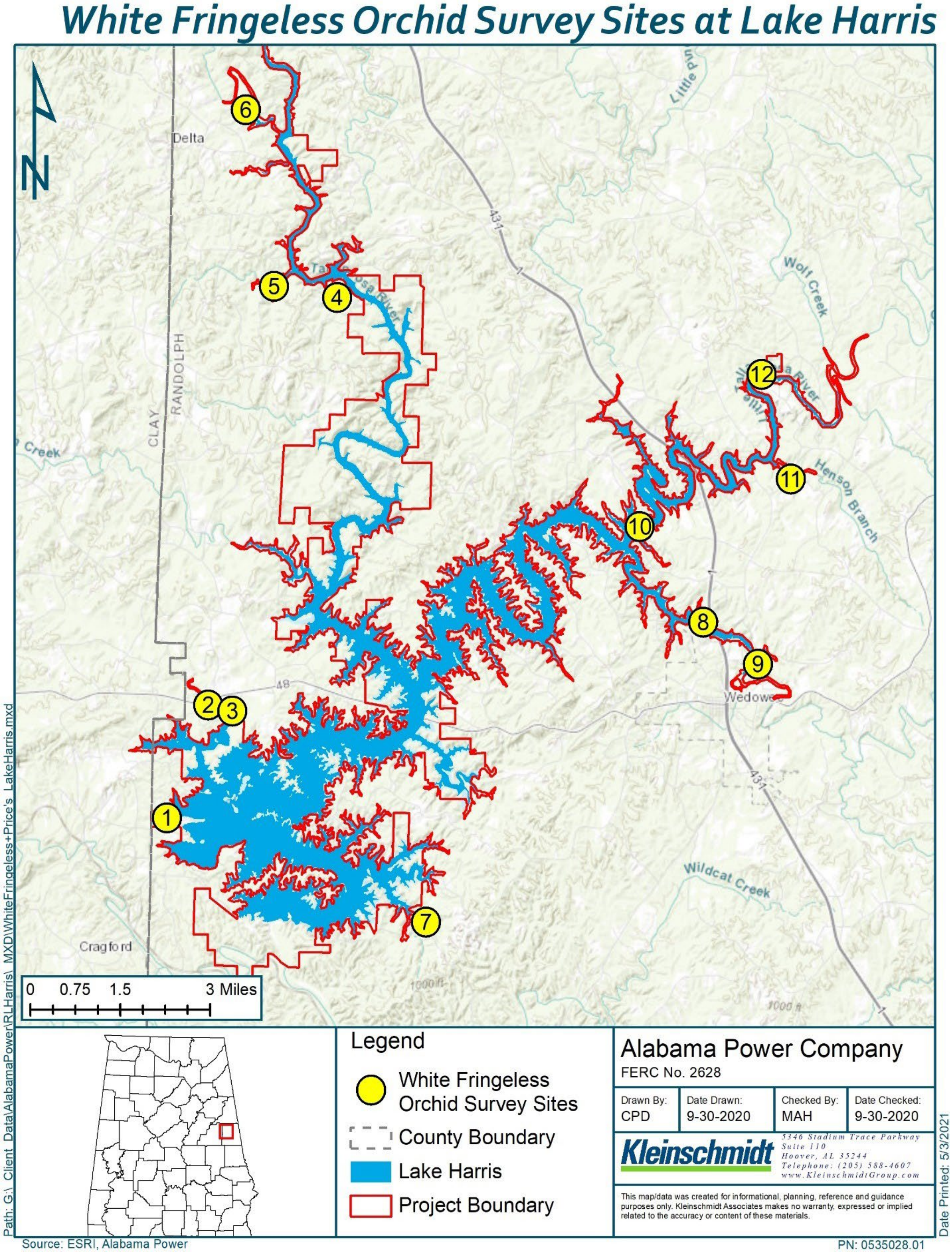

Figure 11-34 White Fringeless Orchid Survey Sites at Lake Harris

11.1.2.8 Monarch Butterfly

Due to the migratory nature of the Monarch Butterfly, this species' current habitat range covers the entirety of both the Skyline and Lake Harris Project Boundaries. Occurrences within the Project Boundary are most likely during fall and spring migration and during the spring breeding period (USFWS 2020b).

11.1.3 Tallapoosa River Downstream of Harris Dam

No federally listed T&E species are present or expected to occur in the Tallapoosa River downstream of Harris Dam through Horseshoe Bend (Kleinschmidt 2021c). Therefore, Alabama Power did not conduct any surveys in this area.

11.2 Environmental Analysis

Alabama Power conducted relicensing studies and associated analyses that pertain to effects on T&E species. Those analyses are presented in the following reports.

- Final Threatened and Endangered Species Study Report
- Final Downstream Release Alternatives Phase 2 Study Report
- Final Operating Curve Change Feasibility Analysis Phase 2 Study Report

Table 11-8 includes the proposed operations and PME measures that may affect threatened and endangered resources at Skyline, Lake Harris, and the Tallapoosa River Downstream of Harris Dam. Not all operations or PME measures apply to each geographic area of the Harris Project; therefore, the analysis of beneficial and adverse effects will be presented accordingly. A complete list of Alabama Power's operations and PME measures is located in Table 5-2.

Table 11-8 Proposed Operations and PME Measures That May Affect Threatened and Endangered Species

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT THREATENED AND ENDANGERED SPECIES
• Continue to operate the Harris Project according to the existing operating curve. • Continue to operate in high flow conditions according to the USACE-approved flood control procedures in the Harris Water Control Manual (USACE 2022). • Continue daily peak-load operations. • Continue operating in accordance with ADROP (Alabama Power Company 2016) to address drought management.
• Finalize and implement a WMP (Alabama Power 2021e) for Lake Harris and Skyline. ❖ Consult with USFWS to develop measures protective of federally listed bats. ❖ Incorporate timber management into the WMP. o Including maintenance of gates and the construction/maintenance of logging roads. o Conduct surveys for Price's Potato-bean at the location of the extant population prior to timbering activities that may affect the extant population. Timbering crews will be notified of the location of any Price's Potato-bean prior to timbering activities. ❖ Maintain pollinator plots at Little Fox Creek. ❖ Continue to provide hunting opportunities to the public. ❖ Continue to manage approximately 105 acres of permanent openings to provide diverse habitat that benefits both game and nongame species. ❖ Continue to conduct property boundary maintenance, such as painting/marking of property lines. ❖ Schedule for revising and implementing the WMP. o Within 6 months of license issuance, Alabama Power will revise or update the WMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval
• Finalize and implement a Shoreline Management Plan (SMP) (Alabama Power 2022c) for Lake Harris. ❖ Incorporate proposed changes in land use classifications (including reclassifying the botanical area at Flat Rock Park from recreation to Natural/Undeveloped). ❖ Continue to encourage the use of alternative bank stabilization techniques other than seawalls. ❖ Continue implementing the Dredge Permit Program (Appendix A to the SMP). ❖ Continue implementing the Water Withdrawal Policy (Kleinschmidt 2018b).

Proposed Operations and PME Measures that May Affect Threatened and Endangered Species
❖ Continue implementing a shoreline classification system to guide management and permitting activities (Appendices C and D of the SMP). ❖ Continue the requirements of a scenic easement for the purpose of protecting scenic and environmental values. ❖ Continue the use of a "sensitive resources" designation in conjunction with shoreline classifications on Harris Project lands managed for the protection and enhancement of cultural resources, wetlands, and threatened and endangered species. ❖ Continue implementing a shoreline compliance program and shoreline permitting program. ❖ Continue to encourage the adoption of shoreline best management practices (BMPs), including BMPs to maintain and preserve naturally vegetated shorelines, to preserve and improve the water quality of the Harris Project's reservoir, and to control soil erosion and sedimentation (Appendix E of the SMP). o Plant native trees, shrubs, and flowers for landscaping and gardens in order to reduce watering as well as chemical and pesticide use. o Preserve or establish a naturally managed vegetative filter strip along the shoreline to keep clearing of native trees and vegetation to a minimum. Alabama Power recommends a buffer set back of at least 15 feet measured horizontally from the full pool elevation. o Plant a low maintenance, slow growing grass that is recommended for your soil conditions and climate. o Maintain the grass as high as possible in order to shade out weeds and improve rooting so less fertilizing and watering are required. o Avoid dumping leaves or yard debris on or near the shoreline. ❖ Provide an update to the SMP every 10 years. ❖ Schedule for revising and implementing the SMP. o Within 6 months of license issuance, Alabama Power will revise or update the SMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval.
• Finalize and implement a Recreation Plan (Alabama Power 2022d). ❖ Continue to operate and maintain 11 Harris Project recreation sites. ❖ Remove Wedowee Marine South as a Harris Project recreation site and request approval of entire facility as non-project use. ❖ Install and maintain recreation (canoe/kayak) access below Harris Dam within the Harris Project Boundary. ❖ Provide an additional recreation site on Lake Harris to include a day use park (swimming, picnicking, and boat ramp). ❖ Implement Barrier-Free Evaluation Program at existing recreation sites.

Proposed Operations and PME Measures that May Affect Threatened and Endangered Species
❖ Provide descriptions of the Project recreation sites including maps. ❖ Provide a Recreation Plan update to FERC every 10 years including monitoring protocols and proposed methodologies for sampling. ❖ Schedule for finalizing and implementing the Recreation Plan. o Within 6 months of license issuance, Alabama Power will revise the Recreation Plan, as needed, in consultation with appropriate resource agencies, and file with FERC for approval

11.2.1 Skyline

11.2.1.1 Wildlife Management Plan/Timber Management

Alabama Power proposes to finalize and implement a WMP, including specific timber management actions that are protective of federally listed bat species. The Harris Project forest lands at Skyline would continue to be managed according to the existing all or uneven-aged management procedures, with a sawtimber cycle of 20 years, and an overall forest rotation of 60 years. Timber management would continue to be completed according to USFWS guidance for federally listed bats. The USFWS currently recommends as a conservation measure, that tree clearing occur from October 15 to March 31 when proposed for areas with potential summer roosting bat habitat. Alabama Power would continue to consult with USFWS concerning known hibernacula and maternity roost trees for the Indiana Bat, Northern Long-eared Bat, and Gray Bat to incorporate any potential new occurrences with the Project Boundary.

A small portion of one of the known populations of Price's Potato-beans may still occur although recent surveys did not detect the species within the Skyline Project Boundary; however, Alabama Power would conduct additional surveys in the area of the known population prior to any timber management activities to ensure that the known population is not impacted if it is still present.

11.2.2 Lake Harris

11.2.2.1 Wildlife Management Plan/Timber Management

Alabama Power proposes to finalize and implement a WMP, including specific timber management actions and BMPs. Continued timber management practices at Lake Harris would not adversely affect the RCW.

No surveys were performed for the Indiana Bat or Northern Long-eared Bat. Alabama Power adheres to current USFWS guidance concerning known hibernacula and maternity roost trees and continues to consult with USFWS to evaluate timber management practices relative to federally listed species. Aside from the potential bat occurrences, no T&E species were found in the Lake Harris Project Boundary; therefore, continued timber management at Lake Harris would not adversely affect T&E species.

11.2.2.2 Shoreline Management Plan

The SMP would continue the use of a "sensitive resources" designation in conjunction with shoreline classifications on Project lands managed for the protection and enhancement of cultural resources, wetlands, and T&E species. Permitting activities in these areas, if applicable, may be highly restrictive or prohibited to avoid potential impacts to sensitive resources, such as historic properties. Alabama Power would continue to maintain current GIS data on the locations of shoreline classified as sensitive resources and would continue to require an internal environmental review for any proposed activity in these sensitive areas prior to issuance of any permit. There are currently no T&E species present on Lake Harris; however, the SMP would have a beneficial effect on potential future T&E species, should they be present, through the protection provided in this SMP sensitive resources process.

11.2.2.3 Recreation Plan

Alabama Power proposes to finalize and implement a Recreation Plan that would include the construction and maintenance of an additional recreation site on Lake Harris to include a day use park with amenities such as a swimming area, picnic tables, and a boat ramp. Alabama Power would consult with USFWS to develop protective measures for federally listed bats during construction and maintenance of the day use park, including tree clearing from October 15 to March 31 if the proposed recreation areas overlap with potential bat habitat.

11.2.3 Tallapoosa River Downstream of Harris Dam

11.2.3.1 Recreation Plan

Alabama Power proposes to finalize and implement a Recreation Plan that would include the installation and maintenance of recreation (canoe/kayak) access below Harris Dam within the Project Boundary. Alabama Power would consult with USFWS to develop protective measures for federally listed bats during construction and maintenance of the canoe/kayak tailrace access, including tree clearing from October 15 to March 31 if the proposed recreation areas overlap with potential bat habitat.

11.3 Unavoidable Adverse Impacts

11.3.1 Skyline

Presence of the Indiana Bat, Northern Long-eared Bat, or Gray Bat may occur in Skyline; however, following the USFWS guidance for timber management would reduce any potential effect on these listed species. Alabama Power continues to consult with USFWS to evaluate timber management practices relative to federally listed species.

11.3.2 Lake Harris

Indiana Bat and Northern Long-eared Bat may potentially occupy land surrounding Lake Harris; however, following the USFWS guidance for timber management would reduce any potential effect on these listed species. Alabama Power continues to consult with USFWS to evaluate timber management practices relative to federally listed species.

11.3.3 Tallapoosa River Downstream of Harris Dam

Indiana Bat and Northern Long-eared Bat may potentially occupy land surrounding the Tallapoosa River downstream of Harris Dam; however, following the USFWS guidance for timber management would reduce any potential effect on these listed species. The USFWS requested that tree clearing occur from October 15 through March 31 in areas that overlap potential bat habitat. Alabama Power will consult the ALNHP and USFWS's Alabama Ecological Services Field Office regarding locations of any known maternity roost trees and hibernacula. If Northern Long-eared or Indiana Bat hibernacula or maternity roost trees are identified in areas within the Project Boundary, Alabama Power will adhere to the most up-to-date USFWS avoidance guidance.

11.4 Recommended PME Measures Not Adopted

In response to the PLP, no resource agency, NGOs, or other stakeholders recommended specific PME measures that may affect T&E species.

12.0 RECREATION RESOURCES

12.1 Affected Environment

12.1.1 Skyline

Recreation use at Skyline was examined during relicensing is presented in the *Recreation Evaluation Report* (Kleinschmidt 2020) and was characterized based on existing available recreation use data obtained from ADCNR and presented in *Man-Days Hunted* and the *Harvest Estimates Used in Alabama Hunting* (ADCNR 2019). Both measured the parameters of hunting activity and number of animals harvested and rely on information gathered by the employees of the Skyline WMA. Any hunting activity for any length of time was considered a man-day of hunting pressure. More than one hunt by the same hunter in a single day was still considered one man-day. The data for the Statewide Game Harvest Survey were obtained after each hunting season by contacting a sample of hunters who purchased a hunting license. The information provided by the hunters was used to develop total man-days used for pursuing a given species and the total harvest for that species (ADCNR 2019). Results of *Man-Days Hunted* and the *Harvest Estimates Used in Alabama Hunting* are provided in Table 12-1.

Table 12-1 Skyline Wildlife Management Area Hunting Data 2016-17 Season through 2018-19 Season

	2016-2017 Season			2017-2018 Season			2018-2019 Season		
Species	**Estimated Man-Days Hunted**	**Estimated Harvest**	**Known Harvest**	**Estimated Man-Days Hunted**	**Estimated Harvest**	**Known Harvest**	**Estimated Man-Days Hunted**	**Estimated Harvest**	**Known Harvest**
Deer	6270	274		6110	229		8003	225	
Turkey	1865	65	51	1710	60	47	700	75	63
Squirrel	600	700		600	700		580	600	
Quail	30	16		30	16		30	15	
Rabbit	550	825		520	745		500	420	
Dove	120	130		95	97		75	80	
Waterfowl	20	15		0	0		30	30	
Raccoon	200	10		200	10		15	15	
Opossum	0	0		0	0		0	0	
Woodcock	18	6		15	4		0	0	
Snipe	0	0		0	0		0	0	
Fox	0	0		0	0		0	0	
Pig	0	0		0	0		0	0	
Trapping	360	31		0	0		0	0	
TOTAL	**10,033**	**2,072**	**51**	**9,280**	**1,861**	**47**	**9,933**	**1,460**	**63**

Source: ADCNR 2019

12.1.2 Lake Harris

12.1.2.1 Regional Recreation Facilities and Opportunities

In the region surrounding Lake Harris, there are many reservoirs that provide recreation opportunities. These reservoirs include Martin, Yates, and Thurlow downstream of Lake Harris on the Tallapoosa River; Weiss, Neely Henry, Logan Martin, Lay, Mitchell, and Jordan to the west of Lake Harris on the Coosa River; and West Point Lake located approximately 30 miles southeast of Lake Harris on the Chattahoochee River

A variety of public recreation facilities and opportunities are available within an approximate 50-mile radius of Lake Harris. Opportunities and facilities include over 70 recreational vehicle (RV) parks and campgrounds within 50 miles of Lake Harris with 2 campgrounds within 10 miles, 6 campgrounds within 10 to 25 miles, and 64 campgrounds within 25 to 50 miles (Appendix F). Altogether, these facilities provide over 3,700 RV sites and 550 campsites in the Harris Project Vicinity. Most of these campgrounds are located to the west and northwest of the Harris Project, near Talladega, Alabama, although some are located near Auburn, Alabama, at Lake Martin, and West Point Lake. Other facilities within 50 miles of the Harris Project include 15 boat launches managed by ADCNR (ADCNR 2016b).

The Talladega National Forest and Cheaha State Park are located to the northwest of Lake Harris. The Talladega National Forest covers approximately 392,567 acres along the southern edge of the Appalachian Mountains and includes the 7,245-acre Cheaha Wilderness Preserve. Recreational opportunities within Talladega National Forest include hiking, off-road vehicle (ORV) and mountain bike trails, camping, scenic viewing, and hunting opportunities (U.S. Forest Service 2016a). The 2,799-acre Cheaha State Park is located on the top of Cheaha Mountain, which features the highest point in Alabama. Recreation facilities at the park include hiking and ORV trails, a day use area, cabins and a lodge, campgrounds, and a restaurant (Alabama State Parks 2016).

12.1.2.2 Recreation Facilities and Opportunities in the Lake Harris Project Boundary

12.1.2.2.1 Developed Project Recreation Sites

A site inventory[47] of the Project recreation sites indicated that there are 12 Project recreation sites that provide opportunities for recreation on Harris Project lands and waters (Kleinschmidt 2020) (Table 12-2). Additionally, inventory surveys were completed at Lakeside Marina and Wedowee Marine. These two marinas are included as part of the inventory analysis because of their contribution to recreation activities on Lake Harris. Of these 14 access sites, the majority are considered day-use sites, with only one privately-owned site providing campgrounds and overnight facilities. The majority of the public access sites have paved access and are well-signed. Eleven of the sites are owned and managed by Alabama Power with seven of these partially managed by ADCNR. The three remaining sites are privately owned. Most of the sites are admission free and open year-round. The three privately owned marinas operate on a fee-based system for customers and public users. Among the 12 Project recreation sites within the Harris Project Boundary, over 50 picnic tables were counted. There are two sites that have designated swimming areas and two sites that have playgrounds. There are over 500 parking spaces, 12 boat launches, and 13 sites offer access to a public use fishing or courtesy dock. There are seven on-site restroom facilities; two are newly installed as of fall 2019. One of the sites has a hiking trail (Kleinschmidt 2020). Project recreation sites are listed in Table 12-2 and the 14 recreation sites included in the inventory analysis are provided in Figure 12-1. Table 12-3 provides additional information on the type of amenities associated with each Project recreation site.

Hunting opportunities are available on Project lands near Harris Dam and north along the Tallapoosa River. Alabama Power works with Alabama's Hunting and Fishing Trail for individuals with disabilities to provide accessible hunting sites on portions of these lands near the dam. Additionally, Natural Undeveloped lands, as identified in the Project Land Use Plan (Section 13.1), are available for public use, including hiking, picnicking, primitive camping, backpacking, and wildlife observation (Alabama Power and Kleinschmidt 2018).

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[47] The inventory was conducted on October 8 -9, 2019. This information does not include any changes made to the recreation sites in 2020-2021.

Table 12-2 Project Recreation Sites

SITE	MANAGEMENT	OWNERSHIP
Big Fox Creek Boat Ramp	Alabama Power/ ADCNR	Alabama Power
Crescent Crest Boat Ramp	Alabama Power	Alabama Power
Flat Rock Park	Alabama Power	Alabama Power
Foster's Bridge Boat Ramp	Alabama Power/ ADCNR	Alabama Power
Highway 48 Bridge Boat Ramp	Alabama Power/ ADCNR	Alabama Power
Lee's Bridge Boat Ramp	Alabama Power	Alabama Power
Little Fox Creek Boat Ramp	Alabama Power/ ADCNR	Alabama Power
Lonnie White Boat Ramp	Alabama Power/ ADCNR	Alabama Power
Harris Tailrace Fishing Pier	Alabama Power	Alabama Power
Swagg Boat Ramp	Alabama Power/ ADCNR	Alabama Power
Wedowee Marine South[48]	Private	Alabama Power/Wedowee Marine
R.L. Harris Management Area	Alabama Power/ ADCNR	Alabama Power

Source: Kleinschmidt 2020

[48] Wedowee Marine South is a private facility, but it is within the Harris Project Boundary and parts of it are considered a Project recreation site.

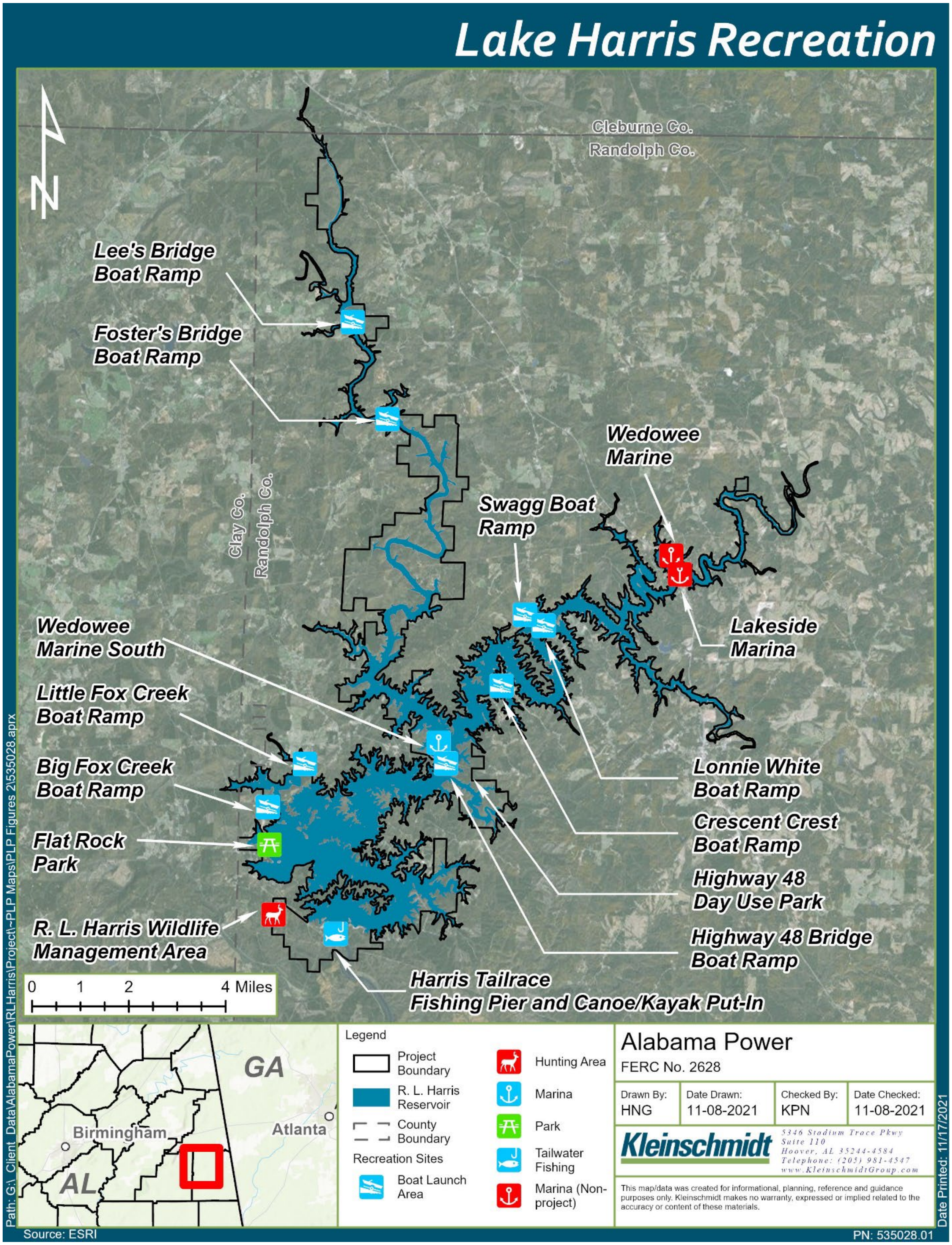

Figure 12-1 Lake Harris Recreation

Table 12-3 Existing Project Recreation Facilities and Amenities[50]

Site	Barrier-Free Parking	Bank Fishing	Boat Launch	Campground	Fishing Pier	Launching Pier	Restrooms	Shelter	Store
Big Fox Creek Boat Ramp			X			X			
Crescent Crest Boat Ramp	X		X			X			
Flat Rock Park	X				X		X	X	
Foster's Bridge Boat Ramp			X			X			
Highway 48 Bridge Boat Ramp	X		X			X	X		
Lee's Bridge Boat Ramp			X			X			
Little Fox Creek Boat Ramp	X		X			X			
Lonnie White Boat Ramp			X			X			
Harris Tailrace Fishing Pier	X				X		X		
Swagg Boat Ramp			X			X			
Wedowee Marine South	X	X	X		X	X	X		X
R.L. Harris Management Area								X[49]	

Source: Kleinschmidt 2020

[49] The R.L. Harris Management Area has four "shooting houses" on site. These are used for hunting and are covered structures, identified as a "shelter."
[50] The inventory was conducted on October 8 -9, 2019. This information does not include any changes made to the recreation sites in 2020-2021.

12.1.2.2.2 Future Recreation Sites

In addition to the developed Project recreation facilities, Alabama Power designated additional lands within the Harris Project Boundary for future recreation development (Alabama Power 2008). These lands are identified as Recreational Use Area No. 2 (approximately 139 acres[51]), Recreational Use Area No. 3 (approximately 75 acres), and Recreation Use Area No. 4 (approximately 68 acres) in the existing Harris Project Land Use Plan. These sites would be developed if additional facilities were determined to be necessary due to future recreational demand and needs. Currently, these lands are managed in accordance with the Harris Project Wildlife Mitigation Plan (Alabama Power 2008).

12.1.2.2.3 Project Area Recreational Use

Project recreation sites had an estimated 227,358 visitor days in 2019. Highway 48 Bridge and Wedowee Marine South contributed the largest proportions of visitor-days with the highest percentage of utilization, at 84 percent and 79 percent, respectively (Southwick Associates 2020). Flat Rock Park had the third highest number of recreation days in 2019, although it was only open May 26 through September 15 in 2019 (Southwick Associates 2020). Percent capacity utilization for each Project recreation site in 2019 is included in Table 12-4.

[51] Wedowee Marine South comprises 20.7 acres of the 139 acres set aside for future recreation use.

Table 12-4 2019 Percent Capacity Utilization by Project Recreation Site

SITE	2019 % CAPACITY UTILIZATION
Big Fox Creek	33%
Crescent Crest	24%
Highway 48 Bridge	84%
Foster's Bridge	40%
Swagg	39%
Little Fox Creek	15%
Lonnie White	29%
Lee's Bridge	20%
Harris Tailrace Fishing Pier	65%
Flat Rock Park	36%
Wedowee Marine South	79%
R.L. Harris Wildlife Mgmt. Area	47%

Source: Southwick Associates 2020

12.1.2.2.4 Recreation Use Policies, Safety, and Communication Procedures

Alabama Power provides information to the public about Lake Harris, Harris Project operations, and Project-related recreation opportunities via the Shorelines website (www.apcshorelines.com), social media platforms (e.g., Facebook and Twitter), a smartphone app, and a toll-free phone number (1-800-LAKES11). Alabama Power's Shorelines website and smartphone app provide general information about Lake Harris, including reservoir elevations, operating schedules, fishing information, lake maps (i.e., showing public use areas, boat launches, fishing pier, and fishing spots), safety information, and a shorelines blog. Individuals can sign up on the Shorelines website to receive emails about lake conditions and operational schedules (Alabama Power 2017a). Information about lakeside lands preserved and protected by Alabama Power is provided via the Preserves website (https://apcpreserves.com/about/). Alabama Power also has signage for all recreation sites that provide maps of all the recreation areas at the Project.

The Alabama Marine Police, a division of the Alabama Law Enforcement Agency (ALEA), patrols public waterways and supervises the registration of non-commercial boats and boat operator licensing. The Alabama Marine Police educate the public about boating safety and regulations through various programs and enforce the state boating regulations (Alabama Law Enforcement Agency 2017b).

Alabama Code, Title 33, Chapter 6A-3.1 prohibits the use of certain vessels on Lake Harris (in addition to Lake Martin on the Tallapoosa River and Weiss Lake on the Coosa River), including: any vessel longer than 30-feet 6-inches; any houseboat; and any vessel longer than 26-feet 11-inches that can exceed 60 miles per hour. Vessels that are used for law enforcement, public safety, search and rescue, scientific research, dam operation or maintenance, or medical vessels are excluded from the restrictions. In addition, sailboats equipped with mast and sails that are dependent on wind for propulsion in the normal course of operation are excluded from the prohibitions (Alabama Marine Police 2009).

Woody stumps and debris provide valuable fisheries and aquatic habitat; however, depending on the location of the debris, it can also provide boating safety hazards. If floating debris is identified, Alabama Power may notify the Alabama Marine Police, and it is the responsibility and determination of the Marine Police as to whether a buoy marker is deployed.

12.1.3 Tallapoosa River Downstream of Harris Dam

12.1.3.1 Regional Recreation Facilities and Opportunities

A tailrace fishing platform (Harris Tailrace Fishing Pier) is located just below the Harris Dam and within the Harris Project Boundary[52]. In addition, there are several recreation areas of note located along the Tallapoosa River downstream of Harris Dam (outside the Project boundary), including the Harold Banks Canoe Trail (HBCT). The HBCT contains four access points: Bibby's Ferry, Germany's Ferry, Horseshoe Bend, and Jaybird Landing[53]. Upstream of Bibby's Ferry are two canoe portages located on privately owned land, Malone and Wadley Bridge [54](Kleinschmidt 2020).

Horseshoe Bend is managed by the NPS and is located downstream approximately 20 miles, or approximately 40 RMs, from Harris Dam. The park preserves the site of the Battle of Horseshoe Bend with the Creek Nation (1813-1814) and encompasses approximately 2,040 acres of mixed hardwood forest along approximately 3.5 miles of the Tallapoosa

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[52] The tailrace fishing platform is a Project recreation site.

[53] Jaybird Landing, as identified in the Martin Dam Project (FERC No. 349) is noted as Jay Bird Creek in the HBCT brochure.

[54] Portions of the sites under private ownership may be positioned on a county or state road right-of-way.

River. Amenities at the park include a 3-mile-long road tour along the edge of the battlefield, a 2.8-mile-long hiking trail, two picnic areas, a visitor center, and a boat launch area. Recreational opportunities include hiking, boating, fishing (at the boat ramp area only), nature study, and historic/cultural interpretive exhibits and activities at the visitor center (NPS 2017a). Annual recreation visitation at Horseshoe Bend in 2019 was 45,372 visits, with the greatest use occurring during the month of July (NPS 2021c).

The Alabama Scenic River Trail, a designated National Recreation Trail with portions extending along the Coosa River, is located approximately 70 miles south of the Harris Project (National Recreation Trails 2017). The Tallapoosa River connects to the Alabama Scenic River Trail; however, since it was added as an expansion to the Alabama Scenic River Trail system, the approximately 200-mile Tallapoosa River segment is not an officially designated National Recreation Trail. The Tallapoosa River provides both riverine and reservoir flatwater boating opportunities (Alabama Newscenter 2014). The riverway extends from upstream of Lake Harris and downstream through the riverine reach past Horseshoe Bend. It then reaches Lake Martin and ultimately extends below Yates and Thurlow dams through the downstream reaches to the confluence of the Tallapoosa River with the Coosa River. This is where it joins the Alabama Scenic River Trail (Alabama Scenic River Trail 2017). Portage access is available around the Harris, Martin, Yates, and Thurlow Project dams, including the 0.45-mile-long portage near Harris Dam. All the portages, including the one near Harris Dam, are managed by the Alabama Scenic River Trail.

12.1.3.2 Existing Recreation Use

The *Recreation Evaluation Report* (Kleinschmidt 2020) included areas of the Tallapoosa River (Figure 12-2) which encompasses the HBCT on the Tallapoosa River and two sections of the Tallapoosa River immediately upstream of HBCT (Kleinschmidt 2020). The HBCT includes the section of river from the Bibby's Ferry access point to Jaybird Landing. The HBCT contains four access points: Bibby's Ferry, Germany's Ferry, Horseshoe Bend[55], and Jaybird Landing. The two additional sections of the Tallapoosa River included in the study area are from the County Road 15 bridge in Malone to the Alabama Highway 22 bridge in Wadley, and from Wadley to Bibby's Ferry. The section of river from the Harris Dam to

[55] Only data regarding the Horseshoe Bend Boat Launch is described in this section.

Malone was not part of the overall study, although Malone was sampled intermittently[56] (Kleinschmidt 2020).

Recreation downstream of Harris Dam on the Tallapoosa River was studied using several methodologies, including public access user counts and surveys, attendance records collected from a river outfitter, downstream landowner surveys, and recreation user surveys (online) (Kleinschmidt 2020).

Data collected during the public access user counts indicated that approximately 70 percent of all Tallapoosa River trips began at Horseshoe Bend, 12.7 percent of trips began at the Germany's Ferry boat launch, and 10.4 percent of trips began at Jaybird Landing (Hunt 2020a). Sixty-one percent of all Tallapoosa River trips ended at Jaybird Landing and 24 percent ended at Horseshoe Bend (Hunt 2020a). Boating and fishing recreation activities during the study period consisted of kayaking (33 percent), kayak fishing (27 percent), shoreline fishing (13 percent), boat fishing (14 percent), canoeing (5 percent), and canoe fishing (5 percent), while swimming, tubing, and recreational boating accounted for only approximately 3 percent of trips (Hunt 2020a).

[56] One access point between Horseshoe Bend and Jaybird Landing (Peters Island) was deemed unusable because it is remote, and a four-wheel drive vehicle is necessary to access it.

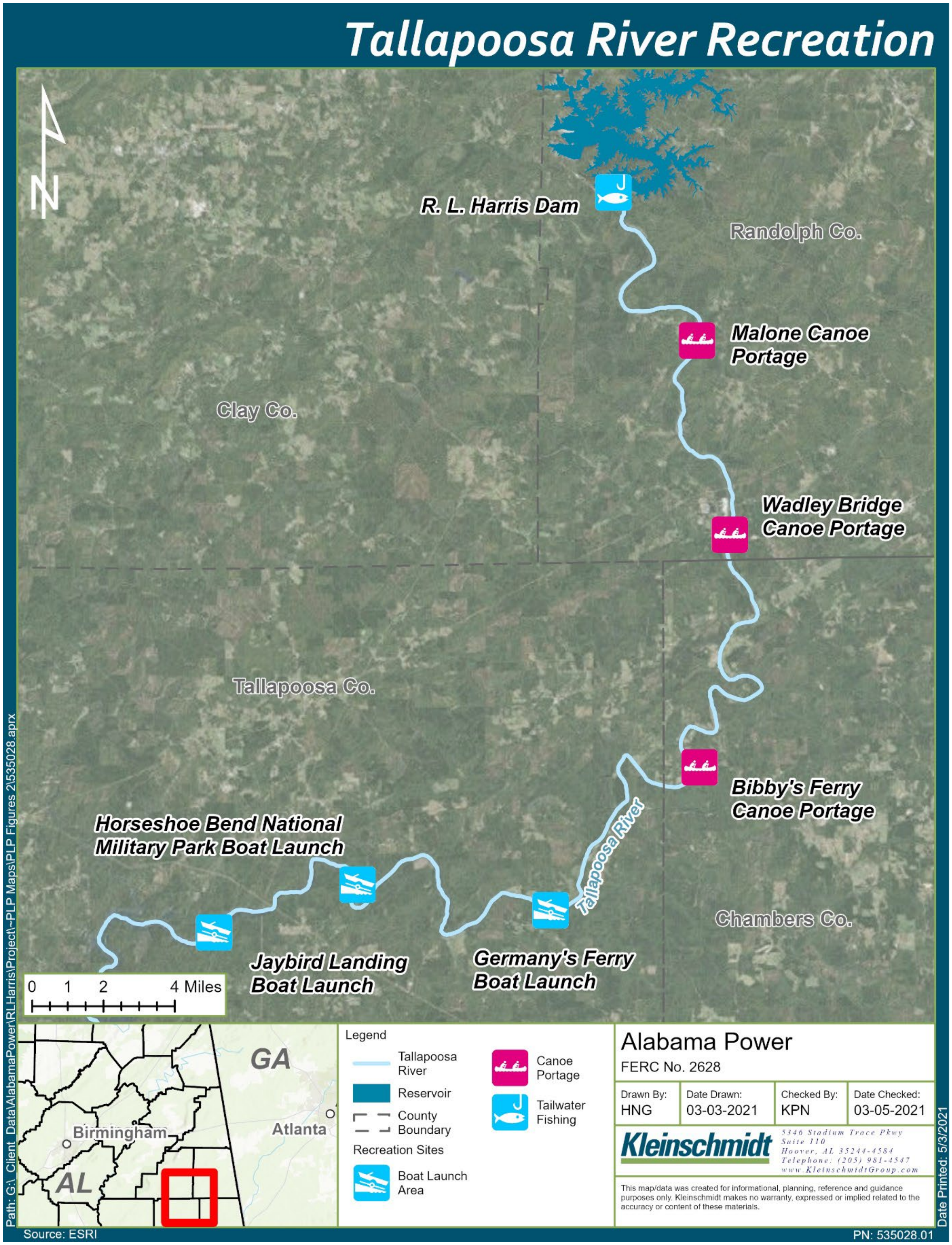

Figure 12-2 Tallapoosa River Recreation

A river outfitter surveyed during the study provided shuttle and outfitting services for 371 individuals (226 kayak/canoe renters and 145 ferried with his personal vessel). The river outfitter specified that the Tallapoosa River trips ranged from 4 to 6 hours with the average total trip lasting 5 hours. There were 371 visitor-days and 1,855 hours of effort attributed to the river outfitter during the study period, with most of the effort occurring in May, June, and July of 2019 (Hunt 2020a).

According to the public access user surveys, the four most popular activities enjoyed by Tallapoosa River recreation users were swimming (76.29 percent), scenic/wildlife viewing (61.17 percent), kayaking (59.79 percent), and tubing/rafting (52.23 percent). Respondents spent an estimated 14,060 person-days recreating on the Tallapoosa River during 2019. A majority (45 percent) of downstream recreation users indicated they accessed the river from "private property only" (Hunt 2020c).

High satisfaction ratings were received from those recreation users using public access points on the Tallapoosa River below Harris Dam; however, data indicate that a majority (75 percent) of the recreation users would prefer additional downstream access points and over 50 percent of the recreation users prefer improvements to the amenities at the sites on the Tallapoosa River (Hunt 2020a).

Regarding water level and recreation on the Tallapoosa River downstream of Harris Dam, the water level does not appear to have any appreciable effect on recreation. Results from the public access user survey indicated the majority of recreation users found all water levels acceptable (499 cfs to 6,110 cfs) and the recreation effort did not appear to be affected by water level. Results from the downstream landowner survey indicated there was no identifiable optimal flow range for downstream landowners; however, any flow greater than 5,000 cfs was designated unacceptable for river-related recreation (Hunt 2020b).

12.2 Environmental Analysis

Alabama Power conducted relicensing studies and associated analyses that pertain to effects on recreation resources. Those analyses are presented in the following reports.

- Final Recreation Evaluation Study Report
- Final Project Lands Evaluation

- Final Downstream Release Alternatives Phase 2 Study Report
- Final Operating Curve Change Feasibility Analysis Phase 2 Study Report
- A Botanical Inventory of a 35-Acre Parcel at Flat Rock Park, Blake's Ferry, Alabama

Table 12-5 includes the proposed operations and PME measures that may affect recreation and land use resources at Skyline, Lake Harris, and the Tallapoosa River downstream of Harris Dam. Not all operations or PME measures apply to each geographic area of the Harris Project; therefore, the analysis of beneficial and adverse effects will be presented accordingly. A complete list of Alabama Power's operations and PME measures is located in Table 5-2.

Table 12-5 Proposed Operations and PME Measures that May Affect Recreation

Proposed Operations and PME Measures That May Affect Recreation
• Continue to operate the Harris Project according to the existing operating curve. • Continue to operate in high flow conditions according to the USACE-approved flood control procedures in the Harris Water Control Manual (USACE 2022). • Continue daily peak-load operations. • Continue operating in accordance with ADROP (Alabama Power Company 2016) to address drought management.
• Install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs with a generating capacity of approximately 2.5 MW. Based on the preliminary design, the continuous minimum flow unit would require a new reinforced concrete addition located on the outside of the Unit 1 side (east side) of the powerhouse. The new steel-lined penstock would penetrate the existing Unit 1 penstock for source water and discharge below the tailrace water surface. • Develop drought operations procedures for the minimum flow. • Operate in accordance with Green Plan (baseline) during CMF unit outages and outages where the water supply to the Unit 1 penstock is affected.
• Finalize and implement a Nuisance Aquatic Vegetation and Vector Control Program (Alabama Power 2021c), which includes: ❖ A description of the nuisance aquatic vegetation and vectors covered under this Program. o This program covers mosquitos (vectors) and nuisance aquatic vegetation and is directed toward non-indigenous aquatic vegetation species.

Proposed Operations and PME Measures That May Affect Recreation
❖ Frequency, timing, and locations of surveys to identify where nuisance aquatic vegetation could create a public health hazard, affect power generation facilities, restrict recreational use, or pose a threat to the ecological balance of Lake Harris. o Perform lake-wide surveys annually to identify areas of aquatic plant infestation. o Monitor the presence and abundance of mosquitos. ❖ Methods for monitoring for increases in nuisance aquatic vegetation. o Increases would be monitored through annual survey and property owner reporting to Alabama Power. o Vectors are monitored through adult resting stations and larval sampling. ❖ Methods for controlling nuisance aquatic vegetation and vectors. o All aquatic plant control measures are directed by staff biologists certified as commercial aquatic applicators by the State of Alabama, Department of Agriculture and Industries. Only EPA approved aquatic herbicides and algaecides are used in the management of invasive aquatic plants. ❖ Schedule for monitoring. o Surveys will occur in the late summer/early fall when vegetation biomass is usually at its peak. ❖ Schedule for finalizing and implementing the program. o Although this program is ongoing, within 3 months of license issuance, Alabama Power will revise or update the plan as needed and file with FERC for approval
• Finalize and implement a WMP (Alabama Power 2021e) for Lake Harris and Skyline. ❖ Consult with USFWS to develop measures protective of federally listed bats. ❖ Incorporate timber management into the WMP. o Including maintenance of gates and the construction/maintenance of logging roads. o Conduct surveys for Price's Potato-bean at the location of the extant population prior to timbering activities that may affect the extant population. Timbering crews will be notified of the location of any Price's Potato-bean prior to timbering activities. ❖ Maintain pollinator plots at Little Fox Creek. ❖ Continue to provide hunting opportunities to the public. ❖ Continue to manage approximately 105 acres of permanent openings to provide diverse habitat that benefits both game and nongame species.

Proposed Operations and PME Measures That May Affect Recreation
❖ Continue to conduct property boundary maintenance, such as painting/marking of property lines. ❖ Schedule for revising and implementing the WMP. o Within 6 months of license issuance, Alabama Power will revise or update the WMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval
• Finalize and implement a Shoreline Management Plan (SMP) (Alabama Power 2022c) for Lake Harris. ❖ Incorporate proposed changes in land use classifications (including reclassifying the botanical area at Flat Rock Park from recreation to Natural/Undeveloped). ❖ Continue to encourage the use of alternative bank stabilization techniques other than seawalls. ❖ Continue implementing the Dredge Permit Program (Appendix A to the SMP). ❖ Continue implementing the Water Withdrawal Policy (Kleinschmidt 2018b). ❖ Continue implementing a shoreline classification system to guide management and permitting activities (Appendices C and D of the SMP). ❖ Continue the requirements of a scenic easement for the purpose of protecting scenic and environmental values. ❖ Continue the use of a "sensitive resources" designation in conjunction with shoreline classifications on Harris Project lands managed for the protection and enhancement of cultural resources, wetlands, and threatened and endangered species. ❖ Continue implementing a shoreline compliance program and shoreline permitting program. ❖ Continue to encourage the adoption of shoreline best management practices (BMPs), including BMPs to maintain and preserve naturally vegetated shorelines, to preserve and improve the water quality of the Harris Project's reservoir, and to control soil erosion and sedimentation (Appendix E of the SMP). o Plant native trees, shrubs, and flowers for landscaping and gardens in order to reduce watering as well as chemical and pesticide use. o Preserve or establish a naturally managed vegetative filter strip along the shoreline to keep clearing of native trees and vegetation to a minimum. Alabama Power recommends a buffer set back of at least 15 feet measured horizontally from the full pool elevation. o Plant a low maintenance, slow growing grass that is recommended for your soil conditions and climate. o Maintain the grass as high as possible in order to shade out weeds and improve rooting so less fertilizing and watering are required.

Proposed Operations and PME Measures That May Affect Recreation
o Avoid dumping leaves or yard debris on or near the shoreline. ❖ Provide an update to the SMP every 10 years. ❖ Schedule for revising and implementing the SMP. o Within 6 months of license issuance, Alabama Power will revise or update the SMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval
• Implement proposed land additions to the Harris Project Boundary and incorporate into Exhibit G.
• Implement proposed land removals from the Harris Project Boundary and incorporate into the Exhibit G.
• Finalize and implement a Recreation Plan (Alabama Power 2022d). ❖ Continue to operate and maintain 11 Harris Project recreation sites. ❖ Remove Wedowee Marine South as a Harris Project recreation site and request approval of entire facility as non-project use. ❖ Install and maintain recreation (canoe/kayak) access below Harris Dam within the Harris Project Boundary. ❖ Provide an additional recreation site on Lake Harris to include a day use park (swimming, picnicking, and boat ramp). ❖ Implement Barrier-Free Evaluation Program at existing recreation sites. ❖ Provide descriptions of the Project recreation sites including maps. ❖ Provide a Recreation Plan update to FERC every 10 years including monitoring protocols and proposed methodologies for sampling. ❖ Schedule for finalizing and implementing the Recreation Plan. o Within 6 months of license issuance, Alabama Power will revise the Recreation Plan, as needed, in consultation with appropriate resource agencies, and file with FERC for approval.

12.2.1 Skyline

12.2.1.1 Wildlife Management Plan/Timber Management

Alabama Power proposes to finalize and implement a WMP, including specific measures to address hunting opportunities for the public at Skyline. The ADCNR would continue to manage the hunting area, including the issuance of permits and maps as well as the determination of regulations such as hunting seasons and bag limits (Alabama Power

2021a). Continuing to provide hunting opportunities for large and small game would provide a long-term benefit to recreation users.

12.2.2 Lake Harris

12.2.2.1 Continued Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. The existing winter pool drawdown of 8 feet results in some unusable public and private recreational structures during the winter months (December – March). Usability of Harris Reservoir private structures, by structure type, at the existing winter pool level is shown in Table 12-6. Usability of public boat ramps at the lowest possible reservoir elevation are shown in Table 12-7. Public boat ramps that are currently available for use during the winter drawdown would remain useable. During periods of drought, the implementation of ADROP would reduce impacts to lake levels and therefore minimize drought effects on recreation use on Harris Reservoir.

Table 12-6 Usability of Private Structures on Harris Reservoir by Structure Type for Baseline Operations of 785.0-feet MSL(at Winter Pool)

Structure Type	Percent of Structures That Are Usable at Winter Pool
Boardwalks (n=25)	0.0
Boathouses (n=929)	32.6
Floats (n=393)	25.7
Piers (n=689)	5.4
Wet Slips (n=87)	9.2

Source: Alabama Power and Kleinschmidt 2022b

Table 12-7 Public Boat Ramp Usability at the Lowest Possible Reservoir Elevation

BOAT RAMP	LOWEST RESERVOIR ELEVATION USABLE (FEET MSL)
Big Fox Creek	785.0[57]
Crescent Crest	785.0
Foster's	785.0
Hwy 48 Bridge	785.0
Lee's Bridge	791.5
Little Fox Creek	790.0
Lonnie White*	787.5
Swagg**	790.0

Source: Alabama Power and Kleinschmidt 2022a

*****Lonnie White Boat Ramp is frequently used at current winter pool, but larger boats cannot launch, and many boat trailers need to back off the edge of the ramp. ADCNR is currently extending the ramp so that it is fully usable prior to the drawdown of 2021.
******Swagg Boat Ramp ends right at the water's edge during current winter pool but is still in use by some recreators.

12.2.2.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam.

The proposed continuous minimum flow would not affect Alabama Power's ability to maintain average lake levels, and therefore, would not affect the ability to use private structures and public boat ramps throughout the year compared to baseline operations (Alabama Power and Kleinschmidt 2022a).

12.2.2.3 Wildlife Management Plan/Timber Management

Similar to Skyline, Alabama Power proposes to finalize and implement a WMP, that provides public hunting opportunities on lands located at Lake Harris. Specifically, the WMP would provide hunting opportunities for persons with disabilities near Harris Dam. Alabama Power would continue to plant and maintain greenfields and/or other wildlife openings in the vicinity of the shooting houses annually. Shooting houses, specifically

[57] 785 ft msl is the winter pool elevation

designed to accommodate disabled hunters, as well as road access to the shooting houses would be maintained (Alabama Power 2021a). Implementation of the WMP would benefit recreation users, particularly disabled users, at Lake Harris by increasing hunting opportunities.

12.2.2.4 Shoreline Management Plan

Alabama Power proposes to finalize and implement a SMP for Lake Harris. The SMP would be modeled after current Alabama Power project SMPs; this allows for uniformity in managing project shorelines across all Alabama Power hydroelectric projects. Continuing to implement a shoreline classification system to guide management and permitting activities would provide specific parcels of land to be classified as "recreation" to respond to the existing and future anticipated recreation use of Lake Harris. Continuing the requirements of a scenic easement for the purpose of protecting scenic and environmental values would also benefit recreation users both on the water and at existing recreation facilities/access by providing an aesthetically pleasing, scenic shoreline.

Alabama Power's Dredge Permit Program, developed in consultation with the USACE and other agencies, establishes the processes and procedures for permittees seeking to obtain direct authorization from Alabama Power for dredging activities up to 500 CY of material (below the full pool elevation). The Dredge Permit Program is not intended to cover applications for dredging on lands determined to be "sensitive." The Dredge Permit Program streamlines the process for allowing dredging under 500 cubic yards thus providing opportunity for homeowners to remove sediments that may restrict access. The proposed location of the spoil site for placement of dredged materials requires approval by Alabama Power and must be identified and included with the application. Spoils may not be placed in areas identified as potentially environmentally sensitive, adjacent waters, bottomland hardwoods, or wetlands, and spoils must be placed in a confined upland area in such a manner that sediment will not re-enter the waterway or interfere with natural drainage. Accumulated sediment can pose a navigational risk to boats, especially during the months when the reservoir is at winter operating curve. Continuing the Dredge Permit Program would provide the opportunity for property owners and other recreational users to improve access at Lake Harris.

12.2.2.5 Nuisance Aquatic Vegetation and Vector Control Program

Alabama Power proposes to finalize and implement a Nuisance Aquatic Vegetation and Vector Control Program at Lake Harris. The Program would include: 1) the frequency, timing, and locations, of surveys to identify areas where nuisance aquatic vegetation could create a public health hazard, affect power generation facilities, restrict recreational use, or pose a threat to the ecological balance of Lake Harris; 2) methods for monitoring increases in nuisance aquatic vegetation; 3) methods for controlling nuisance aquatic vegetation and vectors; and 4) a schedule for monitoring. This Program would have a beneficial effect on recreation by allowing for the identification, monitoring, and control of nuisance aquatic vegetation that may restrict or discourage recreational use of the reservoir.

12.2.2.6 Recreation Plan

Alabama Power evaluated recreation at Lake Harris during relicensing and confirmed that Lake Harris is highly used with overall high levels of satisfaction; however, recreation users did suggest improvements for several recreation sites (Kleinschmidt 2020). Alabama Power proposes to finalize and implement a Recreation Plan, to guide recreation decision making over the course of the license. Specifically, the Recreation Plan would discuss continued operations and maintenance at 11 Project recreation sites. Other items in the Recreation Plan are listed below.

- Remove Wedowee Marine South as a Project recreation site and request approval of the entire facility as Non-Project Use
- Install and maintain recreation (canoe/kayak) access in the tailrace below Harris Dam within the Project Boundary
- Provide an additional recreation site on Lake Harris to include a day use park (with amenities for swimming, picnicking, and a boat ramp)
- Implement the Barrier-Free Evaluation Program at existing recreation sites
- Provide a Recreation Plan update to FERC every 10 years

Providing additional facilities and access at Lake Harris would increase opportunities for recreational users in a variety of activities (day use, boating, fishing) and respond to stakeholder requests for additional Lake Harris recreation access. Developing a Recreation Plan would provide a comprehensive plan for operating and maintaining the existing and proposed facilities and a 10-year update would provide Alabama Power and stakeholders an opportunity to review the recreation use, facility capacity, and future plans for recreation. Removing Wedowee Marine South as a Project recreation site would allow the private owner to continue to operate the marina with facilities that would continue to be available to the public and would be consistent with how other marinas are managed in the Project Boundary. In addition, Alabama Power is proposing to build an additional day use park in the vicinity of Wedowee Marine South that would be a Project recreation site and include amenities for swimming, picnicking, and a boat ramp (Figure 12-3).

Figure 12-3 Aerial Imagery of Harris Reservoir Day-Use Concept Design

12.2.3 Tallapoosa River Downstream of Harris Dam

12.2.3.1 Continued Project Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. During high flow events, downstream recreation access areas that are inundated would continue to be inundated under the proposed continued operations. However, because this occurs only during high flow events, the likelihood of recreational users on the river at that time is very low.

12.2.3.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. In accordance with the FERC-approved *Harris Downstream Release Alternatives Study Plan*, Alabama Power addressed two questions related to how recreation may be affected by a downstream release from Harris Dam, including:

- Determine how downstream releases affect boating in the Tallapoosa River, from Harris Dam to Horseshoe Bend by correlating data collected from Tallapoosa River users with flow information available for the day/time the user was on the water.
- Use the HEC-RAS model to determine how downstream releases affect boatable flows.

In addition, using HEC-RAS model results, Alabama Power examined the flow depth from Harris Dam to Malone and associated river navigability (Kleinschmidt 2021a).

Regarding user perceptions of flow, during the Recreation Evaluation the majority of recreation users found all water levels acceptable (with river flows ranging from 499 cfs to 6,110 cfs), and the recreation effort did not appear to be affected by flow. Most recreation users were not aware of the Tallapoosa River flow until they arrived to recreate; there was no significant relationship between satisfaction and water level (Kleinschmidt 2020). Therefore, the addition of a continuous minimum flow downstream is not expected to have an effect on user perceptions of flow in the Tallapoosa River below Bibby's Ferry.

Alabama Power also assessed how the proposed continuous minimum flow would affect boatable days downstream of the Harris Project compared to boatable days under the Green Plan (baseline). Boatable Days are defined as days (both weekday and weekend) when flows measured at the Wadley gage were between 450 cfs and 2,000 cfs between sunrise and sunset[58]. The definition of boatable days originated from *Development of a Decision Support Tool and Procedures for Evaluating Dam Operation in the Southeastern United States* (Kennedy et al. 2006). The 450 to 2000 cfs range used to define boatable days was selected based on the angling diaries of ADCNR personnel from fishing trips that pre-dated dam construction (personal communication with Elise Irwin and David Anderson on December 13, 2018). These flows were pulled from the existing gages for the days where the diaries indicated the fishing was exceptional; and these flows were during daylight hours only.

Fall has the most variation in the number of boatable days with the most boatable days annually occurring with a continuous minimum flow of 300 cfs (Table 12-8) (Alabama Power and Kleinschmidt 2022a).

Table 12-8 Number of Boatable Days in the Tallapoosa River Below Harris Dam by Season

Alternative	Winter	Spring	Summer	Fall	Annual
GP (baseline)	30	18	23	29	100
300 CMF	32	15	29	61	137

Source: Alabama Power and Kleinschmidt 2022a

Note: Boatable Days are defined as days (both weekday and weekend) when flows measured at the Wadley gage were between 450 cfs and 2,000 cfs between sunrise and sunset.

The HEC-RAS flow depth analysis conducted between Harris Dam and Malone initially revealed that the minimum flow depth was not less than 1-foot with any of the downstream release alternatives. Boating depth increased incrementally as the continuous minimum flow release increased. However, a 1-foot threshold at any one given point on the river is not an accurate indicator of river navigability. Therefore, an additional depth analysis was performed to compare the change in surface water elevations at cross

[58] This definition was presented to HAT 5 on October 19, 2020 and HAT 1 on April 1, 2021.

sections in the river under the various flow alternatives (Alabama Power and Kleinschmidt 2022a).

The 300 cfs continuous minimum flow alternative increased water surface elevation in the immediate tailrace by approximately 0.75 feet compared to Green Plan (baseline) (Table 12-9).

Table 12-9 Change in Water Surface Elevation in the Tallapoosa River Downstream of Harris Dam (in Feet) Based on HEC-RAS Model of Downstream Release Alternative of 300 cfs Compared to Green Plan (Baseline)

ALTERNATIVE	MILES BELOW HARRIS DAM									
	0.4	**0.6**	**0.8**	**1.0**	**1.5**	**2.0**	**2.5**	**3.0**	**4.4**	**6.0**
GP (Baseline)	0	0	0	0	0	0	0	0	0	0
300 CMF	0.72	0.75	0.86	0.79	0.79	0.8	0.94	1.27	0.87	0.86

Source: Alabama Power and Kleinschmidt 2022a

Implementing a continuous minimum flow of approximately 300 cfs would have a beneficial effect on downstream recreation through additional boatable days, particularly in the fall, and increased river navigability in the first 7 miles below Harris Dam (Alabama Power and Kleinschmidt 2022a).

12.2.3.3 Recreation Plan

Alabama Power evaluated recreation downstream of Harris Dam during relicensing and determined that recreation users using existing public access points on the Tallapoosa River downstream of Harris Dam were very satisfied; however, a majority would prefer additional downstream access points and improvements to existing amenities (Kleinschmidt 2020). Therefore, Alabama Power proposes to construct a new recreation access area for canoe/kayak launch at the existing Harris Tailrace Fishing Pier (Figure 12-4). This additional launch access would have a beneficial effect by increasing recreational amenities and opportunities on the Tallapoosa River.

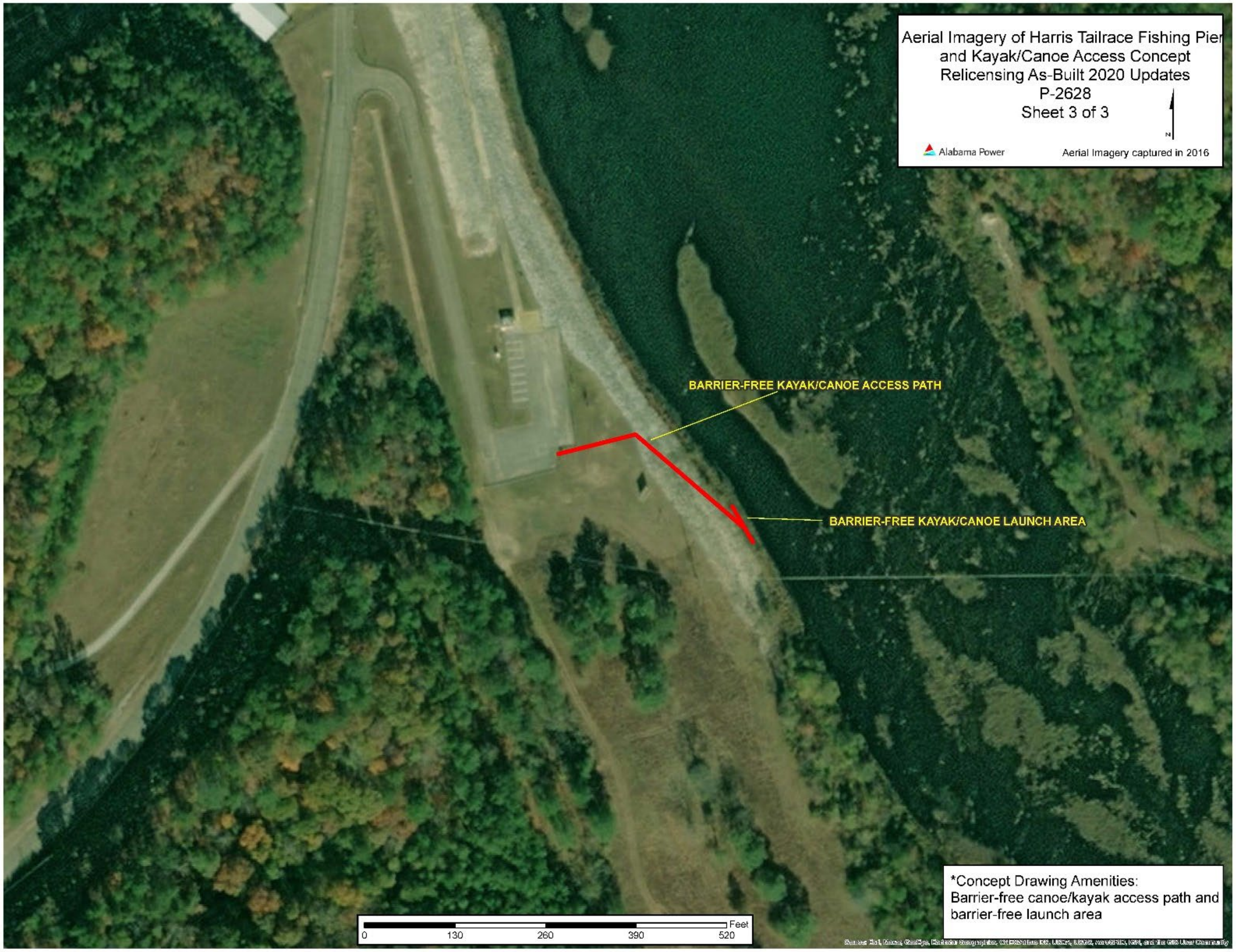

Figure 12-4 Aerial Imagery of Tailrace Fishing Pier Kayak/Canoe Access Concept

12.3 Unavoidable Adverse Impacts

12.3.1 Skyline

No unavoidable adverse impacts to recreation and land use at Skyline as a result of Alabama Power's proposal are anticipated.

12.3.2 Lake Harris

Alabama Power's proposal to continue operating the Project according to the existing operating curve would result in a continuation of some shoreline structures and public boat ramps being unusable during the winter pool drawdown.

12.3.3 Tallapoosa River Downstream of Harris Dam

Continuing to provide peaking operations at Harris Project would continue to affect in-river users and boating by affecting river levels and accessibility.

12.4 Recommended PME Measures Not Adopted

In response to the PLP, resource agencies, NGOs, and other stakeholders recommended specific PME measures that may affect recreation resources. Some of the recommended PME measures are incorporated in Alabama Power's proposal. This section briefly describes the stakeholder recommended PME measures that Alabama Power is not including in its relicensing proposal.

12.4.1 Unit Ramping

The ADCNR recommends that Alabama Power consider ramping the generators during peaking operations. Ramping would involve incrementally increasing the flow through the turbines up to best/full gate. Ramping would potentially benefit recreational users below Harris Dam by reducing the rate of change of discharge and increasing the time between one and two unit operation. Because the turbines at Harris Dam were not designed to run at flows less than best/full gate, they would be subject to mechanical damage under this recommended mode of operation.

12.4.2 Developing Additional Access in the Tallapoosa River Downstream of Harris Dam

The ARA, NPS, and ADCNR recommend that Alabama Power pursue ways to provide public access at/near both the Malone and Wadley sites to allow for canoe/kayak access, as well as fishing and swimming opportunities.

The NPS specifically recommends provisions for:

- Development of additional river access, in partnership with willing landowners and government entities, to improve safe recreational access on the entire 44-mile reach downstream of Harris.
- Create 4 public river access areas in the upstream section of the park which would significantly reduce the distance a recreational boater must traverse between public access nodes by approximately 3 miles and would facilitate the enjoyment and use of the river by a broader swath of the American public.

Alabama Power proposes to provide additional canoe/kayak access on the Tallapoosa River at the existing Harris Tailrace Fishing Pier within the Project Boundary. The property outside the Project Boundary on the Tallapoosa River is owned by others (private, county) and development of an additional recreational access or facility would be the responsibility of the property owner to operate and maintain. Alabama Power does not disagree that having additional access along the river would benefit recreational users; however, it is not the sole responsibility of the licensee to provide facilities along the entirety of the Tallapoosa River.

12.4.3 Public Safety and Notification Plan

The ARA and various downstream stakeholders recommend that Alabama Power develop and include a Safety and Public Notification Plan as an additional PME for the Harris Project. Alabama Power has a FERC-approved Public Safety Plan[59]. Currently, Alabama Power uses three platforms to disseminate hydro operation information to interested stakeholders: a website (https://apcshorelines.com), Smart Lakes mobile application available for iOS and Android devices, and Alabama Power's Reservoir Information System (1-800-LAKES11). The information available on these platforms includes generator status,

[59] Accession Number 20121107-0421

spillway flows, reservoir levels, special operations, as well as up to a 3-day outlook of scheduled generation at each hydroelectric plant. However, these methods require a user to actively locate the information they need through a series of selections (e.g., which lake and what information).

Alabama Power is currently researching whether it can update the Smart Lakes mobile application to include a "push" notification that will notify users when certain events occur (e.g., a generator loads or a spillway gate opens). This could include a method to allow users to sign up through the mobile application to receive text messages for these same notifications. For stakeholders not able to use the mobile application, Alabama Power is determining how to include a form on its website that will allow users to sign up to receive text messages and/or e-mails when a generator is loaded and/or a spillway gate opens. Alabama Power expects this evaluation of the mobile application and notification system to be complete by the 2nd quarter of 2022 and will inform FERC of its findings by July 31, 2022.

13.0 AESTHETIC AND LAND USE RESOURCES

13.1 Affected Environment

13.1.1 Skyline Land Use

Skyline is located approximately 110 miles north of Lake Harris in Jackson County, Alabama. The county seat of Randolph County, Scottsboro, is located approximately 15 miles from the Skyline Project Boundary. Predominate land use within Jackson County is forested (deciduous and evergreen), followed by pasture/hay (Alabama Power and Kleinschmidt 2018). Table 13-1 summarizes the percentages of land use by classifications for Jackson County. The land use classifications are derived from the National Land Cover Database 2011 created by the Multi-Resolution Land Characteristics (MRLC) (MRLC 2016). The data are based on satellite images at a resolution of 98.4 feet and, therefore, provide general major land use categories within Jackson County.

Table 13-1 Percentages of Land Use Classification for Jackson County, Alabama

DESCRIPTION[1]	JACKSON COUNTY
Open Water	4. 4
Developed, Open Space	2. 8
Developed, Low Intensity	1. 2
Developed, Medium Intensity	0. 3
Developed, High Intensity[2]	0. 1
Barren Land (Rock/Sand/Clay)	0. 2
Deciduous Forest	48. 3
Evergreen Forest	4. 0
Mixed Forest	6. 1
Shrub/Scrub	4. 9
Grassland/Herbaceous	2. 3
Pasture/Hay	16. 8
Cultivated Crops[2]	0.0
Woody Wetlands	2. 1
Emergent Herbaceous Wetlands[2]	0. 1

Source: MRLC 2016

[1] For a description of land use types, see http://www.mrlc.gov/nlcd11_leg.php.

[2] For values of 0.0, although present, these areas represent less than 0.1%.

Alabama Power conducted a Phase I Project Lands Evaluation Study to identify lands around Lake Harris and Skyline that are needed for Harris Project purposes and to classify these lands (Alabama Power 2020a). Lands to be added to, or removed from, the current Harris Project Boundary and/or be reclassified were identified.

Land use within Skyline is primarily conservatory in nature with most lands are designated for wildlife management. During the Phase I Project Lands Evaluation Study, Alabama Power evaluated acreage at Skyline to determine availability of suitable Bobwhite Quail (*Colinus virginianus*) habitat. In consultation with ADCNR, Alabama Power evaluated seven sites where Bobwhite Quail are documented to occur to determine if any of these areas had the potential for suitable Bobwhite Quail habitat. Evaluation of the sites, including a qualitative assessment of one site and a site visit, indicated that the areas would not currently support Bobwhite Quail (Alabama Power 2020a).

13.1.2 Lake Harris Land Use

Lake Harris is located on the Tallapoosa River in Clay, Cleburne, and Randolph counties, Alabama. The county seat of Randolph County, Wedowee, is located approximately 5 miles east, and the city of Lineville is located approximately 6-miles west of Lake Harris.

The majority of Lake Harris lands are located within Randolph County, with a small portion of Lake Harris lands located in Clay and Cleburne counties. There are 4.9 acres of federal lands within the Lake Harris Project Boundary[60]. These lands are owned by the BLM (Alabama Power and Kleinschmidt 2018). The general region surrounding Lake Harris is primarily rural with forested lands and limited commercial and private residential development.

Predominate land use within all three counties is forested (deciduous and evergreen), followed by pasture/hay. Table 13-2 summarizes the percentages of land use by classifications for the counties in which the Lake Harris lands are located. The land use classifications are derived from the National Land Cover Database 2011 created by the Multi-Resolution Land Characteristics (MRLC 2016). The data are based on satellite images at a resolution of 98.4 feet and, therefore, provide general major land use categories within Randolph, Clay, and Cleburne counties.

[60] As illustrated on FERC-approved Exhibit G drawing G-19, FERC No. 2628-106 (158 FERC ¶ 62,074).

Table 13-2 Percentages of Land Use Classifications by Counties in the Lake Harris Project Vicinity

DESCRIPTION[1]	RANDOLPH	CLAY	CLEBURNE
Open Water	3. 0	0. 3	0. 4
Developed, Open Space	3. 7	3. 3	3. 5
Developed, Low Intensity	1. 3	0. 2	0. 6
Developed, Medium Intensity	0. 2	0. 1	0. 1
Developed, High Intensity[2]	0. 1	0. 0	0. 0
Barren Land (Rock/Sand/Clay)	0. 3	0. 3	0. 2
Deciduous Forest	36. 6	46. 5	43. 9
Evergreen Forest	20. 5	27. 0	28. 0
Mixed Forest	0. 4	0. 7	1. 4
Shrub/Scrub	8. 4	5. 6	6. 3
Grassland/Herbaceous	7. 9	6. 9	5. 8
Pasture/Hay	17. 1	7. 7	8. 9
Cultivated Crops[2]	0. 0	0. 0	0. 0
Woody Wetlands	0. 6	1. 2	0. 8
Emergent Herbaceous Wetlands[2]	0. 1	0. 0	0. 0

Source: MRLC 2016

[1] For a description of land use types, see http://www.mrlc.gov/nlcd11_leg.php.
[2] For values of 0.0, although present, these areas represent less than 0.1%.

Currently, Alabama Power manages the lands and waters included in the Lake Harris Project Boundary according to the Harris Land Use Plan, which was most recently revised in June 2008 and approved by FERC Order on May 26, 2010. The Harris Land Use Plan describes land use classifications for management of Harris Project lands located within the existing Harris Project Boundary (Table 13-3). The Harris Project does not currently have a FERC-approved SMP but does maintain policies that keep shoreline management consistent with other Alabama Power hydro projects. For example, there are shoreline permitting guidelines and public education programs, including encouraging BMPs that minimize the effects of construction on existing resources (Alabama Power and Kleinschmidt 2018).

Table 13-3 Baseline Land Use Designations within the Lake Harris Project Boundary

Land Use Plan – Land Use Designation	Estimated Acres within Lake Harris Project Boundary
Natural Undeveloped (including islands)	2,460
Hunting (near reservoir)	2,721
Recreation (Public Use Area)	880
Prohibited Access	312
Total	6,373[1]

Source: Alabama Power 2018

[1] Includes lands currently subclassified as Quasi-Public; Alabama Power is not proposing to continue subclassifications of Recreation.

This acreage total does not include the scenic easement (to 800.0-feet msl or 50 horizontal feet from 793.0-feet msl, whichever is less, but never less than 795.0-feet msl)

Alabama Power maintains a shoreline permitting program for management of lands within the Lake Harris Project Boundary. Alabama Power provides general guidelines for shoreline permitting, that include:

- Residential shoreline permitting (Alabama Power 2017a)
- Non-residential use of Lake Harris Project lands and waters (such as public marinas, restaurants, apartments and other rental properties, overnight campgrounds, other commercial businesses) (Alabama Power 2017b)
- Multiple single-family type dwelling use of Harris Project lands and waters (Alabama Power 2017c)

All development activities within the Lake Harris Project Boundary must be preapproved and permitted by Alabama Power. The purpose of the shoreline permitting program is to manage development activities and monitor the shoreline areas on a regular basis to preserve the scenic, recreational, and environmental values of Lake Harris.

In 2012, Alabama Power implemented a shoreline compliance program to ensure that shoreline encroachments are resolved and address shoreline permitting, structure identification and assessment, public education, surveillance, and shoreline preservation.

Alabama Power files annual reports of progress under the shoreline compliance program with FERC. During 2020, Alabama Power resolved 81 encroachments on Harris Reservoir.[61,62]

During relicensing Alabama Power identified that there are no ATV trails located on Harris Project lands; however, there may be some unauthorized use. Alabama Power installed a barrier and signage adjacent to the Flat Rock Park botanical area that is proposed to be reclassified from recreation classification to Natural/Undeveloped.

As described under the Skyline section, Alabama Power conducted a *Phase I Project Lands Evaluation Study* to identify lands around Lake Harris and Skyline that are needed for Harris Project purposes and to classify these lands (Alabama Power 2020a). Lands to be added to, or removed from, the current Harris Project Boundary and/or be reclassified were identified and are analyzed in the Lake Harris Land Use section.

13.1.3 Tallapoosa River Downstream of Harris Dam Land Use

Land use along the Tallapoosa River downstream of Harris Dam was not evaluated during relicensing. However, most of the land along the Tallapoosa River downstream of Harris Dam is undeveloped forest land. Recreation access areas, farmland, and residential areas are also interspersed along the riverbank, including the towns of Malone and Wadley.

13.1.4 Skyline Aesthetics

Lands included in the Skyline area are predominately forested lands with some areas of agriculture. Distant views include rolling forested hills and agricultural lands within the valley. Views within the Skyline area include wooded forests, rock outcroppings, and streams, such as Little Coon Creek, that are characterized by rocky substrates and vegetative riparian areas along the banks (Alabama Power and Kleinschmidt 2018). Figure Figure 13-1, Figure 13-2, and Figure 13-3 provide views within the Skyline area.

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[61] At the Harris Project, "encroachments" may include activities that a property owner begins before receiving a permit. Alabama Power's permitting program started at Harris in 1986 and expanded to the remainder of Alabama Power's hydroelectric projects on the Coosa, Warrior, and Tallapoosa rivers in 1992.
[62] Accession No. 20201223-5282

Source: Alabama Power and Kleinschmidt 2018

Figure 13-1 Aerial View of Skyline Area

Source: Alabama Power and Kleinschmidt 2018

Figure 13-2 Skyline Area Rock Outcrops

Source: Alabama Power and Kleinschmidt 2018

Figure 13-3 Little Coon Creek

13.1.5 Lake Harris Aesthetics

The Lake Harris Project Area is dominated by Lake Harris and surrounding forested hilly terrain, recreation areas, forested shoreline, areas of shoreline residential development, and Harris Dam and associated Project facilities. Lake Harris provides views of open waterway and coves with vegetated shoreline areas. The tailrace area below Harris Dam has naturally armored banks with exposed bedrock and some riprap lined areas. The northern portion of the Lake Harris Project Area includes the Tallapoosa River and is therefore more riverine in character (Alabama Power and Kleinschmidt 2018). Figure 12-4 through Figure 13-8 provide views of Lake Harris Project facilities, Lake Harris, and the tailrace area below Harris Dam.

Source: Alabama Power and Kleinschmidt 2018

Figure 13-4 Aerial View of Harris Dam and Powerhouse

Source: Alabama Power and Kleinschmidt 2018

Figure 13-5 Aerial View of Lake Harris

Source: Alabama Power and Kleinschmidt 2018

Figure 13-6 Aerial View of Lake Harris Shorelines

Source: Alabama Power and Kleinschmidt 2018

Figure 13-7 Harris Dam Tailrace Area

Source: Alabama Power and Kleinschmidt 2018

Figure 13-8 View of Tailrace Area from Harris Dam

Regional scenic attractions in the Lake Harris Project Vicinity include scenic views from Cheaha State Park and Talladega National Forest, both located approximately 30 miles northwest of Lake Harris in the foothills of the Appalachian Mountains (Alabama Power and Kleinschmidt 2018).

There are two National Scenic Byways located in the Lake Harris Project Vicinity. The 26.4-mile Talladega Scenic Drive provides sweeping views of scenic mountains, rock outcroppings, and small rural towns within the Talladega National Forest (USDOT 2020). The 80-mile Appalachian Highlands Scenic Byway crosses portions of Cleburne, Calhoun, Cherokee, and DeKalb counties and provides scenic views along winding roads surrounded by lush vegetation, unique geologic formations, and historic rural communities (Alabama Scenic Byways 2020).

There are no Wild and Scenic Rivers designated in the Harris Project Boundary or in the Lake Harris Project Vicinity (Alabama Power and Kleinschmidt 2018).

13.1.6 Tallapoosa River Downstream of Harris Dam Aesthetics

The Tallapoosa River begins in Georgia and flows through eastern Alabama, providing miles of navigable waters for public recreation and is characterized by clear water and rocky shoals and provides natural and historic views to paddlers (Alabama Scenic River Trail 2017) (Figure 13-9 through Figure 13-12). The Alabama Scenic River Trail, a designated National Recreation Trail with portions extending along the Coosa River, is located approximately 70 miles south of the Harris Project (National Recreation Trails 2017). There are four dams along the Tallapoosa River with Harris Dam the most upstream. Along the Tallapoosa River downstream of Harris Dam are several recreation areas that provide access to the river including the HBCT. The HBCT includes four access points: Bibby's Ferry, Germanys Ferry; Horseshoe Bend, and Jaybird Landing (Figure 13-13 and Figure 13-14). The public can access and view the Tallapoosa River from these locations.

There are no river segments designated as Wild and Scenic under the Wild and Scenic Rivers Act within the Harris Project Boundary. As previously described, NPS noted that 24 miles of the Tallapoosa River downstream of the Harris Project, from Bibby's Ferry to Jaybird Landing, are listed in the Nationwide Rivers Inventory (NRI) (NPS 2021a).

Source: Kleinschmidt 2020

Figure 13-9 Tallapoosa River Downstream of Harris Dam – View 1

Source: Kleinschmidt 2020

Figure 13-10 Tallapoosa River Downstream of Harris Dam – View 2

Source: Kleinschmidt 2020

Figure 13-11 Bibby's Ferry

Source: Kleinschmidt 2020

Figure 13-12 Jaybird Landing

Downstream of Lake Harris is the scenic Horseshoe Bend (Figure 13-13 and Figure 13-14), the site of the Battle of Horseshoe Bend with the Creek Nation. An overlook of the battlefield, a visitor center, and several miles of walking trails are available at this site.

Source: Kleinschmidt 2020

Figure 13-13 Miller Covered Bridge and Abutments Downstream of Horseshoe Bend– View 1

Source: Kleinschmidt 2020

Figure 13-14 Miller Covered Bridge and Abutments Downstream of Horseshoe Bend – View 2

13.2 Environmental Analysis

FERC did not identify aesthetics as an affected resource in their SD2[63]; therefore, Alabama Power did not conduct any studies specific to aesthetic resources during relicensing. Alabama Power conducted relicensing studies and associated analyses that may pertain to effects on aesthetic and land use resources. Those analyses are presented in the following reports.

- Final Phase 1 Project Lands Evaluation Study Report
- Final Downstream Release Alternatives Phase 2 Study Report
- Final Operating Curve Change Feasibility Analysis Phase 2 Study Report
- A Botanical Inventory of a 35-Acre Parcel at Flat Rock Park, Blake's Ferry, Alabama

Table 13-4 includes the proposed operations and PME measures that may affect aesthetic and land use resources at Skyline, Lake Harris, and the Tallapoosa River downstream of Harris Dam. Not all operations or PME measures apply to each geographic area of the Harris Project; therefore, the analysis of beneficial and adverse effects will be presented accordingly. A complete list of Alabama Power's operations and PME measures is located in Table 5-2.

63 Accession No. 20181116-3065

Table 13-4 Proposed Operations and PME Measures That May Affect Aesthetics and Land Use

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT AESTHETICS AND LAND USE
• Continue to operate the Harris Project according to the existing operating curve. • Continue to operate in high flow conditions according to the USACE-approved flood control procedures in the Harris Water Control Manual (USACE 2022). • Continue daily peak-load operations. • Continue operating in accordance with ADROP (Alabama Power Company 2016) to address drought management.
• Install, operate, and maintain a vertical Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs with a generating capacity of approximately 2.5 MW. Based on the preliminary design, the continuous minimum flow unit would require a new reinforced concrete addition located on the outside of the Unit 1 side (east side) of the powerhouse. The new steel-lined penstock would penetrate the existing Unit 1 penstock for source water and discharge below the tailrace water surface. • Develop drought operations procedures for the minimum flow. • Operate in accordance with Green Plan (baseline) during CMF unit outages and outages where the water supply to the Unit 1 penstock is affected.
• Finalize and implement a WMP (Alabama Power 2021e) for Lake Harris and Skyline. ❖ Consult with USFWS to develop measures protective of federally listed bats. ❖ Incorporate timber management into the WMP. o Including maintenance of gates and the construction/maintenance of logging roads. o Conduct surveys for Price's Potato-bean at the location of the extant population prior to timbering activities that may affect the extant population. Timbering crews will be notified of the location of any Price's Potato-bean prior to timbering activities. ❖ Maintain pollinator plots at Little Fox Creek. ❖ Continue to provide hunting opportunities to the public. ❖ Continue to manage approximately 105 acres of permanent openings to provide diverse habitat that benefits both game and nongame species. ❖ Continue to conduct property boundary maintenance, such as painting/marking of property lines.

Proposed Operations and PME Measures that May Affect Aesthetics and Land Use
❖ Schedule for revising and implementing the WMP. o Within 6 months of license issuance, Alabama Power will revise or update the WMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval
• Finalize and implement a Shoreline Management Plan (SMP) (Alabama Power 2022c) for Lake Harris. ❖ Incorporate proposed changes in land use classifications (including reclassifying the botanical area at Flat Rock Park from recreation to Natural/Undeveloped). ❖ Continue to encourage the use of alternative bank stabilization techniques other than seawalls. ❖ Continue implementing the Dredge Permit Program (Appendix A to the SMP). ❖ Continue implementing the Water Withdrawal Policy (Kleinschmidt 2018b). ❖ Continue implementing a shoreline classification system to guide management and permitting activities (Appendices C and D of the SMP). ❖ Continue the requirements of a scenic easement for the purpose of protecting scenic and environmental values. ❖ Continue the use of a "sensitive resources" designation in conjunction with shoreline classifications on Harris Project lands managed for the protection and enhancement of cultural resources, wetlands, and threatened and endangered species. ❖ Continue implementing a shoreline compliance program and shoreline permitting program. ❖ Continue to encourage the adoption of shoreline best management practices (BMPs), including BMPs to maintain and preserve naturally vegetated shorelines, to preserve and improve the water quality of the Harris Project's reservoir, and to control soil erosion and sedimentation (Appendix E of the SMP). o Plant native trees, shrubs, and flowers for landscaping and gardens in order to reduce watering as well as chemical and pesticide use. o Preserve or establish a naturally managed vegetative filter strip along the shoreline to keep clearing of native trees and vegetation to a minimum. Alabama Power recommends a buffer set back of at least 15 feet measured horizontally from the full pool elevation. o Plant a low maintenance, slow growing grass that is recommended for your soil conditions and climate. o Maintain the grass as high as possible in order to shade out weeds and improve rooting so less fertilizing and watering are required. o Avoid dumping leaves or yard debris on or near the shoreline. ❖ Provide an update to the SMP every 10 years.

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT AESTHETICS AND LAND USE
❖ Schedule for revising and implementing the SMP. o Within 6 months of license issuance, Alabama Power will revise or update the SMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval
• Implement proposed land additions to the Harris Project Boundary and incorporate into Exhibit G.
• Implement proposed land removals from the Harris Project Boundary and incorporate into the Exhibit G.
• Finalize and implement a Recreation Plan (Alabama Power 2022d). ❖ Continue to operate and maintain 11 Harris Project recreation sites. ❖ Remove Wedowee Marine South as a Harris Project recreation site and request approval of entire facility as non-project use. ❖ Install and maintain recreation (canoe/kayak) access below Harris Dam within the Harris Project Boundary. ❖ Provide an additional recreation site on Lake Harris to include a day use park (swimming, picnicking, and boat ramp). ❖ Implement Barrier-Free Evaluation Program at existing recreation sites. ❖ Provide descriptions of the Project recreation sites including maps. ❖ Provide a Recreation Plan update to FERC every 10 years including monitoring protocols and proposed methodologies for sampling. ❖ Schedule for finalizing and implementing the Recreation Plan. o Within 6 months of license issuance, Alabama Power will revise the Recreation Plan, as needed, in consultation with appropriate resource agencies, and file with FERC for approval.

13.2.1 Skyline Land Use

Alabama Power is not proposing any land use classification changes, or land additions or removals at Skyline.

13.2.2 Lake Harris Land Use

13.2.2.1 Shoreline Management Plan

Alabama Power proposes to finalize and implement a SMP for Lake Harris that would incorporate proposed changes in land use classifications. During the Phase I Project Lands Evaluation, Alabama Power conducted a botanical inventory at Flat Rock Park, followed by an additional botanical inventory of an adjacent parcel in 2020. Alabama Power proposes to reclassify approximately 57[64] acres of existing Harris Project lands from recreation to Natural/Undeveloped due to the presence of the rare Blake's Ferry Pluton. This classification would further protect the unique habitat in the area that allows for the rare plant species to thrive (Alabama Power 2021b). The reclassification of these lands would not affect recreation lands available at Flat Rock Park, including opportunities for hiking.

In addition, Alabama Power is proposing to reclassify other lands within the Harris Project Boundary. A summary of proposed reclassifications is included in Table 13-5. Recreation lands reclassified as Natural/Undeveloped would continue to be available for undeveloped recreation purposes such as hiking and primitive camping (Alabama Power 2021b).

[64] Note that approximate 57 acres are listed in this section which includes the two surveys for a 20 acre parcel and 35 acre parcel. The discrepancy in the total acreage vs. acreage surveyed is due to the acreage included in the Project Boundary below 800 ft msl.

Table 13-5 Project Lands Proposed for Reclassification[65]

LAND PARCEL ID	ACREAGE FOR RECLASSIFICATION	CLASSIFICATION CHANGE	REASONS FOR RECLASSIFICATION
RC1	105 acres	Recreation to Natural/ Undeveloped	Currently classified as recreation for the purposes of a future park site; analysis of potential recreation use revealed that property is difficult to access and is located within an area of the lake with limited demand for public recreation opportunities; existing recreation project lands are located immediately upstream of this tract, which provide better access; reclassification to Natural/Undeveloped provides consistency of land use with adjacent project lands and will aid in the protection of the adjacent Natural/Undeveloped project lands.
RC2	63 acres	Recreation to Natural/ Undeveloped	Currently classified as recreation for the purposes of a future park site; analysis of potential recreation use revealed that property is difficult to access and is located within an area of the lake with limited demand for public recreation opportunities; existing recreation project lands are located immediately upstream of this tract, which provide better access; reclassification to Natural/Undeveloped provides consistency of land use with adjacent project lands and will aid in the protection of the adjacent Natural/Undeveloped project lands.
RC3	61 acres	Recreation to Natural/ Undeveloped	Added to Harris Project in 1995 for future recreation; however, existing recreation project lands have since been developed and are located immediately downstream of this tract, which provide better access; reclassification to Natural/Undeveloped will aid in the maintenance of the natural aesthetics in the area.

65 The reclassifications that would result from a proposed land removal or land addition are **not** included in this table because these proposed reclassifications are contingent upon FERC approval of the removal or addition, respectively. A summary of the proposed reclassifications under REMOVAL/ADDITION are included in Table 13-6.

Land Parcel ID	Acreage for Reclassification	Classification Change	Reasons for Reclassification
RC4	25 acres	Recreation to Commercial Recreation	Property contains an existing marina (Wedowee Marine South); Alabama Power's shoreline office is located on this tract; reclassification to commercial recreation will align with existing current use.
RC5	63 acres	Recreation to Natural/ Undeveloped	Added to Harris Project in 1995 for future recreation; however, property has steep terrain with subpar access; existing recreation project lands are located immediately north of this tract, which provide better access; reclassification to Natural/Undeveloped provides consistency of land use with adjacent project lands and will aid in the protection of the adjacent Natural/Undeveloped project lands.
RC6	5 acres	Prohibited Access to Recreation	Property contains the existing tailrace fishing recreation site; reclassification to recreation will align with existing current use.
RC7	57 acres	Recreation to Natural/ Undeveloped	Property is located adjacent to an existing project recreation site (Flat Rock Park) but is separated by forested land and is not currently used for recreation purposes; property is not designated for future expansion due to proximity of a transmission line corridor and adjacent private development; reclassification to Natural/Undeveloped provides protection of rare botanical species identified during the Flat Rock Botanical Inventories.
RC8	51 acres	Recreation to Natural/ Undeveloped	Property is part of a larger tract originally classified as recreation for the purposes of developing a public recreation site; a project recreation site (Big Fox Creek Boat Ramp) was constructed at the south end of the larger tract and contains adequate acreage for possible future expansion; this remainder of the larger tract is not needed for future recreation purposes; reclassification to Natural/Undeveloped will aid in the maintenance of natural aesthetics and will serve as a buffer zone around the existing public recreation area.

LAND PARCEL ID	ACREAGE FOR RECLASSIFICATION	CLASSIFICATION CHANGE	REASONS FOR RECLASSIFICATION
RC9	80 acres	Recreation to Commercial Recreation	Alabama Power has received numerous inquiries regarding potential campgrounds in this vicinity; reclassification to commercial recreation will provide lands for similar uses; tract is adjacent to area of proposed new day use park.
RC10	100 acres	Hunting to Natural/ Undeveloped	Tract is currently classified as hunting since it is adjacent to the Harris physical disabled hunting area; property is not needed for future expansion of the hunting area; reclassification to Natural/Undeveloped will aid in the maintenance of natural aesthetics and will serve as a buffer zone around the existing disabled hunting area and nearby project lands classified as prohibited access.

Source: Alabama Power 2021b

13.2.2.2 Land Removals/Additions

Alabama Power proposes to implement land additions and removals to the Project Boundary. Specifically, Alabama Power proposes to remove five parcels of recreation lands and three parcels of Natural/Undeveloped from the Project and add two parcels of hunting lands, five parcels of Natural/Undeveloped lands, and one parcel of commercial recreation land to the Project (Alabama Power 2021b). These parcels are described in Table 13-6. Approximately 286 acres of lands associated with tracts are proposed to be removed from the Harris Project and FERC jurisdiction and approximately 504 acres are proposed to be added to the Harris Project (Figure 13-15). Note that all portions of these parcels below 800′ msl are project lands and will remain within the project boundary. Lands between 793′ msl and 795′ msl will be reclassified to flood storage. Lands located between 795′ msl and 800′ msl will be reclassified to scenic easement. The reclassification of these lands is contingent on FERC approval of the proposed land addition or removal; therefore, these lands are depicted on the "addition and removal" maps and are not separately illustrated on the reclassification maps. Lands proposed for removal no longer serve a Project purpose due to the reasons listed in Table 13-6. Removing these lands would not adversely affect the overall recreation opportunities offered at the Project.

Additionally, Alabama Power proposes to remove several existing road corridors that currently cross Natural/Undeveloped lands. These corridors are comprised of both publicly dedicated rights-of-way and existing or known future private roads that cross Alabama Power Project lands to access privately owned properties that may be land locked by those Project lands or have other access issues that necessitate crossing Project lands. Removal of the corridors, specifically those that are not publicly dedicated rights-of-way, would eliminate the future need for separate joint use applications to remove these lands to grant the rights necessary to utilize the adjacent private property (i.e., access, utilities, clearing, etc.). These corridors are described in Table 13-7 and are shown in Figure 13-16. Approximately 43 acres of road corridors are proposed to be removed. Appendix G provides maps depicting Alabama Power's land proposal by parcel.

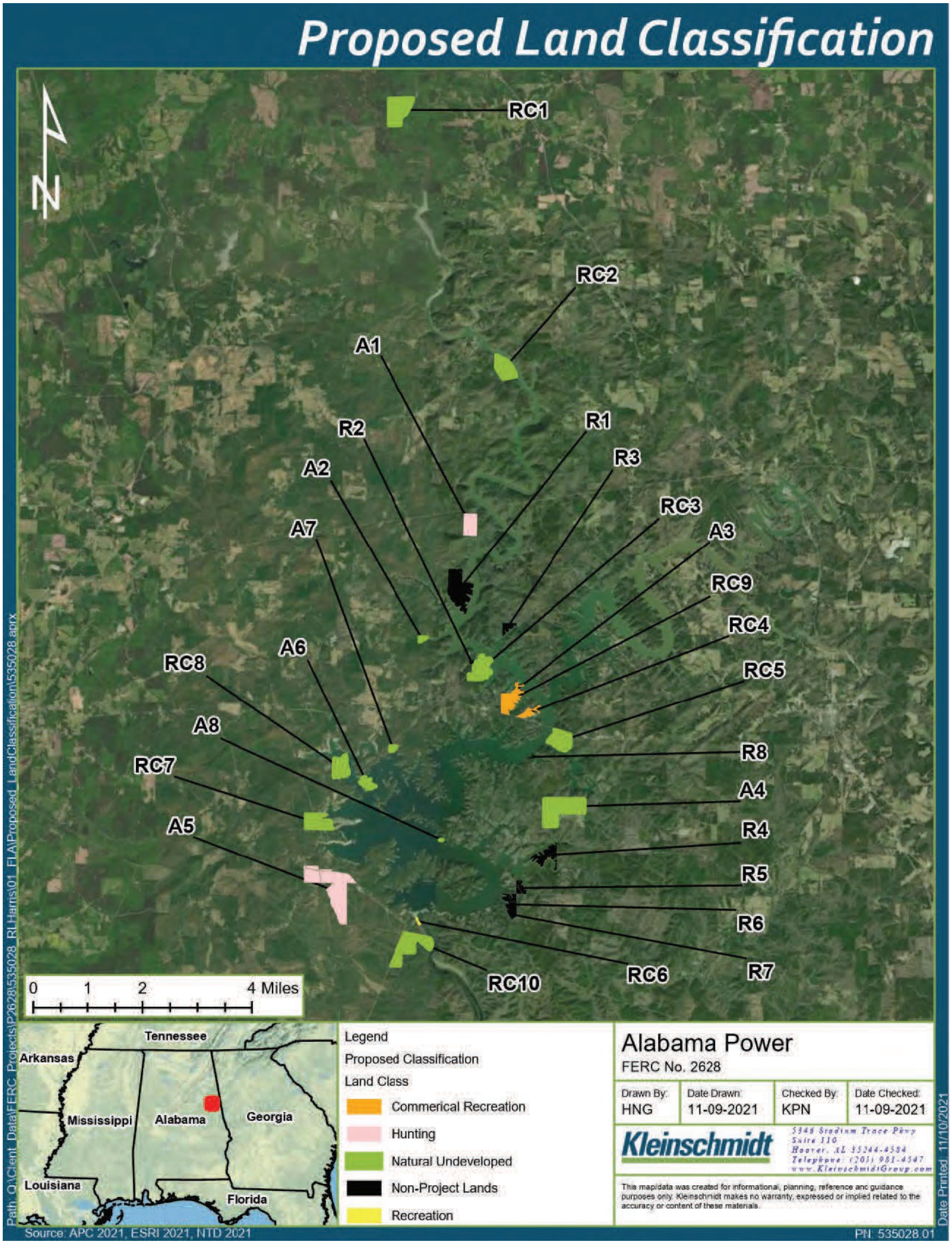

Figure 13-15 Proposed Land Use Classifications

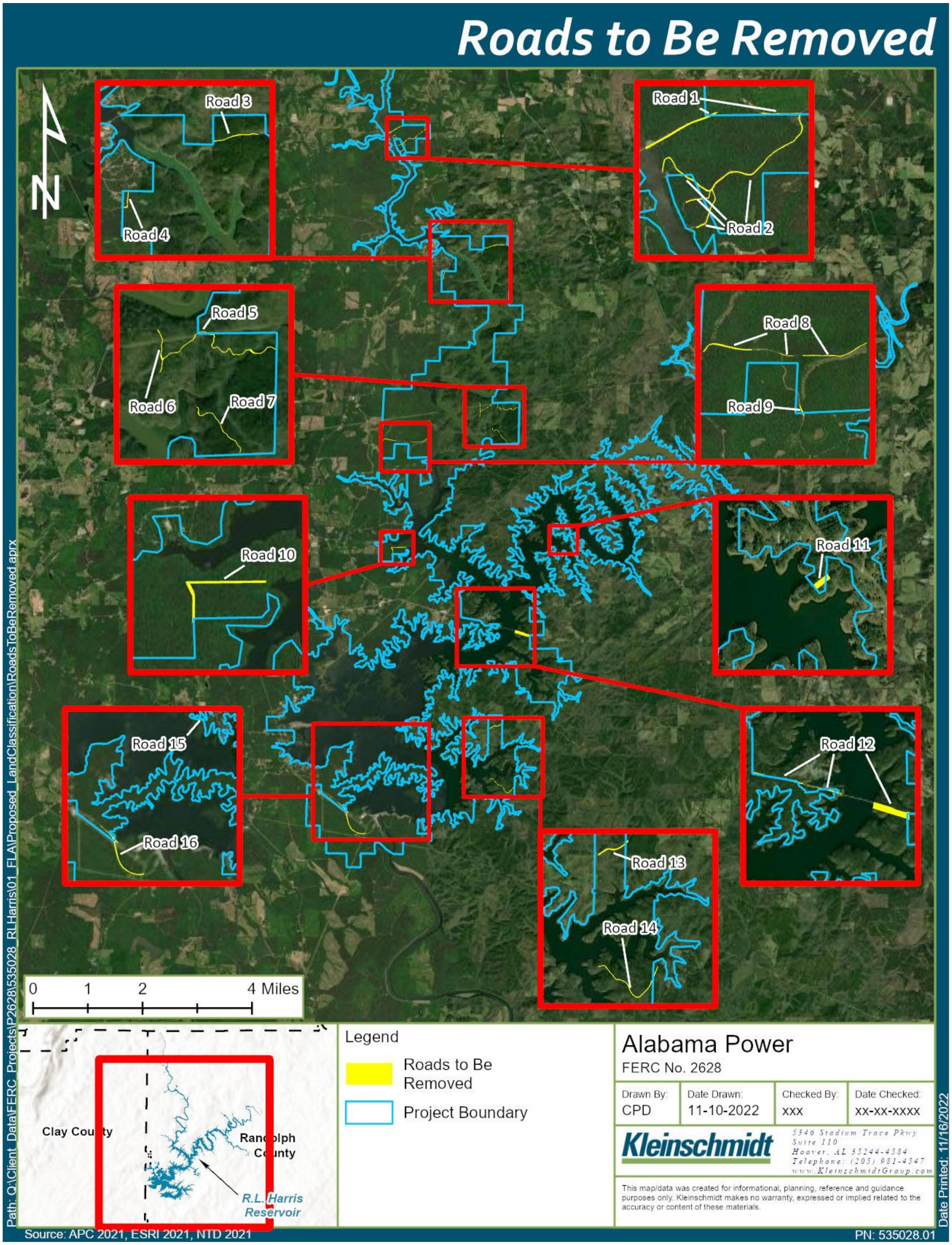

Figure 13-16 Road Corridors Proposed for Removal

Table 13-6 Project Lands Proposed for Removal/Addition

Land Parcel ID	Acreage	Add/Remove	Existing or Proposed Classification	Reason for Removal/Addition
R1	144.3 acres	Remove	Natural/ Undeveloped	No Project purpose for this parcel; adjacent to existing private development, including improved access road across northeast corner of parcel; not suitable for hunting lands due to its proximity to non-project (private) development; not suitable for recreation due to limited access to the property and location within area of lake with limited demand for public recreation opportunities. If Removal is approved: • Reclassify 1.0 acre between 793′ msl – 795′ msl from Natural/ Undeveloped to flood storage (see R1-RC1) • Reclassify 4.04 acres between 795′ msl – 800′ msl from Natural/Undeveloped to scenic easement (see R1-RC2)
R2	2.82 acres	Remove	Recreation	No Project purpose for this parcel; small parcel located at the end of an old road; not adjacent to existing project lands or proposed additions to project lands; not suitable for recreation as located within a slough and within an area of the lake with limited demand for public recreation opportunities; nearby recreation project lands already developed; not suitable for hunting lands due to small size; not suitable for Natural/Undeveloped due to proximity to proposed future developments. If Removal is approved: • Reclassify 0.10 acre between 793′ msl – 795′ msl from Recreation to flood storage (see R2-RC1) • Reclassify 0.29 acres between 795′ msl – 800′ msl from Recreation to scenic easement (see R2-RC2)
R3	19.04 acres	Remove	Recreation	No Project purpose: parcel was added to Harris Project in 1995 for use by the Boy Scouts, which never transpired; not suitable for recreation due to its location within an area of the lake with limited access and recreation demand, nearby existing recreation sites with better access; not suitable for

Land Parcel ID	Acreage	Add/Remove	Existing or Proposed Classification	Reason for Removal/Addition
				hunting lands due to its small size and not adjacent to existing project lands; not suitable for Natural/Undeveloped due to proximity to proposed future developments. If Removal is approved: • Reclassify 0.27 acres between 793′ msl – 795′ msl from Recreation to flood storage (see R3-RC1) • Reclassify 0.95 acres between 795′ msl – 800′ msl from Recreation to scenic easement (see R3-RC2)
R4	52.21 acres	Remove	Natural/ Undeveloped	No Project purpose: parcel is located on peninsula, but tip of peninsula is non-project lands; not suitable for Natural/Undeveloped due to proposed future development of privately-owned tip, which will result in the need to cross project lands will access and utilities; not suitable for recreation due to location within an area of the lake with limited demand for recreational opportunities; not suitable for hunting due to shape of parcel and proximity to private development. If Removal is approved: • Reclassify 2.10 acres between 793′ msl – 795′ msl from Natural/ Undeveloped to flood storage (see R4-RC1) • Reclassify 6.99 acres between 795′ msl – 800′ msl from Natural/Undeveloped to scenic easement (see R4-RC2)

Land Parcel ID	Acreage	Add/Remove	Existing or Proposed Classification	Reason for Removal/Addition
R5	20.19 acres	Remove	Recreation	No Project purpose: nearby private development resulting in landowners that need access through Project lands; not suitable for recreation due to its location within area of lake with limited demand for public recreation opportunities; not suitable for Natural/Undeveloped due to proximity to private development of peninsula; not suitable for hunting due to its small size and proximity to private development. If Removal is approved: • Reclassify 0.12 acres between 793′ msl – 795′ msl from Recreation to flood storage (see R5-RC1) • Reclassify 0.52 acres between 795′ msl – 800′ msl from Recreation to scenic easement (see R5-RC2)
R6	36.62 acres	Remove	Natural/ Undeveloped	No Project purpose; land locks privately-owned tracts with Project Boundary; not suitable for Natural/Undeveloped due to proximity to private development of peninsula, which has (and will continue to) result in the need to cross Project lands with access roads and utilities; not suitable for recreation due to its location within area of lake with limited demand for public recreation opportunities; not suitable for hunting due to due to proximity to private development. If Removal is approved: • Reclassify 0.34 acres between 793′ msl – 795′ msl from Natural/ Undeveloped to flood storage (see R6-RC1) • Reclassify 1.27 acres between 795′ msl – 800′ msl from Natural/Undeveloped to scenic easement (see R6-RC2)
R7	9 acres	Remove	Recreation	No Project purpose; similar to R5 and R6 in its proximity to private development; not suitable for recreation due to its location within area of lake with limited demand for public recreation opportunities; property is not located on shoreline; not suitable for Natural/Undeveloped due to proximity to private development; not suitable for hunting due to due to its small size and proximity to private development.

Land Parcel ID	Acreage	Add/Remove	Existing or Proposed Classification	Reason for Removal/Addition
R8	1.81 acres	Remove	Recreation	No Project purpose; parcel classified as recreation in 1995 land use plan for potential boat launch; since then, area has been developed with private residential developments that include private boat launches; parcel is not suitable for recreation due access, which is approximately 10-12 miles by county road from the nearest major highway; more accessible public launches have been constructed in general vicinity; parcel is land locked by private ownership; not suitable for Natural/Undeveloped due to small size and proximity to existing residential developments; not suitable for hunting due to small size and not adjacent to Project lands. If Removal is approved: • Reclassify 0.10 acres between 793′ msl – 795′ msl from Recreation to flood storage (see R8-RC1) • Reclassify 0.54 acres between 795′ msl – 800′ msl from Recreation to scenic easement (see R8-RC2)
A1	64 acres	Add	Hunting	Property fills a “donut hole” within current Project lands classified as hunting lands; Project purpose is hunting.
A2	3.83 acres	Add	Natural/Undeveloped	Small tract adjacent to existing project lands classified as Natural/Undeveloped; adding tract provides consistency of land use and will aid in the protection of the adjacent Natural/Undeveloped project lands; Project purpose is Natural/Undeveloped If Addition is approved: • Reclassify 0.06 acres between 793′ msl – 795′ msl from flood storage to Natural/Undeveloped (see A2-RC1) • Reclassify 0.15 acres between 795′ msl – 800′ msl from scenic easement to Natural/Undeveloped (see A2-RC2)
A3	1.86 acres	Add	Commercial Recreation	Parcel is adjacent to large tract of land currently classified as recreation that is proposed to be reclassified as commercial recreation (RC9); adding this tract provides consistency of land use with adjacent property; Project purpose is recreation.

Land Parcel ID	Acreage	Add/Remove	Existing or Proposed Classification	Reason for Removal/Addition
				If Addition is approved: • Reclassify 0.08 acres between 793′ msl – 795′ msl from flood storage to Commercial Recreation (see A3-RC1) • Reclassify 0.28 acres between 795′ msl – 800′ msl from scenic easement to Commercial Recreation (see A3-RC2)
A4	154 acres	Add	Natural/Undeveloped	Parcel is bordered by Natural/Undeveloped project lands to the north and to the south of this tract; adding tract provides consistency of land use and will aid in the protection of the adjacent Natural/Undeveloped project lands; Project purpose is Natural/Undeveloped.
A5	261 acres	Add	Hunting	Adjacent to existing project lands classified as hunting lands, which are designated as disabled hunting; portions of this parcel are currently utilized for the disable hunting area; adding tract will provide acreage for future expansion of the disable hunting area if needed; Project purpose is hunting.
A6	14.49 acres	Add	Natural/Undeveloped	Adjacent to existing Project lands classified as Natural/Undeveloped; adjacent Project lands include birding trail extending from Little Fox Creek public recreation site; adding tract provides consistency of land use and available acreage for future expansion of birding trail; Project purpose is Natural/Undeveloped. If Addition is approved: • Reclassify 1.12 acres between 793′ msl – 795′ msl from flood storage to Natural/Undeveloped (see A6-RC1) • Reclassify 4.38 acres between 795′ msl – 800′ msl from scenic easement to Natural/Undeveloped (see A6-RC2)
A7	5.57 acres	Add	Natural/Undeveloped	Adjacent to existing project lands classified as Natural/Undeveloped; adding tract provides consistency of land use and will aid in the protection of the adjacent Natural/Undeveloped Project lands; Project purpose is Natural/Undeveloped. If Addition is approved:

Land Parcel ID	Acreage	Add/Remove	Existing or Proposed Classification	Reason for Removal/Addition
				• Reclassify 0.14 acres between 793′ msl – 795′ msl from flood storage to Natural/Undeveloped (see A7-RC1) • Reclassify 0.52 acres between 795′ msl – 800′ msl from scenic easement to Natural/Undeveloped (see A7-RC2)
A8	0.17 acres	Add	Natural/Undeveloped	Two small tips of a peninsula; adjacent portion of peninsula is currently within the Project Boundary and classified as natural undeveloped; adding tracts provides consistency of land use and will aid in the protection of the adjacent Natural/Undeveloped Project lands; Project purpose is Natural/Undeveloped. If Addition is approved: • Reclassify 0.02 acres between 793′ msl – 795′ msl from flood storage to Natural/Undeveloped (see A8-RC1) • Reclassify 0.09 acres between 795′ msl – 800′ msl from scenic easement to Natural/Undeveloped (see A8-RC2)

Source: Alabama Power 2021b

Table 13-7 Road Corridors Proposed for Removal

Land Parcel ID	Acreage	Add/Remove	Existing or Proposed Classification	Reason for Removal/Addition
Road 1	2.44 acres	Remove	Natural/ Undeveloped	No Project purpose for this parcel; existing public road – Randolph County Road 88
Road 2	3.58 acres	Remove	Natural/Undeveloped	No Project purpose for this parcel; existing public road – Randolph County Road 272
Road 3	1.91 acres	Remove	Hunting	No Project purpose for this parcel; existing public road – unnamed
Road 4	0.73 acres	Remove	Natural/Undeveloped	No Project purpose for this parcel; existing public road – Randolph County Road 263
Road 5	2.91 acres	Remove	Natural/Undeveloped	No Project purpose for this parcel; existing public road – Randolph County Road 299
Road 6	0.63 acres	Remove	Natural/Undeveloped	No Project purpose for this parcel; existing public road – unnamed
Road 7	1.11 acres	Remove	Natural/Undeveloped	No Project purpose for this parcel; existing private road used to access privately owned lands that are land locked by Alabama Power Project lands
Road 8	1.90 acres	Remove	Hunting	No Project purpose for this parcel; existing public road – Randolph County Road 281
Road 9	0.20 acres	Remove	Hunting	No Project purpose for this parcel; existing public road – Randolph County Road 2811
Road 10	2.16 acres	Remove	Natural/Undeveloped	No Project purpose for this parcel; existing private road used to access privately owned lands that are land locked by Alabama Power Project lands
Road 11	0.52 acres	Remove	Recreation	No Project purpose for this parcel; existing public road – Crescent Creek Ridge Road
Road 12	12.52 acres	Remove	Recreation	No Project purpose for this parcel; existing public road – Alabama Highway 48
Road 13	1.95 acres	Remove	Natural/Undeveloped	No Project purpose for this parcel; existing public road – Randolph County Road 816

Land Parcel ID	Acreage	Add/Remove	Existing or Proposed Classification	Reason for Removal/Addition
Road 14	2.92 acres	Remove	Natural/Undeveloped	No Project purpose for this parcel; existing private road used to access privately owned lands that are land locked by Alabama Power Project lands
Road 15	0.52 acres	Remove	Natural/Undeveloped	No Project purpose for this parcel; existing public road – Randolph County Road 804
Road 16	6.64 acres	Remove	Hunting	No Project purpose for this parcel; existing public road – RL Harris Dam Road

13.2.2.3 Recreation Plan

Alabama Power is proposing to finalize and implement a Recreation Plan with provisions to provide an additional day use park on Lake Harris to include with amenities for swimming, picnicking, and a boat ramp. The new day use park would be classified as "Recreation" and would be lands designation for recreation use throughout the term of the new license. Providing additional recreation land in this classification would have a long-term beneficial effect on recreation opportunities at the Harris Project, specifically on Lake Harris. Lands classified as "Recreation" allow particular uses consistent with providing public access to the Tallapoosa River and Lake Harris.

13.2.3 Tallapoosa River Downstream of Harris Dam Land Use

13.2.3.1 Continued Project Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. During high flow events, downstream lands that are inundated would continue to be inundated under the proposed continued operations and would have no change on land use compared to baseline.

13.2.4 Skyline Aesthetics

13.2.4.1 Wildlife Management Plan/Timber Management

Alabama Power proposes to finalize and implement a WMP, including specific timber management actions and BMPs that reduce or prevent runoff, erosion, and sedimentation that may impact streams and waterbodies within Skyline. Alabama Power's proposal to continue timber management as part of the WMP would have a beneficial effect by avoiding large, or total acreages of clear cutting, increasing the overall scenic value of the forested areas.

13.2.5 Lake Harris Aesthetics

13.2.5.1 Continued Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. This proposal would have no effect on aesthetic resources at Lake Harris since no change is proposed. The winter pool drawdown would continue as it does under existing operations, exposing the area from 793-ft msl (summer operating curve) to 785-ft msl (winter operating curve). No additional shoreline area would be exposed.

13.2.5.2 Wildlife Management Plan/Timber Management

Similar to Skyline, Alabama Power's proposal to continue timber management as part of the WMP would have a beneficial effect by avoiding large, or total acreages of clear cutting, increasing the overall scenic value of the forested areas.

13.2.5.3 Shoreline Management Plan

Alabama Power proposes to finalize and implement a SMP for Lake Harris. The SMP would be modeled after other current Alabama Power project SMPs; this would allow uniformity in the way that Alabama Power manages Project shorelines across all their hydroelectric projects.

Existing land use classifications at Lake Harris include recreational use (public use areas), hunting, prohibited access, and Natural/Undeveloped. Natural/Undeveloped lands include lands that remain in an undeveloped state to serve as protective buffer zones around public recreation areas and shoreline areas, preserve natural aesthetic qualities, prevent overcrowding, and protect environmentally sensitive areas. Hiking and primitive camping activities and timber management activities are allowed on lands classified as Natural/Undeveloped (Alabama Power 2021b). During the Phase I Project Lands Evaluation, Alabama Power identified a need to modify the existing Natural/Undeveloped classification definition to match the Natural/Undeveloped lands definition in other Alabama Power SMPs. The SMP would include a modified definition for lands classified as Natural/Undeveloped, as follows to include Project lands that would remain undeveloped for the following specific Project purposes:

- Protecting environmentally sensitive areas
- Preserving natural aesthetic qualities
- Serving as buffer zones around public recreation areas
- Preventing overcrowding of partially developed shoreline

This classification allows for public hiking trails, nature studies, primitive camping, wildlife management (excluding hunting), and normal forestry management practices. Alabama Power typically owns these lands in fee simple title and manages them for effective protection of associated resource values (Alabama Power 2021b).

Alabama Power would also continue the requirements of a scenic easement for the purpose of protecting scenic and environmental values. Alabama Power maintains a scenic easement at Lake Harris on lands located between the 795-feet msl contour and the 800-feet[66] msl contour. No construction and/or related activity may take place within Alabama Power's scenic easement lands without Alabama Power's prior written authorization. Certain activities are not permitted within Alabama Power's scenic easement lands, including but not necessarily limited to changing the contour of the land; laying/seeding any sod, grass, and/or garden; constructing any habitable structure, fence or well; allowing the presence of any garbage, debris, or other foreign material; removing any tree measuring more than 3-inches in diameter; and clearing any shrubbery measuring more than 4-feet-tall (Alabama Power 2022c).

The SMP would benefit aesthetic resources around Lake Harris through its specific actions included within the Natural/Undeveloped land use classification and the scenic easement. The Natural/Undeveloped and scenic easement land use classifications assist in protecting environmentally sensitive areas and preserve the scenic easement at Lake Harris. Limiting the development and vegetative actions in the scenic easement maintains a more natural, scenic view, resulting in a beneficial effect on aesthetic resources.

13.2.5.4 Recreation Plan

Alabama Power is proposing to finalize and implement a Recreation Plan with provisions to provide an additional day use park on Lake Harris to include with amenities for swimming, picnicking, and a boat ramp. Aesthetics would be considered and incorporated in the design of the day use park, providing a long-term beneficial effect to the overall scenic value of the area.

[66] Or 50 horizontal feet from 793-feet msl, whichever is less, but never less than 795-feet msl.

13.2.6 Tallapoosa River Downstream of Harris Dam Aesthetics

13.2.6.1 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. Alabama Power's proposal would result in a more stable riverine environment downstream of Harris Dam. Consistently wetted riparian areas would improve the scenic quality of the Tallapoosa River downstream of Harris Dam by minimizing or eliminating the occurrences of exposed riverbanks during periods of no generation, having a beneficial effect on aesthetic resources in the Tallapoosa River.

13.3 Unavoidable Adverse Impacts

13.3.1 Skyline

During timber management activities, there would be short-term adverse aesthetic impacts from timber harvests immediately following these management actions. Implementing timber management actions through the WMP, including replanting and rotation of areas affected, would minimize the overall aesthetic effect.

13.3.2 Lake Harris

Similar to Skyline, during timber management activities around Lake Harris, there would be short-term adverse aesthetic impacts from timber harvests immediately following these management actions. Implementing timber management actions through the WMP including replanting and rotation of areas affected would minimize the overall aesthetic effect.

Construction at existing and proposed recreation sites at Lake Harris would result in short-term unavoidable adverse impacts to aesthetics in the immediate recreation area limited to the period of construction. BMPs and closure of the recreation sites during construction would minimize undesirable views and noise from construction equipment and activity.

13.3.3 Tallapoosa River Downstream of Harris Dam

Short-term unavoidable adverse impacts associated with the proposed installation of a minimum flow unit at Harris Dam include an increase in noise and undesirable views around the powerhouse due to construction equipment and activity. These impacts are temporary during construction periods and would not impact the Harris Project after construction.

In addition, construction of the new canoe/kayak access area located at the existing Harris Tailrace Fishing facility downstream of the Harris Dam would result in short-term unavoidable adverse impacts to aesthetics in the immediate tailrace area as a result of a construction equipment, disturbed vegetation, and construction related noise.

13.4 Recommended PME Measures Not Adopted

In response to the PLP, resource agencies, NGOs, and other stakeholders recommended specific PME measures that may affect land use and aesthetic resources. Some of the recommended PME measures are incorporated in Alabama Power's proposal. This section briefly describes the stakeholder recommended PME measures that Alabama Power is not including in its relicensing proposal.

13.4.1 Seawall Criteria

The ADCNR recommends that Alabama Power implement specific criteria to evaluate new permit requests for constructing seawalls. The proposed SMP provides for a permitting program that encourages the use of riprap and natural bank stabilization as the preferred methods of erosion control; however, use of seawalls will be evaluated and may be approved on a case-by-case basis. Alabama Power generally restricts the use of new seawalls to areas where there is: evidence of significant active erosion, high potential for substantial wave action (due to the area's location on open waters), heavy and/or frequent boat traffic, a previously installed seawall which has failed, or a combination of the above.

In addition, Alabama Power requires, as a condition of a permit, that any future seawall proposals include the placement of riprap, for fish and other semi-aquatic species habitat and increased stability, in front of the seawall. Only in very limited cases where the Alabama Power regional coordinator is convinced that riprap would not be an effective source of bank stabilization, or would be economically unfeasible, would seawalls without riprap be permitted.

14.0 SOCIOECONOMIC RESOURCES

14.1 Affected Environment

14.1.1 Skyline

This summary of the socioeconomic data for the Skyline Project Vicinity, located in Jackson County, Alabama includes population patterns, average household income, and employment sectors.

14.1.1.1 Population Patterns

Table 14-1 summarizes the population estimates for Jackson County and for the state of Alabama as reported in the 2010 and 2020 Census (Census Bureau 2021a). Based on the 2021 population estimates, Jackson County's population density is 50 people per square mile, which is lower than the state average density of 95 people per square-mile. Jackson County ranked 27 out of the 67 counties in Alabama in terms of total population in 2021 (Home Town 2021a, 2021b).

Table 14-1 Estimated Population in the Skyline Project Vicinity

County/State	2010 Census	2020 Census	Percent Change 2010-2020
Jackson	53,227	52,579	-1.2
Alabama	4,779,736	5,024,279	5.1

Source: Census Bureau 2021a

14.1.1.2 Households/Family Distribution and Income

Table 14-2 provides the household and family distribution and income for Jackson County as estimated by the U.S. Census Bureau for 2019 (Census Bureau 2021a).

Table 14-2 Household Incomes and Distributions for Jackson County at Skyline

	JACKSON COUNTY
2015-2019 Households	20,695
2015-2019 Approximate Number of Persons Per Household	2.5
2015-2019 Percentage of Population in Civilian Labor Force	50.8 %
2015-2019 Median Household Income	$41,769
2019 Population Below Poverty Level	14.7 %
2021 Unemployment Rate	2.7 %

Source: Census Bureau 2021a; AL Dept of Labor 2021

14.1.1.3 Project Vicinity Employment Sources

Jackson County is in the North Alabama Works region as classified by the Alabama Labor Department Workforce Division, which also includes Limestone, Madison, Morgan, Cullman, Marshall, Dekalb, Lauderdale, Colbert, Franklin, Lawrence, Marion, and Winston counties. The major employers in this region are manufacturing; health care and social assistance; retail trade; professional, scientific, and technical services; and accommodation and food services (AL Dept of Labor 2020).

Table 14-3 summarizes the percent distribution of employment industries with the Skyline Project Vicinity.

Table 14-3 2019 Percent Industry Employment in Jackson County at Skyline

INDUSTRIES	JACKSON COUNTY (%)
Manufacturing	35.6
Retail Trade	14.4
Health Care & Social Assistance	10.2
Educational Services	8.6
Accommodation & Food Services	7.6
Public Administration	5.0
Construction	3.8
Wholesale Trade	2.8
Finance & Insurance	2.2
Remaining Industries with less than 2.2% Share of Total Employment	9.8

Source: AL Dep of Labor 2019a

According to the 2017 Census of Agriculture, 1,355 farms were located in Jackson County, and the average annual production per farm was $113,276 (USDA 2017a).

14.1.2 Lake Harris

Lake Harris is located within Randolph, Clay, and Cleburne counties, Alabama. The following is a summary of socioeconomic data for these counties, including population patterns, average household income, and employment sectors.

14.1.2.1 Population Patterns

Table 14-4 summarizes the population estimates for the three counties in which Lake Harris Project lands are located and for the state of Alabama as reported in the 2010 and 2020 Census (Census Bureau 2021a). All counties except for Randolph experienced a slight increase in population. The closest population centers to Lake Harris are Wedowee, Lineville, and Wadley (downstream of Harris Dam), with populations of 820, 2,332, and 829 respectively, based on the 2019 Census estimate (Data USA 2019a; 2019b; 2019c).

Table 14-4 Estimated Population at Lake Harris

County/State	2010 Census	2020 Census	Percent Change (%) 2010-2020
Randolph	22,913	21,967	-4.1
Clay	13,932	14,236	2.2
Cleburne	14,972	15,056	0.6
Alabama	4,779,736	5,024,279	5.1

Source: Census Bureau 2021a

Based on the 2021 population estimates, Randolph County's population density is 41 people per square-mile, which is lower than the state average density of 95 people per square-mile. The population density for Clay County is 22 people per square-mile, and Cleburne County is 28 people per square-mile. Randolph County ranked 45 of the total 67 counties in Alabama in terms of total population in 2021. Clay County ranked 59, and Cleburne ranked 54 (Home Town 2021c; 2021d; 2021e).

14.1.2.2 Households/Family Distribution and Income

Table 14-5 provides the household and family distribution and income for Randolph, Clay, and Cleburne counties.

Table 14-5 Household Incomes and Distributions for Counties at Lake Harris

	RANDOLPH COUNTY	CLAY COUNTY	CLEBURNE COUNTY
2015-2019 Households	8,702	5,198	5,680
2015-2019 Approximate Number of Persons per Household	2.55	2.52	2.60
2015-2019 Percentage of Population in Civilian Labor Force	50.0%	53.9%	50.8%
2015-2019 Median Household Income	$43,395	$40,845	$44,741
2019 Population Below Poverty Level	17.5%	16.6%	13.3%
2021 Unemployment Rate	2.6%	2.6%	2.4%

Source: Census Bureau 2021a; AL Department of Labor 2021

14.1.2.3 Project Vicinity Employment Sources

Randolph, Clay, and Cleburne counties are in the East Alabama Works region as classified by the Alabama Labor Department Workforce Division, which also includes Etowah, Cherokee, Calhoun, and Talladega counties. The major employers in this region are manufacturing, health care and social assistance, retail trade, educational services, and accommodation and food services (Al Dept of Labor 2020b).

Table 14-6 summarizes the percent distribution of employment industries within each of the counties.

Table 14-6 2019 Percent Industry Employment by Counties at Lake Harris

INDUSTRIES	RANDOLPH COUNTY (%)	CLAY COUNTY (%)	CLEBURNE COUNTY (%)
Manufacturing	21.4	54.8	15.7
Educational Services	15.5	8.2	16.7
Retail Trade	14.7	6.3	13.6
Health Care & Social Assistance	13.7	12.4	9.8
Accommodation & Food Services	7.6	2.7	8.8
Public Administration	6.4	4.4	10.3
Transportation & Warehousing	4.1	-	-
Wholesale Trade	3.1	-	-
Construction	2.8	N/A	11.0
Finance & Insurance	-	2.2	
Agriculture, Forestry, Fishing, & Hunting	-	-	3.5
Remaining Industries	10.7	9.0	10.6

Source: AL Dept of Labor 2019b; 2019c; 2019d

According to the 2017 Census of Agriculture, 597 farms were located in Randolph County, 381 farms in Clay County, and 319 farms in Cleburne County. The average annual production per farm was $255,797 in Randolph County, $213,461 in Clay County, and $368,198 in Cleburne County (USDA 2017b; 2017c; 2017d).

14.1.3 Tallapoosa River Downstream of Harris Dam

The Tallapoosa River downstream of Harris Dam is located within Randolph, Chambers, and Tallapoosa counties, Alabama. The following is a summary of socioeconomic data for these counties, including population patterns, average household income, and employment sectors.

14.1.3.1 Population Patterns

Table 14-7 summarizes the population estimates for the three counties near the Tallapoosa River downstream of Harris Dam and for the state of Alabama as reported in the 2010 and 2020 Census (Census Bureau 2021b). Randolph and Tallapoosa counties experienced a slight decrease in population. The largest population centers downstream of Harris Dam are Malone and Wadley, with Wadley having a population of 829, based on the 2019 Census estimate (Data USA 2019c).

Table 14-7 Estimated Population along the Tallapoosa River Downstream of Harris Dam

COUNTY/STATE	2010 CENSUS	2020 CENSUS	PERCENT CHANGE (%) 2010-2020
Randolph	22,913	21,967	-4.1
Chambers	34,215	34,772	1.6
Tallapoosa	41,616	41,311	-0.7
Alabama	4,779,736	5,024,279	5.1

Source: Census Bureau 2021b

Based on population estimates for 2021, Randolph County's population density is 41 people per square-mile, which is lower than the state average density of 95 people per square-mile. Chambers County's population density is 55 people per square-mile, and Tallapoosa County's is 58. Randolph County ranked 45 of the total 67 counties in Alabama in terms of total population in 2021. Chambers County ranked 36, and Tallapoosa ranked 30 (Home Town 2021c; 2021f; 2021g).

14.1.3.2 Households/Family Distribution and Income

Table 14-8 provides the household and family distribution and income for Randolph, Chambers, and Tallapoosa counties.

Table 14-8 Household Incomes and Distributions for Counties in the Tallapoosa River Downstream of Harris Dam

	RANDOLPH COUNTY	CHAMBERS COUNTY	TALLAPOOSA COUNTY
2015-2019 Households	8,702	13,448	16,205
2015-2019 Approximate Number of Persons per Household	2.55	2.46	2.46
2015-2019 Percentage of Population in Civilian Labor Force	50.0%	56.5%	50.8%
2015-2019 Median Household Income	$43,395	$42,289	$45,828
2019 Population Below Poverty Level	17.5%	19.6%	16.0%
2021 Unemployment Rate	2.6%	3.6%	4.2%

Source: Census Bureau 2021b; AL Dept of Labor 2021

14.1.3.3 Project Vicinity Employment Sources

Randolph County is in the East Alabama Works region as classified by the Alabama Labor Department Workforce Division. Chambers and Tallapoosa counties are in the Central Alabama Works region. The major employers in the region are manufacturing, health care and social assistance, retail trade, educational services, and accommodation and food services (Al Dept of Labor 2019e).

Table 14-9 summarizes the percent distribution of employment industries within each of the counties.

Table 14-9 2019 Percent Industry Employment by Counties near the Tallapoosa River Downstream of Harris Dam

INDUSTRIES	RANDOLPH COUNTY (%)	CHAMBERS COUNTY (%)	TALLAPOOSA COUNTY (%)
Manufacturing	21.4	25.9	19.9
Educational Services	15.5	7.3	6.7
Retail Trade	14.7	11.9	10.5
Health Care & Social Assistance	13.7	13.0	17.5
Accommodation & Food Services	7.6	10.2	7.2
Public Administration	6.4	6.5	7.1
Admin & Support & Waste Mgmt & Remediation Services	-	4.8	13.9
Transportation & Warehousing	4.1	4.7	-
Wholesale Trade	3.1	-	-
Construction	2.8	3.2	3.3
Professional, Scientific, & Technical Services	-	-	1.8
Remaining Industries	10.7	12.5	12.1

Source: AL Dept of Labor 2019b; 2019f; 2019g

According to the 2017 Census of Agriculture, 597 farms were located in Randolph County, 331 farms in Chambers County, and 347 farms in Tallapoosa County. The average annual production per farm was $255,797 in Randolph County, $27,368 in Chambers County, and $47,639 in Tallapoosa County (USDA 2017b; 2017e; 2017f).

14.2 Environmental Analysis

Alabama Power did not conduct socioeconomic studies related to the relicensing of the Harris Project. There are currently no known issues relating to socioeconomic resources at the Project, and the Project is not anticipated to have significant effects on area socioeconomics.

Alabama Power is not proposing any PME measures that would directly protect, enhance, or mitigate socioeconomics resources for the Harris Project. Table 14-10 includes the proposed operations and PME measures that may indirectly affect socioeconomic resources at Skyline, Lake Harris, and the Tallapoosa River downstream of Harris Dam. Not all operations or PME measures apply to each geographic area of the Harris Project; therefore, the analysis of beneficial and adverse effects will be presented accordingly. A complete list of Alabama Power's operations and PME measures is located in Table 5-2.

Table 14-10 Proposed Operations and PME Measures that May Indirectly Affect Socioeconomics

PROPOSED OPERATIONS AND PME MEASURES THAT MAY INDIRECTLY AFFECT SOCIOECONOMICS
• Continue to operate the Harris Project according to the existing operating curve. • Continue to operate in high flow conditions according to the USACE-approved flood control procedures in the Harris Water Control Manual (USACE 2022). • Continue daily peak-load operations. • Continue operating in accordance with ADROP (Alabama Power Company 2016) to address drought management.
• Install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs with a generating capacity of approximately 2.5 MW. Based on the preliminary design, the continuous minimum flow unit would require a new reinforced concrete addition located on the outside of the Unit 1 side (east side) of the powerhouse. The new steel-lined penstock would penetrate the existing Unit 1 penstock for source water and discharge below the tailrace water surface. • Develop drought operations procedures for the minimum flow. • Operate in accordance with Green Plan (baseline) during CMF unit outages and outages where the water supply to the Unit 1 penstock is affected.
• Finalize and implement a WMP (Alabama Power 2021e) for Lake Harris and Skyline. ❖ Consult with USFWS to develop measures protective of federally listed bats. ❖ Incorporate timber management into the WMP. o Including maintenance of gates and the construction/maintenance of logging roads. o Conduct surveys for Price's Potato-bean at the location of the extant population prior to timbering activities that may affect the extant population. Timbering crews will be notified of the location of any Price's Potato-bean prior to timbering activities. ❖ Maintain pollinator plots at Little Fox Creek. ❖ Continue to provide hunting opportunities to the public.

PROPOSED OPERATIONS AND PME MEASURES THAT MAY INDIRECTLY AFFECT SOCIOECONOMICS
❖ Continue to manage approximately 105 acres of permanent openings to provide diverse habitat that benefits both game and nongame species. ❖ Continue to conduct property boundary maintenance, such as painting/marking of property lines. ❖ Schedule for revising and implementing the WMP. o Within 6 months of license issuance, Alabama Power will revise or update the WMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval.
• Finalize and implement a Recreation Plan (Alabama Power 2022d). ❖ Continue to operate and maintain 11 Harris Project recreation sites. ❖ Remove Wedowee Marine South as a Harris Project recreation site and request approval of entire facility as non-project use. ❖ Install and maintain recreation (canoe/kayak) access below Harris Dam within the Harris Project Boundary. ❖ Provide an additional recreation site on Lake Harris to include a day use park (swimming, picnicking, and boat ramp). ❖ Implement Barrier-Free Evaluation Program at existing recreation sites. ❖ Provide descriptions of the Project recreation sites including maps. ❖ Provide a Recreation Plan update to FERC every 10 years including monitoring protocols and proposed methodologies for sampling. ❖ Schedule for finalizing and implementing the Recreation Plan. o Within 6 months of license issuance, Alabama Power will revise the Recreation Plan, as needed, in consultation with appropriate resource agencies, and file with FERC for approval.

14.2.1 Skyline

14.2.1.1 Wildlife Management Plan/Timber Management

Alabama Power proposes to finalize and implement a WMP that would continue to provide hunting opportunities to the public and continue to have a beneficial effect on socioeconomics of local towns around Skyline as hunters often shop, dine, and use local lodging in close proximity to where they are hunting.

14.2.2 Lake Harris

14.2.2.1 Continued Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP, therefore, there would be no anticipated change to socioeconomics resources at Lake Harris.

14.2.2.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. Alabama Power's proposed minimum flow is not expected to have a significant impact on socioeconomic resources at Lake Harris. However, installation of the proposed minimum flow unit at Harris Dam may result in an increase in temporary jobs. During the unit installation and associated construction, additional workers may temporarily inhabit the area, producing a short-term increase in business for the local restaurant, lodging, and fuel industries.

14.2.2.3 Wildlife Management Plan/Timber Management

Alabama Power proposes to finalize and implement a WMP that would continue to provide hunting opportunities to the public and continue to have a beneficial effect on socioeconomics of local towns around Lake Harris as hunters often shop, dine, and use local lodging in close proximity to where they are hunting.

14.2.2.4 Recreation Plan

Alabama Power proposes to continue to operation and maintain 11 Project recreation sites and to provide an additional recreation site at Lake Harris to include a day use park (swimming, picnicking, and boat ramp). This additional recreation site could have a beneficial effect on socioeconomics by increasing recreational opportunities on Lake Harris and providing temporary employment opportunities as a result of construction activity.

14.2.3 Tallapoosa River Downstream of Harris Dam

14.2.3.1 Continued Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP; therefore, there would be no anticipated change of Lake Harris operation on socioeconomic resources in the Tallapoosa River below Harris Dam.

14.2.3.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. Alabama Power's proposed minimum flow would have a beneficial effect on downstream recreation through additional boatable days, particularly in the fall, and increased river navigability. Increased recreational opportunities could have a beneficial effect on socioeconomics in the Tallapoosa River in the form of additional visitors and associated expenditures (food, lodging, bait, guide services). In addition, temporary employment opportunities as a result of construction activity may benefit local socioeconomics.

14.2.3.3 Recreation Plan

Alabama Power proposes to construct a new recreation access area in the Harris Project tailrace that would include canoe/kayak launch facilities at the existing Harris Tailrace Fishing Pier. This additional access could have a beneficial effect on socioeconomics by increasing recreational opportunities on the Tallapoosa River. In addition, temporary employment opportunities as a result of construction activity at the tailrace recreation site may benefit local socioeconomics.

14.3 Unavoidable Adverse Impacts

14.3.1 Skyline

Alabama Power's Project operations are not expected to have any unavoidable adverse impacts on socioeconomics.

14.3.2 Lake Harris

The existing winter operating curve results in the unavoidable adverse impact to some private docks/structures that are not accessible to the reservoir, and some private docks/structures that have limited accessibility to the reservoir. However, approximately 50 percent of public boat ramps remain accessible to visitors and property owners. Therefore, continued operations are not expected have an unavoidable adverse impact on socioeconomics.

14.3.3 Tallapoosa River Downstream of Harris Dam

Alabama Power's Project operations may have a minor unavoidable adverse impact on recreation use on the Tallapoosa River. Changes in the generation schedule may impact planned use of guide services and recreation use which may have a minor adverse effect on local socioeconomics.

14.4 Recommended PME Measures Not Adopted

In response to the PLP, no resource agency, NGO, or other stakeholder recommended specific PME measures that may affect socioeconomic resources.

15.0 CULTURAL RESOURCES

15.1 Affected Environment

15.1.1 Skyline

15.1.1.1 Discovery Measures and Identified Cultural Resources

An initial review of the Alabama Cultural Resources Online Database, housed at the Office of Archaeological Resources (OAR) and consisting of the National Archaeological Database Bibliography, the Alabama State Site File (ASSF) (OAR 2017) and the Alabama Phase I Surveys Website (OAR 2014) identified two previous cultural surveys and over 100 sites within the Skyline WMA. All sites were listed as undetermined regarding National Register of Historic Places (NRHP) eligibility (Alabama Power and Kleinschmidt 2018). There are also 198 recorded caves in the Skyline Project Boundary.

Alabama Power worked with the State Historic Preservation Office (SHPO), FERC, and applicable tribes to select 29 sites for reassessment at Skyline. Alabama Power discussed these sites with stakeholders on May 22, 2019, July 9, 2019, November 6, 2019, and May 28, 2020. The Skyline assessment also included 11 caves and 1.66 miles of discontinuous bluff line. The complete results are presented with the HPMP in "A Cultural Resources Assessment of Select Sites in the James D. Martin-Skyline Wildlife Management Area as Part of the Harris Project in Jackson County, Alabama."

Currently, of the 148 sites within Skyline, there are 19 cultural resources sites that are recommended eligible for listing in the NRHP and 129 cultural resources sites that are recommended ineligible or undetermined. Alabama Power will determine any effects and mitigation for historic properties through consultation with the SHPO and applicable tribes[67].

[67] Alabama Power revised the number of cultural sites (total, eligible, and ineligible or undetermined) to accurately reflect the Revised Cultural Resources Table based on FERC's August 29, 2022 Additional Information Request. The SHPO concurredwith the revisions on October 28, 2022.

15.1.2 Lake Harris

15.1.2.1 Discovery Measures and Identified Cultural Resources

An initial review of the Alabama Cultural Resources Online Database, housed at OAR and consisting of the National Archaeological Database Bibliography, ASSF (OAR 2017) and the Alabama Phase I Surveys Website (OAR 2014) identified 29 previous cultural surveys and over 300 sites [68] within the Lake Harris Project Area.

From these sites within the Lake Harris Project Area, Alabama Power worked with the SHPO, FERC, and applicable tribes to identify 101 sites[69] in the Lake Harris Project Area for a preliminary assessment. Alabama Power discussed these sites with stakeholders on May 22, 2019, July 9, 2019, November 6, 2019, and May 28, 2020. This assessment did not include systematic shovel testing. It was intended to identify sites that were originally mis-plotted, that are clearly deflated beyond the potential to retain intact cultural deposits, lay below the winter drawdown and are inaccessible year-round, or that have been subjected to alteration that has negated their potential to contain intact cultural deposits (e.g., developed). After the preliminary assessment, a total of 52 sites which appeared to retain integrity were further investigated. Results from the investigation of these 52 sites are presented with the HPMP in "A Cultural Resources Assessment of Select Sites on the Alabama Power Company Lands in the R.L. Harris Reservoir in Randolph County".

Currently, of the 338 sites within the Lake Harris Project Boundary, there are 22 cultural resources sites that are recommended eligible for listing in the NRHP. All of the eligible cultural resource's sites are located in the Harris Project Boundary. In addition, 316 cultural resources sites are recommended ineligible or undetermined. Alabama Power will

[68] The 2018 Harris Pre-Application Document identified 16 previous cultural resources surveys and 327 sites within the Lake Harris Project Area. In March 2019, Alabama Power presented stakeholders with a revised list of 330 archeological sites in the Lake Harris Project Area. The "A Cultural Resources Assessment Of Select Sites On The Alabama Power Company Lands In The R.L. Harris Reservoir In Randolph County" report lists 29 previously conducted Phase I surveys within a one-mile radius of the survey area.

[69] Initially 96 sites were identified for a preliminary assessment, which included sites identified by the Muscogee (Creek) Nation in their August 16, 2019 letter. Later the Muscogee (Creek) Nation requested the addition of a few other sites for a total of 101 sites.

determine effects and mitigation for historic properties through consultation with the SHPO and applicable tribes[70].

15.1.3 Tallapoosa River Downstream of Harris Dam

15.1.3.1 Discovery Measures and Identified Cultural Resources

Alabama Power worked with OAR to identify 19 cultural sites in the Tallapoosa River downstream of Harris Dam through Horseshoe Bend[71]. Of the 19 sites in the Tallapoosa River, six are recommended eligible for listing or listed in the NRHP, four are recommended ineligible, and nine have undetermined NRHP eligibility.

Of the 19 sites, a primary point of interest in the area downstream of Harris Dam is the Miller Bridge Piers and Abutments. The Miller Bridge Piers and Abutments were built in 1908 and was once the longest covered bridge in the United States at 600-feet in length. It has become recognized as a significant cultural resource associated with Horseshoe Bend National Military Park and, as such, the NPS requested specific consideration of the resource be taken regarding potential impacts from downstream flows. The remnants of the bridge include abutments on the left and right banks of the Tallapoosa River, as well as four stone and masonry piers within the river that are constantly affected by the flow of the river, as the piers stand on the riverbed.

Of the 19 resources in the Tallapoosa River, 6 are recommended eligible for listing in the NRHP, 4 are recommended ineligible, and 9 are undetermined as regards their NRHP eligibility. Of the eligible cultural resources, one is owned by Alabama Power but is not part of the Harris Project Boundary. The others are owned by private landowners or the NPS. Alabama Power will determine effects and mitigation for historic properties in the Harris Project Boundary through consultation with the SHPO and applicable tribes. In addition, Alabama Power is consulting with the NPS regarding the ownership, effects, and mitigation for the Miller Bridge Piers and Abutments.

[70] Alabama Power revised the number of cultural sites (total, eligible, and ineligible or undetermined) to accurately reflect the Revised Cultural Resources Table based on FERC's August 29, 2022 Additional Information Request. The SHPO concurredwith the revisions on October 28, 2022.

[71] One of the 19 downstream sites is located within the Harris Project Boundary, however, many of these resources are on private property and not within Alabama Power's jurisdiction.

15.2 Environmental Analysis

Alabama Power conducted relicensing studies and associated analyses that pertain to effects on cultural resources. Those analyses are presented in the following reports.

- Inadvertent Discovery Plan
- Traditional Cultural Properties Identification Plan
- Final Area of Potential Effects Report
- Final Downstream Release Alternatives Phase 2 Study Report
- Final Operating Curve Change Feasibility Analysis Phase 2 Study Report
- Draft Historic Properties Management Plan

Table 15-1 includes the proposed operations and PME measures that may affect cultural resources at Skyline, Lake Harris, and the Tallapoosa River Downstream of Harris Dam. Not all operations or PME measures apply to each geographic area of the Harris Project; therefore, the analysis of beneficial and adverse effects will be presented accordingly. A complete list of Alabama Power's operations and PME measures is located in Table 5-2.

Table 15-1 Proposed Operations and PME Measures that May Affect Cultural Resources

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT CULTURAL RESOURCES
• Continue to operate the Harris Project according to the existing operating curve. • Continue to operate in high flow conditions according to the USACE-approved flood control procedures in the Harris Water Control Manual (USACE 2022). • Continue daily peak-load operations. • Continue operating in accordance with ADROP (Alabama Power Company 2016) to address drought management.
• Install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs with a generating capacity of approximately 2.5 MW. Based on the preliminary design, the continuous minimum flow unit would require a new reinforced concrete addition located on the outside of the Unit 1 side (east side) of the powerhouse. The new steel-lined penstock would penetrate the existing Unit 1 penstock for source water and discharge below the tailrace water surface. • Develop drought operations procedures for the minimum flow. • Operate in accordance with Green Plan (baseline) during CMF unit outages and outages where the water supply to the Unit 1 penstock is affected.

Proposed Operations and PME Measures that May Affect Cultural Resources

- Finalize and implement a Shoreline Management Plan (SMP) (Alabama Power 2022c) for Lake Harris.
    - ❖ Incorporate proposed changes in land use classifications (including reclassifying the botanical area at Flat Rock Park from recreation to Natural/Undeveloped).
    - ❖ Continue to encourage the use of alternative bank stabilization techniques other than seawalls.
    - ❖ Continue implementing the Dredge Permit Program (Appendix A to the SMP).
    - ❖ Continue implementing the Water Withdrawal Policy (Kleinschmidt 2018b).
    - ❖ Continue implementing a shoreline classification system to guide management and permitting activities (Appendices C and D of the SMP).
    - ❖ Continue the requirements of a scenic easement for the purpose of protecting scenic and environmental values.
    - ❖ Continue the use of a "sensitive resources" designation in conjunction with shoreline classifications on Harris Project lands managed for the protection and enhancement of cultural resources, wetlands, and threatened and endangered species.
    - ❖ Continue implementing a shoreline compliance program and shoreline permitting program.
    - ❖ Continue to encourage the adoption of shoreline best management practices (BMPs), including BMPs to maintain and preserve naturally vegetated shorelines, to preserve and improve the water quality of the Harris Project's reservoir, and to control soil erosion and sedimentation (Appendix E of the SMP).
        - o Plant native trees, shrubs, and flowers for landscaping and gardens in order to reduce watering as well as chemical and pesticide use.
        - o Preserve or establish a naturally managed vegetative filter strip along the shoreline to keep clearing of native trees and vegetation to a minimum. Alabama Power recommends a buffer set back of at least 15 feet measured horizontally from the full pool elevation.
        - o Plant a low maintenance, slow growing grass that is recommended for your soil conditions and climate.
        - o Maintain the grass as high as possible in order to shade out weeds and improve rooting so less fertilizing and watering are required.
        - o Avoid dumping leaves or yard debris on or near the shoreline.
    - ❖ Provide an update to the SMP every 10 years.
    - ❖ Schedule for revising and implementing the SMP.
        - o Within 6 months of license issuance, Alabama Power will revise or update the SMP as needed, in consultation with appropriate resource agencies, and file with FERC for approval.

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT CULTURAL RESOURCES
• Implement proposed land additions to the Harris Project Boundary and incorporate into Exhibit G.
• Implement proposed land removals from the Harris Project Boundary and incorporate into the Exhibit G.
• Finalize and implement a Recreation Plan (Alabama Power 2022d). ❖ Continue to operate and maintain 11 Harris Project recreation sites. ❖ Remove Wedowee Marine South as a Harris Project recreation site and request approval of entire facility as non-project use. ❖ Install and maintain recreation (canoe/kayak) access below Harris Dam within the Harris Project Boundary. ❖ Provide an additional recreation site on Lake Harris to include a day use park (swimming, picnicking, and boat ramp). ❖ Implement Barrier-Free Evaluation Program at existing recreation sites. ❖ Provide descriptions of the Project recreation sites including maps. ❖ Provide a Recreation Plan update to FERC every 10 years including monitoring protocols and proposed methodologies for sampling. ❖ Schedule for finalizing and implementing the Recreation Plan. o Within 6 months of license issuance, Alabama Power will revise the Recreation Plan, as needed, in consultation with appropriate resource agencies, and file with FERC for approval.
• Finalize and implement a Historic Properties Management Plan (HPMP (Alabama Power 2021f). ❖ Include aspects of the Traditional Cultural Properties (TCP) Identification Plan and the Inadvertent Discovery Plan (IDP). ❖ Provisions for training with appropriate Alabama Power personnel regarding looting. In addition, Alabama Power will explore options for training for indications of looting beyond Alabama Power personnel and/or its contactors. ❖ Include strategies for mitigation for potential adverse effects to historic properties within the Harris Project Area of Potential Effects (APE) ❖ Provisions for the NRHP eligibility evaluation of Harris Dam facilities in 2033. ❖ Develop a BMP brochure (printed and online editions) for managing cultural resources on private lands. ❖ Develop mitigation procedures for any adverse effects of Harris Project operations on the Miller Bridge Piers and Abutments, as necessary, after consultation with State Historic Preservation Officer (SHPO) and NPS. ❖ Schedule for revising and implementing the HPMP.

PROPOSED OPERATIONS AND PME MEASURES THAT MAY AFFECT CULTURAL RESOURCES
o Within 6 months of license issuance, Alabama Power will revise the HPMP, as needed, in consultation with the Alabama Historical Commission (AHC) and applicable tribes, and file with FERC for approval.

15.2.1 Skyline

15.2.1.1 Historic Properties Management Plan

Alabama Power proposes to revise and implement a HPMP to govern management of historic properties in the Project's Area of Potential Effects (APE) over the term of a new license. Alabama Power consulted with the Alabama Historical Commission (AHC) and the applicable tribes pursuant to Section 106 of the NHPA (Alabama Power 2020b). The HPMP contains the elements listed below.

- Aspects of the Traditional Cultural Properties (TCP) Identification Plan (Alabama Power 2020c) and the Inadvertent Discovery Plan (IDP) (Alabama Power 2020d).
- Provisions for training with appropriate Alabama Power personnel on looting. In addition, Alabama Power will explore options for training for indications of looting beyond Alabama Power personnel and/or its contractors.
- Strategies for mitigation for potential adverse effects to historic properties within the Project APE.
- Provisions for the NRHP eligibility evaluation of Harris Dam facilities in 2033.
- Provisions to develop a BMP brochure (printed and online editions) for the managing of cultural resources on private lands.

The HPMP would include aspects of the IDP and the TCP Identification Plan, to further ensure protection of historic properties within the APE. Alabama Power's IDP establishes procedures in the event of an inadvertent discovery of any human remains and/or historic properties within the APE (Alabama Power 2020b). These procedures were developed in consultation with the Alabama SHPO, FERC, and applicable tribes (Alabama Power 2020d).

TCPs are defined by the Department of the Interior NPS as a historic property that displays significance "derived from the role the property plays in a community's historically rooted beliefs, customs, and practices" (NPS 2012). Alabama Power's TCP Identification Plan establishes procedures for identifying TCPs in the APE of the Harris Project (Alabama Power 2020b).

Alabama Power began implementing the TCP Identification Plan in April 2020. The HPMP includes strategies for mitigation for potential adverse effects to historic properties. In addition, the HPMP would assist Alabama Power in historic preservation and the management of historic properties at Skyline. Alabama Power is filing a final HPMP concurrently with the FLA.

15.2.2 Lake Harris

15.2.2.1 Continued Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. These continued operations could potentially result in adverse effects on historic properties from forces such as wind erosion, recreational activities, and vandalism at the same level as occurs under existing operations; therefore, there would be no changes to the effects on historic properties along the shoreline of the Harris Reservoir. The type and level of these effects vary depending on the location, size, and visibility of the historic properties.

15.2.2.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. The proposed continuous minimum flow would have negligible effects on Harris Reservoir elevations on average. Therefore, historic properties identified in the Lake Harris Project Boundary would not be affected by Alabama Power's proposed continuous minimum flow.

15.2.2.3 Shoreline Management Plan

Alabama Power proposes to finalize and implement a SMP for Lake Harris. The SMP would benefit historic properties in the Lake Harris Project Boundary through its specific actions that minimize erosion including continuing to encourage the use of alternative bank stabilization techniques other than seawalls and continuing to encourage the adoption of shoreline BMPs. Specifically, the following BMPs would help control soil erosion and sedimentation and benefit historic properties at Lake Harris (Alabama Power 2021b):

- Preserve or establish a naturally managed vegetative filter strip along the shoreline to keep clearing of native trees and vegetation to a minimum. Alabama Power recommends a buffer set back of at least 15 feet measured horizontally from the full pool elevation.
- Plant a low maintenance, slow growing grass that is recommended for your soil conditions and climate. Reference information can be found in Appendix E of the draft SMP.
- Maintain the grass as high as possible to shade out weeds and improve rooting so less fertilizing and watering are required.

In addition, the SMP would continue the use of a "sensitive resources" designation in conjunction with shoreline classifications on Project lands managed for the protection and enhancement of cultural resources, wetlands, and T&E species. Permitting activities in these areas, if applicable, may be highly restrictive or prohibited to avoid potential impacts to sensitive resources, such as historic properties. Alabama Power would continue to maintain current GIS data on the locations of shoreline classified as sensitive resources and would continue to require an internal environmental review for any proposed activity in these sensitive areas prior to issuance of any permit. In addition, all permits issued by Alabama Power include a condition to ensure that the permittee will cease work and contact Alabama Power immediately upon discovering archaeological (cultural resources) material.

15.2.2.4 Recreation Plan

Alabama Power proposes to continue to operation and maintain 11 Project recreation sites and to provide an additional recreation site at Lake Harris to include a day use park (swimming, picnicking, and boat ramp). This additional recreation site has been surveyed for cultural resources. Implementing the HPMP in coordination with the Recreation Plan would follow the TCP Consultation Protocol and have a beneficial effect on providing cultural resource protection on new recreation construction.

15.2.2.5 Historic Properties Management Plan

Alabama Power proposes to finalize and implement a HPMP to govern management of historic properties in the Project's APE over the term of a new license. The HPMP includes strategies for mitigation for potential adverse effects to historic properties eligible or potentially eligible for the National Register at Lake Harris The HPMP includes provisions for training with appropriate Alabama Power personnel on looting at Lake Harris and Alabama Power will explore options for training for indications of looting beyond Alabama Power personnel and/or its contractors. The HPMP also includes provisions to develop a BMP brochure (printed and online editions) for the managing of cultural resources on private lands. In addition, the HPMP includes provisions to determine the NRHP eligibility of the Harris powerhouse and dam. The Harris Dam facilities, completed in 1983, are less than 50 years of age, and, therefore, are not yet eligible for listing to the NRHP. When the Harris Dam facilities reach the minimum age criterion for listing in the NRHP (in 2033), the facilities would be evaluated for significance and determination for NRHP eligibility (NPS 1997).

15.2.3 Tallapoosa River Downstream of Harris Dam

15.2.3.1 Continued Operations (Normal, Flood, Drought)

Alabama Power proposes to continue operating the Harris Project during daily peak-load periods according to the existing operating curve, flood control procedures, and ADROP. Ongoing operations would result in the daily fluctuation in water surface elevation as measured at Horseshoe Bend, as occurs under baseline operations. Therefore, no change in potential impacts to historic properties in the Tallapoosa River downstream of Harris Dam is expected. Alabama Power would develop mitigation procedures for any adverse effects of Project operations on the Miller Bridge Piers and Abutments, as necessary, following consultation with SHPO and NPS.

15.2.3.2 Continuous Minimum Flow

Alabama Power proposes to install, operate, and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam. During the Downstream Release Alternatives Study, existing information (elevation data [LiDAR], aerial imagery, and topographic data), the HEC-RAS model, and expert opinions were used to qualitatively evaluate the effect of the proposed continuous minimum flow on specific cultural resources downstream of Harris Dam.

In addition, Alabama Power commissioned OAR to provide quantitative analysis on the impact of different flows to cultural resources downstream of Harris Dam to Horseshoe Bend. OAR used the flow stage data provided by the HEC-RAS model and LiDAR to produce a 3-foot digital elevation model (DEM). OAR then used the DEM to determine cultural resources that are subject to inundation and the downstream alternative releases where fluctuation, wave action, and flowage had the potential to remove sediment and result in various forms of adverse effect. Appendix E of the *Final Downstream Release Alternatives Phase 2 Study Report* (filed as privileged) includes a spreadsheet showing modeled elevation data for each of the 19 cultural resources sites downstream of Harris Dam to Horseshoe Bend and associated maps. The elevation data shows each site under the analyzed flow scenarios and the minimum/maximum site elevation. These elevations were used to show the percent of time each site is underwater with each of the downstream release alternatives.

The inundation of cultural resources below Harris Dam is considered differently than those above the dam. Cultural resources inundated within the reservoir do not experience the same effects as those along the river channel below the dam where the flow velocity of the river is greater. In the reservoir, inundation can serve as a protective measure for sites, removing them from some potential impacts caused by recreational activity, looting, erosion from exposure, wave action, and fluctuating water levels. However, below the dam, inundation more often results in scouring and removal of overlying protective vegetation and sediments (Alabama Power and Kleinschmidt 2022b).

As presented in the *Final Downstream Release Alternatives Phase 2 Report*, the 19 cultural resource sites on the Tallapoosa River downstream of Harris Dam are inundated 49.4 percent of the time under Green Plan (baseline). Under the proposed continuous minimum flow, 11 of the cultural resources were inundated for a similar amount of time compared to Green Plan (baseline) (Alabama Power and Kleinschmidt 2022b). Inundation compared to Green Plan (baseline) at the eight affected sites only differed by an increase in inundation 1.9 percent of the time at 300 cfs continuous minimum flow. This increase in inundation at these eight sites is minimal. Alabama Power’s proposal to provide a continuous minimum flow of approximately 300 cfs would have similar impacts to cultural resources downstream of Harris Dam as those of Green Plan (baseline) operations and would therefore not be expected to cause new or additional adverse impacts to cultural resources.

15.2.3.2.1 Recreation Plan

Alabama Power proposes to construct a new recreation access area for canoe/kayak launch at the existing Harris Tailrace Fishing Pier. This additional launch access would have a beneficial effect by increasing recreational amenities and opportunities on the Tallapoosa River. This additional recreation access site has been surveyed for cultural resources. Implementing the HPMP in coordination with the Recreation Plan would ensure that Alabama Power follows the TCP Consultation Protocol and have a beneficial effect on providing cultural resource protection on the new canoe/kayak launch.

15.2.3.3 Historic Properties Management Plan

The HPMP would assist Alabama Power in historic preservation and the management of historic properties in the Tallapoosa River downstream of Harris Dam, specifically through developing a BMP brochure (printed and online editions) for managing cultural resources on private lands. In addition, Alabama Power would develop mitigation procedures for any adverse effects of Project operations on the Miller Bridge Piers and Abutments, as necessary, following consultation with SHPO and NPS.

15.3 Unavoidable Adverse Impacts

15.3.1 Skyline

The HPMP allows for consideration and appropriate management of effects from Harris Project operations to historic properties, per the APE. The HPMP, however, does not prevent all adverse impacts to eligible or potentially eligible historic properties. The HPMP includes methods as to how an assessment of effects and resolution to adverse effects on historic properties will be achieved.

15.3.2 Lake Harris

The HPMP allows for consideration and appropriate management of effects from Harris Project operations to historic properties. The HPMP, however, does not prevent all adverse impacts to eligible or potentially eligible historic properties. The HPMP includes methods as to how an assessment of effects and resolution to adverse effects on historic properties will be achieved.

15.3.3 Tallapoosa River Downstream of Harris Dam

The HPMP allows for consideration and appropriate management of effects from Harris Project operations to historic properties. The HPMP, however, does not prevent all adverse impacts to eligible or potentially eligible historic properties. The HPMP includes methods as to how an assessment of effects and resolution to adverse effects on historic properties will be achieved.

15.4 Recommended PME Measures Not Adopted

In response to the PLP, resource agencies, NGOs, and other stakeholders recommended specific PME measures that may affect cultural resources. Some of the recommended PME measures are incorporated in Alabama Power's proposal. This section briefly describes the stakeholder recommended PME measures that Alabama Power is not including in its relicensing proposal.

15.4.1 Minimum Flow

The NPS commented that it is unclear whether Alabama Power's minimum flow proposal would help alleviate or reduce the impact of erosion on cultural resources in the Tallapoosa River downstream of Harris Dam and recommended that Alabama Power consider minimum flows above 300 cfs. Table 5-1 provides information on minimum flows above 300 cfs continuous minimum flow. Also, the conceptual design for the proposed continuous minimum flow of 300 cfs indicates unit size would be limited by the space available in the powerhouse; therefore, the amount of flow through the unit would also be limited.

16.0 ECONOMIC ANALYSIS

16.1 Cost and Value of Operating and Maintaining the License

Alabama Power proposes to modify the existing powerhouse to include a new minimum flow unit to provide an approximately 300 cfs continuous minimum flow. The overall cost and value of the licensed Harris Project is presented in Exhibit D of this FLA.

16.2 Costs of Proposed Protection, Mitigation and Enhancement Measures

Table 16-1 provides a summary of estimated costs of Alabama Power's proposed PME measures, including estimated total capital costs, estimated total operation and maintenance costs, and annual operation and maintenance costs. PME measures proposed in this FLA will result in approximately $43,420,000 in capital costs, approximately $37,750,000 total operations and maintenance costs, and an annual operations and maintenance cost of $1,258,333 at the Harris Project.

Costs associated with continued operation of the Project, including PME measures, are provided in Exhibit D. Costs for the minimum flow provided in Table 16-1 do not reflect energy gains or losses.

Table 16-1 Estimated Costs of Proposed Harris Project PME Measures

PM&E Measure	Total Capital	Total O&M Over 30 Years	Annual O&M
Continue operating in accordance with ADROP to address drought management	$ 0	$ 0	$ 0-
Install, operate and maintain a Francis-type minimum flow unit to provide a continuous minimum flow of approximately 300 cfs in the Tallapoosa River below Harris Dam and with a generating capacity of approximately 2.5 MW. Final best gate flow would be determined following unit installation and performance testing.	$ 37,900,000	$2,250,000	$ 75,000
Develop drought operations procedures for the minimum flow	$ 25,000	$ 0	$ 0
Develop and implement a Project Operations and Flow Monitoring Plan to monitor compliance with 1) Project Operation and Water Level Management; 2) flood control operations 3) drought management; and 4) flow releases from the Harris Dam	$ 100,000	$ 300,000	$ 10,000
Develop and implement an Aquatic Resources Monitoring Plan	$ 20,000	$ 390,000	$ 13,000
Develop and implement a Water Quality Monitoring Plan consistent with the 401 Water Quality Certification	$ 65,000	$ 6,000,000	$ 200,000
Continue operating the existing aeration system	$ 0	$ 0	$ 0
Incorporate an aeration system in the design of the new continuous minimum flow unit	$ 0	$ 0	$ 0
Continue to maintain the skimmer weir at the highest setting	$ 0	$ 0	$ 0

PM&E Measure	Total Capital	Total O&M Over 30 Years	Annual O&M
When conditions exist, and upon request from ADCNR, hold Harris Reservoir water levels constant or slightly increasing for a 14-day period for spring spawning	$ 0	$ 0	$ 0
Provide fish habitat improvements by adding habitat enhancements to Harris Reservoir	$ 0	$ 900,000	$ 30,000
Finalize and implement a Nuisance Aquatic Vegetation and Vector Control Program	$ 0	$ 1,200,000	$ 40,000
Develop and implement an Erosion Monitoring Plan	$ 20,000	$ 300,000	$ 10,000
Finalize and implement a Wildlife Management Plan (WMP) for Lake Harris and Skyline	$ 1,800,000	$ 11,295,000	$ 376,500
Finalize and implement a Shoreline Management Plan (SMP) for Lake Harris	$ 0	$ 5,355,000	$ 178,500
Implement proposed land additions to the Project Boundary and incorporate into Exhibit G	$ 0	$ 0	$ 0
Implement proposed land removals from the Project Boundary and incorporate into the Exhibit G	$ 0	$ 0	$ 0
Finalize and implement a Recreation Plan.	$ 3,490,000	$ 8,370,000	$ 279,000
Finalize and implement a Historic Properties Management Plan (HPMP)	$ 0	$ 1,390,000	$ 46,333

17.0 CONSISTENCY WITH COMPREHENSIVE PLANS

Pursuant to Section 10(a) (2) of the Federal Power Act, Alabama Power has identified the following comprehensive plans as those whose mandates and regulations are applicable to the Project.

17.1 Alabama

- Alabama Department of Conservation and Natural Resources. 1990. Wildlife lands needed for Alabama. Montgomery, Alabama. October 1990.
- Alabama Department of Economic and Community Affairs. 2008. Alabama Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2008-2012. Montgomery, Alabama.64F[72]
- Alabama Department of Conservation and Natural Resources. Undated. Alabama's comprehensive wildlife conservation strategy. Montgomery, Alabama.

17.2 United States

- Gulf States Marine Fisheries Commission. 2006. The striped bass fishery of the Gulf of Mexico, United States: a regional management plan. Ocean Springs, Mississippi. March 2006.
- National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.
- U.S. Fish and Wildlife Service. 1990. Gulf coast joint venture plan: A component of the North American waterfowl management plan. June 1990.
- U.S. Fish and Wildlife Service. 2000. Recovery plan for the Mobile River Basin aquatic ecosystem. Department of the Interior. Daphne, Alabama. November 17, 2000.
- U.S. Fish and Wildlife Service. Undated. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.

[72] Note that the SCORP has been updated for the years 2013-2018, but the updated document is not on FERC's list of comprehensive plans.

- U.S. Fish and Wildlife Service. 2006. Aquatic resources management plan for the Alabama River Basin. Department of the Interior. Daphne, Alabama. May 17, 2006.
- U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American Waterfowl Management Plan. Department of the Interior. Environment Canada. May 1986.
- U.S. Fish and Wildlife Service. National Marine Fisheries Service. Gulf States Marine Fisheries Commission. 1995. Gulf Sturgeon Recovery/Management Plan. Atlanta, Georgia. September 15, 1995.

Based on a review of these plans, Alabama Power has determined that proposed Project operations and enhancements will be consistent with the above listed comprehensive plans.

The following plans do not have a nexus to the Project and were not reviewed.

- National Marine Fisheries Service. 1991. Final Recovery Plan for the Humpback Whale. Silver Spring, Maryland. November 1991.
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- National Marine Fisheries Service. 2010. Recovery Plan for the Fin Whale. Silver Spring, Maryland. July 2010.
- National Marine Fisheries Service. 2010. Recovery Plan for the Sperm Whale. Silver Spring Maryland. December 2010.
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- Tennessee Valley Authority. Division of Water Control Planning. 1965. Development of the water resources of the Bear Creek watershed. Knoxville, Tennessee. May 1965.
- Tennessee Valley Authority. Division of Water Control Planning. 1967. Supplemental Report - Development of the water resources of the Bear Creek watershed. Knoxville, Tennessee. October 1967.

- U.S. Fish and Wildlife Service. 1988. Great Lake and Northern Great Plains Piping Plover recovery plan. Department of the Interior, Twin Cities, Minnesota. May 12, 1988.

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APPENDIX A

ACRONYMS AND ABBREVIATIONS

APPENDIX B

PRELIMINARY LICENSING PROPOSAL STAKEHOLDER COMMENTS

APPENDIX C

GEOLOGY AND SOILS

APPENDIX D

TERRESTRIAL AND WILDLIFE

APPENDIX E

THREATENED & ENDANGERED SPECIES

Appendix F

Recreation

APPENDIX G

PROJECT LANDS

Appendix H

Aquatic Resources

APPENDIX A

ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

#

150CMF	150 cubic feet per second continuous minimum flow
150CMF+GP	150 cubic feet per second continuous minimum flow + Green Plan
300CMF	300 cubic feet per second continuous minimum flow
300CMF+GP	300 cubic feet per second continuous minimum flow + Green Plan
600CMF	600 cubic feet per second continuous minimum flow
600CMF+GP	600 cubic feet per second continuous minimum flow + Green Plan
800 CMF	800 cubic feet per second continuous minimum flow
800CMF+GP	800 cubic feet per second continuous minimum flow + Green Plan

A

A&I	Agricultural and Industrial
ACAMP	Alabama's Coastal Area Management Program
ACFWRU	Alabama Cooperative Fish and Wildlife Research Unit
ACT	Alabama-Coosa-Tallapoosa (River Basin)
ADCNR	Alabama Department of Conservation and Natural Resources
ADEM	Alabama Department of Environmental Management
ADROP	Alabama-ACT Drought Response Operations Plan
Alabama Power	Alabama Power Company
ALEA	Alabama Law Enforcement Agency
ALNHP	Alabama Natural Heritage Program
AHC	Alabama Historical Commission
APE	Area of Potential Effects
ARM	Aquatic Resources Monitoring Plan
ATV	All-terrain Vehicle
ASSF	Alabama State Site File
AWW	Alabama Water Watch

B

BCC	Birds of Conservation Concern
BESS	Battery Energy Storage System
BLM	U.S. Bureau of Land Management
BMP	Best Management Practice

C

°C	Degrees Celsius
Cahaba Consulting	Cahaba Consulting, LLC
CEQ	Council on Environmental Quality
C.F.R.	Code of Federal Regulations
cfs	Cubic Feet per Second
CMF	Continuous Minimum Flow
CWA	Clean Water Act
CY	Cubic yards
CZMA	Coastal Zone Management Act

D

DEM	Digital Elevation Model
DIL	Drought Intensity Level
DSF	Day second feet

E

ECOS	Environmental Conservation Online System
EFH	Essential Fish Habitat
EPRI	Electric Power Research Institute
EPT	Ephemeroptera, Plecoptera, or Trichoptera Orders
EMG	Electromyogram
EMP	Erosion Monitoring Plan
ESA	Endangered Species Act

F

°F	Degrees Fahrenheit
F&W	Fish and Wildlife
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
Ft	Feet

G

GIS	Geographic Information System
GP	Green Plan (baseline)
GPS	Global Positioning System
GSA	Geological Survey of Alabama

H

Harris Dam	R.L. Harris Dam
Harris Project	R.L. Harris Hydroelectric Project
Harris WCM	Harris Water Control Manual
HAT	Harris Action Team
HBCT	Harold Banks Canoe Trail
HDSS	High Definition Stream Survey
HEC-RAS	Hydrologic Engineering Center's River Analysis System
HEC-ResSim	Hydrologic Engineering Center's Reservoir System Simulation
Horseshoe Bend	Horseshoe Bend National Military Park
hp	Horsepower
HPMP	Historic Properties Management Plan

I

IBI	Index of Biological Integrity
IDP	Inadvertent Discovery Plan
ILP	Integrated Licensing Process
IPaC	Information Planning and Conservation
ISR	Initial Study Report
IVM	Integrated Vegetation Management

K

Kleinschmidt	Kleinschmidt Associates
kV	Kilovolt
kVA	Kilovolt-amp

L

LiDAR	Light Detection and Ranging
LWF	Limited Warm-water Fishery

M

M&I	Municipal and Industrial
mgd	Million Gallons per Day
mg/L	Milligrams per liter
µg/L	Micrograms per liter
µs/cm	Microsiemens per centimeter
mL	Milliliters
ModGP	Modified Green Plan
MOU	Memorandum of Understanding
MRLC	Multi-Resolution Land Characteristics
msl	Mean Sea Level
MW	Megawatt
MWh	Megawatt Hour

N

NEPA	National Environmental Policy Act
NGO	Non-governmental Organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPS	National Park Service
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NRI	National Rivers Inventory
NTU	Nephelometric Turbidity Unit
NWI	National Wetlands Inventory

O

OAR	Office of Archaeological Resources
OAW	Outstanding Alabama Water
ORV	Off-road Vehicle
OWR	Office of Water Resources

P

PA	Programmatic Agreement
PAD	Pre-Application Document
PLP	Preliminary Licensing Proposal
PME	Protection, Mitigation, and Enhancement
POFM	Project Operations and Flow Monitoring Plan
PreGP or PGP	Pre-Green Plan
Project	R.L. Harris Hydroelectric Project
PWS	Public Water Supply

R

RCW	Red-cockaded Woodpecker
RM	River Mile
RV	Recreational Vehicle

S

S	Swimming
SH	Shellfish Harvesting
SHPO	State Historic Preservation Office
Skyline WMA	James D. Martin-Skyline Wildlife Management Area
SMP	Shoreline Management Plan
SMZ	Streamside Management Zone
SPD	Study Plan Determination

T

T&E	Threatened and Endangered
TCP	Traditional Cultural Properties
TMDL	Total Maximum Daily Load
Trutta	Trutta Environmental Solutions
TVA	Tennessee Valley Authority

U

USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USR	Updated Study Report

W

WCM	Water Control Manual
WMP	Wildlife Management Plan
WQC	Water Quality Certification
WSGB	Wedowee Water, Sewer, and Gas Board

APPENDIX B

LIST OF COMMENTERS ON ALABAMA POWER'S PRELIMINARY LICENSING PROPOSAL

List of Commenters on Alabama Power’s Preliminary Licensing Proposal (PLP)		
Date	**Accession No.**	**Commenter**
9/1/2021	20210901-5154	Lavonne Randall
9/3/2021	20210903-5012	Jeff Muscarella
9/7/2021	20210907-5002	Kraig Kasler
9/6/2021	20210907-5003	Pamela Graben
9/7/2021	20210907-5098	James Rice
9/7/2021	20210907-5101	Richard Burnes
9/7/2021	20210907-5106	Nancy Burnes
9/7/2021	20210907-5171	Casey Patrick
9/8/2021	20210908-5056	Jimmy Traylor
9/9/2021	20210909-5039	Charles Cook
9/10/2021	20210910-5002	Robin Bruton
9/12/2021	20210913-5006	William Coats
9/13/2021	20210913-5146	Janet Blalock
9/13/2021	20210913-5154	Tut Smith
9/13/2021	20210913-5155	Mandy Forrester
9/13/2021	20210913-5156	Carl Farmer
9/13/2021	20210913-5166	Kelly Caldwell
9/13/2021	20210913-5191	Bart Sims
9/13/2021	20210913-5192	Derek Witcher
9/13/2021	20210913-5194	Glen Canary
9/13/2021	20219013-5201	Melanie Yearwood
9/13/2021	20210913-5249	Terry Cotina
9/13/2021	20210914-5003	Alison Cerovsky
9/13/2021	20210914-5004	Lisa Cook
9/13/2021	20210914-5005	Robyn Stone
9/13/2021	20210914-5007	Kevin McCarty
9/13/2021	20210914-5008	John & Dianne Singletary

9/13/2021	20210914-5009	Sonja Baker
9/13/2021	20210914-5010	Jarett Board
9/13/2021	20210914-5011	Melissa Witcher
9/13/2021	20210914-5012	Vincent Russo
9/13/2021	20210914-5013	Mike Farrar
9/13/2021	20210914-5014	Kim Farrar
9/13/2021	20210914-5015	David Brookes
9/13/2021	20210914-5016	Brian Wells
9/14/2021	20210914-5017	Savannah Taylor
9/14/2021	20210914-5018	Wayne Fotf
9/14/2021	20210914-5019	Howard Avery
9/14/2021	20210914-5057	William Ford
9/14/2021	20210914-5061	Michael Ford
9/14/2021	20120914-5107	Ryan Gunnin
9/14/2021	20120914-5121	Haleigh Ford
9/14/2021	20120914-5129	Jeff Helms
9/14/2021	20210915-5001	Lisa Morgan
9/14/2021	20210915-5002	John Morgan
9/14/2021	20210915-5003	Jeff Southern
9/14/2021	20210915-5004	David Stanford
9/14/2021	20210915-5006	Robert Schwartz
9/15/2021	20210915-5096	David Dewinter
9/15/2021	20210915-5135	Roy Lewis
9/16/2021	20210916-5000	Linda Ball
9/16/2021	20210916-5055	Jimmy Traylor
9/16/2021	20210916-5073	Kristin Barnes
9/19/2021	20210920-5001	Cindy Leake
9/19/2021	20210920-5002	Diana Keller
9/20/2021	20210920-5055	Paul Trammell

9/20/2021	20210920-5096	Amy Shay
9/20/2021	20210921-5000	Dennis Barr
9/20/2021	20210921-5001	Larry Styes
9/21/2021	20210922-5002	Dennis Yearwood
9/22/2021	20210922-5095	Terry Kemp
9/23/2021	20210923-5009	Michael Whorton
9/23/2021	20210923-5012	John Culp
9/23/2021	20210923-5018	Nancy Hyde
9/23/2021	20210923-5030	Dan Christensen
9/23/2021	20210923-5033	Spencer Kollas
9/23/2021	20210923-5037	Roger Graben
9/23/2021	20210923-5038	Lisa Keet
9/23/2021	20210923-5047	Cindy Stanford
9/23/2021	20210923-5050	Jonl Steinke
9/23/2021	20210923-5068	Julie Durrance
9/23/2021	20210923-5084	Carlton Amason
9/23/2021	20210923-5086	Elizabeth Yother
9/23/2021	20210923-5090	Stephen West
9/23/2021	20210923-5107	Robert Helton
9/23/2021	20210923-5110	Anne Jarvis
9/23/2021	20210923-5128	Janey Patty
9/23/2021	20210924-5000	Kristin Barnes
9/23/2021	20210924-5001	Steve Jenkins
9/23/2021	20210924-5002	Scott Edwards
9/23/2021	20210924-5003	Monika Lunsford
9/24/2021	20210924-5048	Sonja Baker
9/24/2021	20210924-5049	Nancy Wallace
9/24/2021	20210924-5085	Jeffrey Wright
9/24/2021	20210924-5091	Kenneth Montgomery

9/24/2021	20210924-5101	Jim Dudley
9/24/2021	20210924-5103	Sonja Holloman
9/24/2021	20210924-5148	Phillip Rhyne
9/24/2021	20210927-5000	Sally Germany
9/24/2021	20210927-5001	Kevin Campbell
9/24/2021	20210927-5002	Daniel Thomas
9/24/2021	20210927-5003	Ray Stedwell
9/25/2021	20210927-5005	Cary Reno
9/25/2021	20210927-5006	Ryan West
9/25/2021	20210927-5007	James Bankston
9/25/2021	20210927-5008	John Britt
9/25/2021	20210927-5009	Chris Lunsford
9/25/2021	20210927-5010	Norman Patty
9/25/2021	20210927-5018	Mildred Hill
9/25/2021	20210927-5019	Kathy Nixon
9/25/2021	20210927-5020	Tammy Lovvorn
9/25/2021	20210927-5021	Maria Smith
9/25/2021	20210927-5022	Jeffrey Lawler
9/26/2021	20210927-5023	Rick Benefield
9/26/2021	20210927-5024	Charles Denman
9/26/2021	20210927-5025	Phillip Nixon
9/26/2021	20210927-5026	David Flohr
9/26/2021	20210927-5027	Barbara Owen
9/26/2021	20210927-5028	Bradley Mitchell
9/26/2021	20210927-5029	Emily Berger
9/26/2021	20210927-5030	Robert Berger
9/27/2021	20210927-5034	William Julian
9/27/2021	20210927-5039	Tracy Dickerson
9/27/2021	20210927-5044	Michael Belek

9/27/2021	20210927-5047	Larry Lanier
9/27/2021	20210927-5050	Barry Smith
9/27/2021	20210927-5052	Matthew Stryker
9/27/2021	20210927-5059	Leisel Caldwell
9/27/2021	20210927-5067	John Del Pilar
9/27/2021	20210927-5069	Rachel Moon
9/27/2021	20210927-5092	US Fish and Wildlife Service (USFWS)
9/27/2021	20210927-5102	Todd Kellar
9/27/2021	20210927-5106	Douglas Bonner
9/27/2021	20210927-5114	Douglas Blalock
9/27/2021	20210927-5122	Jennifer Cackett
9/27/2021	20210928-5000	Mark Christopher
9/27/2021	20210928-5001	Chris Hulsey
9/27/2021	20210928-5002	Roger McNeilm
9/27/2021	20210928-5003	David Greene
9/27/2021	20210928-5004	Michael Edwards
9/28/2021	20210928-5012	Alabama Department of Environmental Management (ADEM)
9/29/2021	20210929-5002	James Wendling
9/29/2021	20210929-5023	Tim Riley
9/28/2021	20210928-5182	Alabama Department of Conservation and Natural Resources (ADCNR)
9/28/2021	20210928-5043	Leslie Riley
9/29/2021	20210929-5083	Thomas Gordan
9/29/2021	20210929-5090	National Park Service (NPS)
9/29/2021	20210929-5101	George Diamond
9/29/2021	20210929-5117	Carol Knight
9/29/2021	20210930-5000	Lynn Stewart
9/29/2021	20210930-5002	Steve Traylor
9/29/2021	20210930-5003	Jonathan Belek

9/29/2021	20210930-5004	Sandra Belek
9/29/2021	20210930-5005	Mickey Lyons
9/30/2021	20210930-5008	Maria Brindle
9/30/2021	20210930-5016	Joe Whorton
9/30/2021	20210930-5124	Edgar Satterthwait
9/30/2021	20210930-5130	Marjorie Satterthwait
9/30/2021	20210930-5135	George Bishop
9/30/2021	20210930-5189	Susan Denman
9/30/2021	20211001-5006	John Hall
9/30/2021	20211001-5007	Albert Eiland
10/1/2021	20211001-3009	Federal Energy Regulatory Commission (FERC)
10/1/2021	20211001-5039	Drew Morgan
10/1/2021	20211001-5168	Donna Matthews
10/1/2021	20211001-5291	Albert Eiland
10/1/2021	20211001-5323	Alabama Rivers Alliance (ARA)
10/1/2021	20211001-5341	Donna Matthews
10/4/2021	20211004-5101	Environmental Protection Agency (EPA)
10/5/2021	20210930-5349	Albert Eiland
10/5/2021	20211005-5097	Steven Barnes
10/7/2021	20211007-5118	Sherry Teal

APPENDIX C

GEOLOGY AND SOILS

1. PHYSIOGRAPHY OF THE SKYLINE PROJECT VICINITY
2. PHYSIOGRAPHIC DISTRICTS OF THE CUMBERLAND PLATEAU - SKYLINE
3. SOIL TYPES LOCATED IN THE SKYLINE VICINITY
4. SOIL TYPES WITHIN THE SKYLINE PROJECT BOUNDARY - TABLE
5. PHYSIOGRAPHY OF THE LAKE HARRIS PROJECT VICINITY
6. PHYSIOGRAPHY AND TOPOGRAPHY – LAKE HARRIS
7. SOIL TYPES LOCATED IN LAKE HARRIS PROJECT VICINITY
8. SOILS WITHIN THE LAKE HARRIS PROJECT BOUNDARY - TABLE
9. PHSYIOGRAPHY OF THE TALLAPOOSA RIVVER DOWNSTREAM OF HARRIS DAM
10. SOIL TYPES LOCATED IN THE VICINITY OF THE TALLAPOOSA RIVER DOWNSTREAM OF HARRIS DAM
11. SOILS WITHIN THE VICINITY OF THE TALLAPOOSA RIVER DOWNSTREAM OF HARRIS DAM - TABLE

1. PHYSIOGRAPHY OF THE SKYLINE PROJECT VICINITY

Physiography of the Skyline Project Vicinity

Jackson County Mountains District

The Jackson County Mountains district is a submaturely dissected plateau of high relief characterized by mesa-like sandstone remnants above limestone lowland (Sapp and Emplaincourt 1975). Rock formations observed in the Project area include: the Pottsfield formation, Pennington formation, Bangor Limestone, Monteagle Limestone and Tuscumbia Limestone (Raymond et. al.1988 [citation includes information in the following list]):

- **Pottsfield formation** consists primarily of sandstone and shale with some coal and limestone
- **Pennington formation** consists of a lower supratidal dolostone subsequently overlain by fine-grained shallow-marine clastics
- **Bangor Limestone** is a bioclastic and oolitic limestone containing interbeds of mudstone and shale
- **Monteagle Limestone** consists of massive cross-bedded oolitic and bioclastic limestone
- **Tuscumbia Limestone** is a bioclastic or micritic, partially oolitic, limestone with local abundant chert

Structural Features

The Cumberland Plateau (referred to as the Appalachian Plateau) is underlain by Paleozoic sedimentary rocks. The Paleozoic sedimentary rocks are underlain by crystalline basement rock of Precambrian age. The Cumberland Plateau includes northeast-trending anticlines including the Sequatchie, Murphrees Valley, and Wills Valley. The Sequatchie and Wills Valley anticlines are asymmetric to the northwest and include southeast-dipping thrust faults along parts of the northwest limbs. The Murphrees Valley anticline is asymmetric to the southeast and is bounded on the southeast side by the northwest-dipping Straight Mountain fault. Synclinal Sand, Lookout, and Blount mountains separate the anticlines. The Paleozoic sedimentary rocks dip southwestward into the Black Warrior basin beneath the coastal plain overlap (Raymond et al. 1988).

Mineral Resources

Historically, there has been extensive mining within the Cumberland Plateau of Alabama. Two of the largest coalfields lie beneath the province (Raymond et al. 1988). Twenty-one listed abandoned mines previously operated within Jackson County; however, there are no listed mines operating within Jackson County as of 2013 (Whitson 2013). The primary resource mined within the county historically has been coal, commonly found in the Pottsfield formation. There is potential for limestone quarries in Jackson County due to the presence of the Monteagle and Tuscumbia limestones. Historically, the formations quarried in other counties were located within the Cumberland Plateau (Raymond et al. 1988).

References:

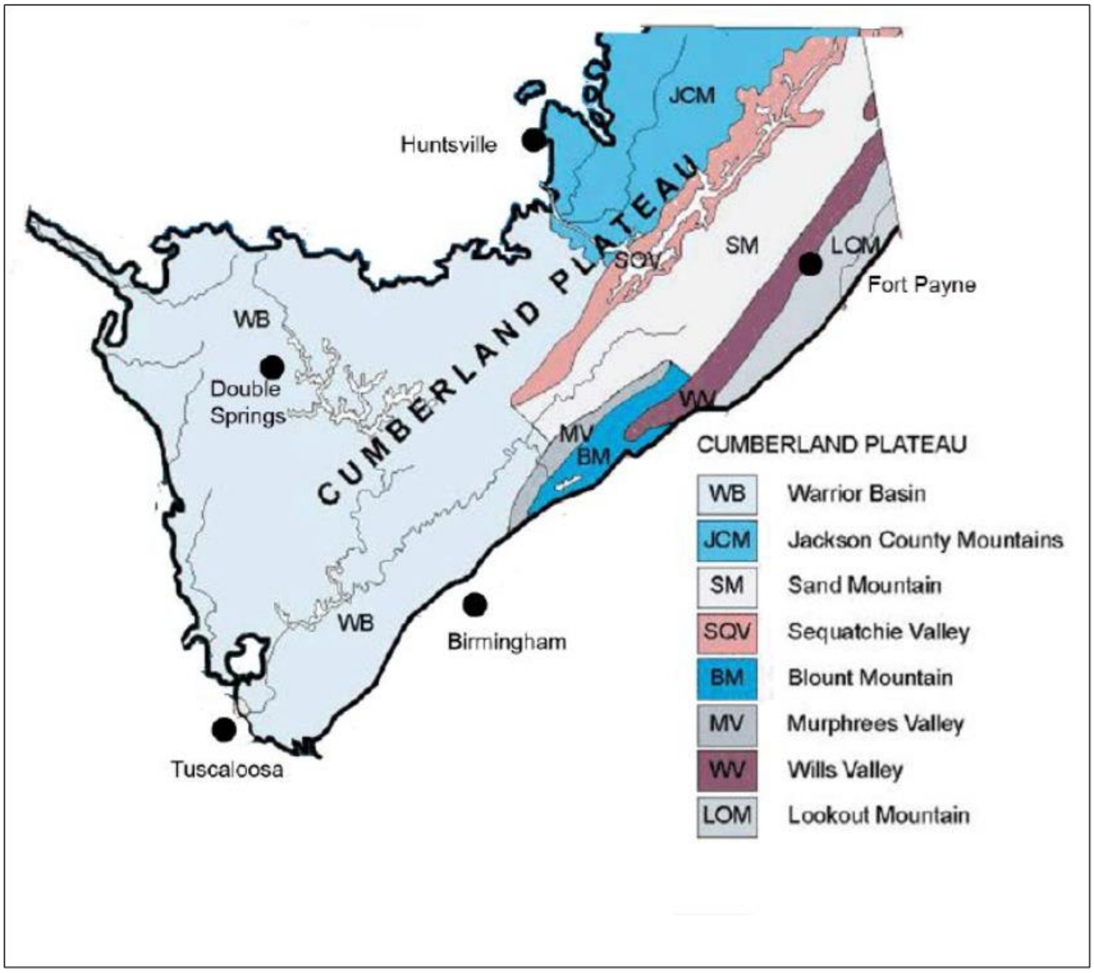
Raymond, D. E., W.E. Osborne, C.W. Copeland, and T.L. Neathery. 1988. Alabama Stratigraphy. Geological Survey of Alabama, Tuscaloosa, AL.

Sapp, D. and J. Emplaincourt. 1975. Physiographic Regions of Alabama. Map 168. Geological Survey of Alabama, Tuscaloosa, AL.

Whitson, C. 2013. Alabama Mine Map Repository. Directory of Underground Mine Maps. Birmingham, AL.

2. PHYSIOGRAPHIC DISTRICTS OF THE CUMBERLAND PLATEAU - SKYLINE

Physiographic Districts of the Cumberland Plateau



Source: Neilson 2013a

Reference:

Neilson, M. 2013a. Encyclopedia of Alabama: Cumberland Plateau Physiographic Section. Available at: http://www.encyclopediaofalabama.org/article/h-1301. Accessed on November 28, 2016.

3. SOIL TYPES LOCATED IN THE SKYLINE VICINITY

Soil Types Located in the Skyline Vicinity

Jackson County Soils

Jackson County soils encompass all of the approximately 15,063 acres at Skyline. Soil units encountered include: Allen, Barbourville-Cotaco, Bruno, Colbert-Talbott, Colbert, Dunning, Egam, Hollywood, Hartsells, Huntington, Hanceville, Hilly stony land, Hermitage, Holston, Jefferson-Allen, Jefferson, Limestone Rockland, Lindside, Muskingum, Melvin, Monongahela, Rolling Stony Land, Rough Stony Land, Swaim, Sequatchie, Stony Alluvium, Talbott, and Wolftever (NRCS 2016b [Note: citation pertains to information in the following list]).

Allen: generally described as a well-drained loam derived from sandstone and shale typically found on ridges or hillslopes. Multiple Allen units identified within the Skyline Project area included:

- eroded and undulating phase fine sandy loam with 2 to 5 percent slopes
- eroded and rolling phase fine sandy loam with 5 to 12 percent slopes
- rolling phase fine sandy loam with 5 to 12 percent slopes
- undulating phase fine sandy loam with 2 to 5 percent slopes

Barbourville-Cotaco: fine sandy loams generally described as moderately well drained with slopes of 0 to 4 percent. Derived from sandstone and shale, Barbourville-Cotaco is typically found on stream terraces.

Bruno: fine sandy loam and loamy fine sand generally described as moderately well drained with slopes of 0 to 2 percent. Derived from sedimentary rock, Bruno is typically found in floodplains.

Colbert-Talbott: stony silty clay loams generally described as well drained with slopes of 2 to 12 percent. Derived from limestone, Colbert-Talbott is typically found on hillslopes.

Colbert: silty clay loam generally described as moderately well drained with slopes of 5 to 12 percent. Derived from limestone, Colbert is typically found on hillslopes.

Dunning: silty clay generally described as poorly drained with slopes of 0 to 2 percent. Derived from sedimentary rock, Dunning is typically found in depressions.

Egam: silt loam generally described as well drained with slopes of 0 to 2 percent. Derived from limestone, sandstone and shale, Egam is typically found in flood plains.

Hollywood: silty clay generally described as moderately well drained with slopes of 0 to 2 percent. Derived from limestone, Hollywood is typically found on terraces.

Hartsells: generally described as a well-drained loam derived from sandstone typically found on ridges or hillslopes. Multiple units of Hartsells, identified within the Skyline Project area, included:

- rolling shallow phase fine sandy loam
- undulating shallow phase fine sandy loam

- eroded Nauvoo fine sandy loam with 6 to 10 percent slopes
- Nauvoo fine sandy loam with 6 to 10 percent slopes
- undulating phase fine sandy loam

Huntington: silt loam generally described as well drained with slopes of 0 to 2 percent. Derived from sedimentary rock, Huntington is typically found in flood plains.

Hanceville: rolling phase and undulating phase fine sandy loams generally described as well drained with slopes of 0 to 10 percent. Derived from sandstone and shale, Hanceville is typically found on ridges.

Hilly Stony: typically well drained and found on hillslopes with slopes of 10 to 20 percent.

Hermitage: cherty silty clay loam generally described as well drained with slopes of 12 to 25 percent. Derived from cherty limestone, Hermitage is typically found on hillslopes.

Holston: loam generally described as well drained with slopes of 2 to 5 percent. Derived from limestone, sandstone and shale, Holston is found on stream terraces or hillslopes.

Jefferson-Allen: generally described as a well-drained loam derived from sandstone and shale and is typically found on hillslopes with slopes ranging from 5 to 35 percent. Multiple units of Jefferson-Allen identified within the Skyline Project area included:
- eroded hilly phase loam
- hilly phase loam
- eroded rolling phase loam
- severely eroded hilly phase loam
- severely eroded steep phase loam

Jefferson: generally described as a well-drained loam derived from sandstone and shale and is typically found on stream terraces with slopes of two to 12 percent. Multiple Jefferson units identified within the Skyline Project area included:
- eroded undulating phase fine sandy loam
- eroded rolling phase fine sandy loam
- rolling phase fine sandy loam
- undulating phase fine sandy loam

Limestone Rockland: typically well drained and found on hillslopes with slopes of 11 to 40 percent.

Lindside: silt loam generally described as somewhat poorly drained with slopes of 0 to 2 percent. Derived from sedimentary rock, Lindside is typically found in flood plains.

Muskingum: fine sandy and stony fine sandy loams generally described as well drained with slopes of 10 to 20 percent. Derived from sandstone, Muskingum is typically found on hillslopes.

Melvin: silt loam generally described as poorly drained with slopes of 0 to 2 percent. Derived from sedimentary rock, Melvin is typically found in flood plains.

Monongahela: loam generally described as moderately well drained with slopes of 2 to 5 percent. It is typically found on stream terraces and is derived from limestone, sandstone, and shale.

Rolling Stony Land: typically well drained and found on hillslopes with slopes of 2 to 12 percent.

Rough Stony Land: typically well drained and found on hillslopes with slopes of 20 to 45 percent.

Swaim: generally described as a moderately well-drained loam derived from limestone typically found on ridges or hillslopes with slopes of two to 12 percent. Multiple Swaim silty clay loam units identified within the Skyline Project area included:

- eroded and non-eroded undulating phase
- eroded and non-eroded rolling phase

Sequatchie: fine sandy loam generally described as well drained with slopes of 0 to 2 percent. Derived from sedimentary rock, Sequatchie is typically found on stream terraces.

Stony Alluvium is typically well drained and found in flood plains with slopes of 0 to 2 percent.

Talbott: silty clay loam generally described as well drained with slopes of 5 to 12 percent. Derived from limestone, Talbott is typically found on hillslopes.

Wolftever: silt loam generally described as moderately well drained with slopes of 2 to 5 percent. Derived from sedimentary rock, Wolftever is typically found on stream terraces (NRCS 2016b).

Note: There may be a discrepancy in the total number of acres reported as Harris Project acres due to map inconsistencies.

Reference:
NRCS 2016 - Natural Resources Conservation Service (NRCS). 2016. Web Soil Survey. Available at: http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed November 2, 2016.

4. SOIL TYPES WITHIN THE SKYLINE PROJECT BOUNDARY - TABLE

Table 1 Soils Types within the Skyline Project Boundary

Map Unit Symbol	Map Unit Name	Acres in Project Boundary	Percent of Project Boundary
#1, Jackson County, Alabama (AL071)			
Hfm	Hartsells fine sandy loam, undulating, shallow phase	0.7	0.0%
Hfo	Hartsells (Nauvoo) fine sandy loam, 6 to 10 percent slopes	26.6	0.1%
Lr	Limestone rockland rough	228.6	1.2%
Mfl	Muskingum (Gorgas) fine sandy loam, 10 to 20 percent slopes	0.5	0.0%
Msl	Muskingum (Gorgas) stony fine sandy loam, 10 to 20 percent slopes, very stony	3.8	0.0%
Msz	Muskingum (Gorgas) stony fine sandy loam, 20 to 45 percent slopes, very stony	1.7	0.0%
RsC	Rolling stony land, Colbert soil material	11.9	0.1%
RsM	Rough stony land, Muskingum soil material	88.9	0.5%
Subtotals for #1		**362.8**	**1.9%**
Totals for Project Boundary		**18,694.1**	**100.0%**
#2, Jackson County, Alabama (AL071)			
Lr	Limestone rockland rough	199.4	1.1%
RsM	Rough stony land, Muskingum soil material	2.7	0.0%
Subtotals for #2		**202.1**	**1.1%**
Totals for Project Boundary		**18,694.1**	**100.0%**
#3, Jackson County, Alabama (AL071)			
Hfn	Hartsells (Nauvoo) fine sandy loam, 6 to 10 percent slopes, eroded	0.0	0.0%
Hfo	Hartsells (Nauvoo) fine sandy loam, 6 to 10 percent slopes	91.6	0.5%
Lr	Limestone rockland rough	83.1	0.4%
Mfl	Muskingum (Gorgas) fine sandy loam, 10 to 20 percent slopes	24.5	0.1%
Msl	Muskingum (Gorgas) stony fine sandy loam, 10 to 20 percent slopes, very stony	25.4	0.1%
#4, Jackson County, Alabama (AL071)			
Hfo	Hartsells (Nauvoo) fine sandy loam, 6 to 10 percent slopes	32.1	0.2%
Hfu	Hartsells fine sandy loam, undulating phase	7.8	0.0%
Lr	Limestone rockland rough	26.0	0.1%
Mfl	Muskingum (Gorgas) fine sandy loam, 10 to 20 percent slopes	6.4	0.0%
Msl	Muskingum (Gorgas) stony fine sandy loam, 10 to 20 percent slopes, very stony	6.8	0.0%
RsM	Rough stony land, Muskingum soil material	86.8	0.5%

Map Unit Symbol	Map Unit Name	Acres in Project Boundary	Percent of Project Boundary
Subtotals for #4		**165.9**	**0.9%**
Totals for Project Boundary		**18,694.1**	**100.0%**
#5, Jackson County, Alabama (AL071)			
Lh	Limestone rockland, hilly	47.7	0.3%
Ll	Lindside silt loam	0.6	0.0%
Lr	Limestone rockland rough	230.4	1.2%
Mo	Melvin silty clay loam	0.3	0.0%
Subtotals for #5		**278.9**	**1.5%**
Totals for Project Boundary		**18,694.1**	**100.0%**
#6, Jackson County, Alabama (AL071)			
JAr	Jefferson-Allen loams, severely eroded, hilly phases	5.3	0.0%
Lr	Limestone rockland rough	28.2	0.2%
RsM	Rough stony land, Muskingum soil material	43.1	0.2%
Subtotals for #6		**76.5**	**0.4%**
Totals for Project Boundary		**18,694.1**	**100.0%**
#7, Jackson County, Alabama (AL071)			
Ade	Allen fine sandy loam, eroded, undulating phase	8.0	0.0%
Adn	Allen fine sandy loam, eroded, rolling phase	21.9	0.1%
Ado	Allen fine sandy loam, rolling phase	2.3	0.0%
Adu	Allen fine sandy loam, undulating phase	2.8	0.0%
BC	Barbourville-Cotaco fine sandy loams	1.7	0.0%
Bf	Bruno fine sandy loam	59.2	0.3%
Bu	Bruno loamy fine sand	11.9	0.1%
CTd	Colbert-Talbott stony silty clay loams, severely eroded, rolling phases	5.0	0.0%
Cto	Colbert silty clay loam, rolling phase	11.8	0.1%
Du	Dunning silty clay	5.6	0.0%
Eg	Egam silt loam	34.8	0.2%
Hcv	Hollywood silty clay, level phase	38.4	0.2%
Hfg	Hartsells fine sandy loam, rolling, shallow phase	280.7	1.5%
Hfo	Hartsells (Nauvoo) fine sandy loam, 6 to 10 percent slopes	1,432.4	7.7%
Hfu	Hartsells fine sandy loam, undulating phase	89.4	0.5%
Hl	Huntington silt loam	51.7	0.3%
Hno	Hanceville fine sandy loam, rolling phase	52.5	0.3%
Hnu	Hanceville fine sandy loam, undulating phase	7.4	0.0%
HsM	Hilly stony land	35.4	0.2%
Hth	Hermitage cherty silty clay loam, eroded, hilly phase	2.2	0.0%
Huu	Holston loam, 2 to 5 percent slopes	0.4	0.0%

Map Unit Symbol	Map Unit Name	Acres in Project Boundary	Percent of Project Boundary
JAh	Jefferson-Allen loams, eroded, hilly phases	19.4	0.1%
JAl	Jefferson-Allen loams, hilly phases	77.4	0.4%
JAn	Jefferson-Allen loams, eroded, rolling phases	33.3	0.2%
JAr	Jefferson-Allen loams, severely eroded, hilly phases	210.7	1.1%
JAs	Jefferson-Allen loams, severely eroded, steep phases	33.0	0.2%
Jfe	Jefferson fine sandy loam, eroded, undulating phase	9.7	0.1%
Jfn	Jefferson fine sandy loam, eroded, rolling phase	43.3	0.2%
Jfu	Jefferson fine sandy loam, undulating phase	44.4	0.2%
Lh	Limestone rockland, hilly	140.7	0.8%
Ll	Lindside silt loam	18.7	0.1%
Lr	Limestone rockland rough	6,987.7	37.4%
Mfh	Muskingum (Gorgas) fine sandy loam, 10 to 20 percent slopes, eroded	24.0	0.1%
Mfl	Muskingum (Gorgas) fine sandy loam, 10 to 20 percent slopes	639.7	3.4%
Ml	Melvin silt loam	0.0	0.0%
Mnu	Monongahela loam, undulating phase	4.7	0.0%
Msl	Muskingum (Gorgas) stony fine sandy loam, 10 to 20 percent slopes, very stony	628.4	3.4%
Msz	Muskingum (Gorgas) stony fine sandy loam, 20 to 45 percent slopes, very stony	480.3	2.6%
RlM	Rolling stony land, Muskingum soil material	20.4	0.1%
RsC	Rolling stony land, Colbert soil material	52.7	0.3%
RsM	Rough stony land, Muskingum soil material	5,221.2	27.9%
Sce	Swaim silty clay loam, eroded, undulating phase	0.7	0.0%
Scn	Swaim silty clay loam, eroded, rolling phase	26.3	0.1%
Sco	Swaim silty clay loam, rolling phase	9.4	0.1%
Scu	Swaim silty clay loam, undulating phase	15.6	0.1%
Sfv	Sequatchie fine sandy loam, level phase	5.9	0.0%
StM	Stony alluvium	156.8	0.8%
Tcn	Talbott silty clay loam, eroded, rolling phase	16.5	0.1%
W	Water	0.9	0.0%
Wsu	Wolftever silt loam, undulating phase	3.6	0.0%
Subtotals for #7		**17,140.4**	**91.7%**
Totals for Skyline Project Boundary		**18,694.1**	**100.0%**

Source: NRCS 2016

Note: There may be a discrepancy in the total number of acres reported as Skyline acres due to map inconsistencies.

Reference:

NRCS 2016 - Natural Resources Conservation Service (NRCS). 2016. Web Soil Survey. Available at: http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed November 2, 2016.

5. PHYSIOGRAPHY OF THE LAKE HARRIS PROJECT VICINITY

Physiography of the Lake Harris Project Vicinity

The Northern Piedmont

The Northern Piedmont consists of three sections called blocks; the Tallapoosa block, the Coosa block, and the Talladega block. The Project area is within the Tallapoosa and Coosa blocks. The Tallapoosa block contains rocks of the Wedowee Group, the Hackneyville schist, the Cornhouse schist and the Emuckfaw Formation. The Wedowee Group consists of a wide range of sericite phyllites, feldspathic-biotite-quartz gneiss and quartzite. The Hackneyville schist is composed of muscovite and biotite schist, and biotite quartz schist with occasional kyanite. The Cornhouse schist consists of interlayered chlorite-biotitegarnet schist and muscovite-biotite-garnet-quartz-plagioclase schist. Quartzite and layered amphibolites are also present. The Emuckfaw Formation is interlayered metagraywacke and muscovite-garnet-biotite-schist with local occurrences of quartzite and amphibolite (Raymond, et al. 1988).

In addition to the regionally metamorphosed rocks of the Tallapoosa block, granitoid plutons composed of the Elkahatchee quartz diorite gneiss, the Zana granite and Kowaliga gneiss occur in the Tallapoosa block. The Coosa block contains rocks of the Poe Bridge Mountain Group, the Mad Indian Group, the Wedowee Group, the Higgins Ferry Group and the Hatchet Creek Group. The Wedowee Group consists of quartz-graphite-sericite phyllite to fine-grained schist and chlorite-sericite phyllite to fine-grained schist. The Poe Bridge Mountain and Higgins Ferry Groups contain sequences of interlayered coarse-grained graphitic feldspathic mica schist, graphitic and garnetiferous quartzite, garnet mica schist, fine-grained biotite gneiss and quartzite. These groups also are associated with major amphibolite sequences: the Ketchepedrakee Amphibolite with the Poe Bridge Mountain Group and the Mitchell Dam Amphibolite with the Higgins Ferry Group. The Mad Indian and Hatchet Creek Groups consists of feldspathic garnet-quartz-muscovite schist, minor amounts of biotite (garnet) schist and gneiss, micaceous quartzite, migmatitic gneiss and rare amphibolite. They also typically contain abundant pegmatite and small granitoid bodies (Raymond et al. 1988).

Structural Features

The dominant features in the Piedmont are northeast-trending ridges underlain by resistant quartzite and quartz-rich schists. The linear ridges to the northwest and northeast of the dam site are a result of tectonic movement approximately 500 million years ago. Triassic dikes intruded into the area approximately 200 million years ago and show no sign of any movement since that time. The Tallapoosa block contains the Alexander City fault and a series of cataclastic zones. The Alexander City fault divides the Wedowee Group and Emuckfaw Formation (Beg 1987). The Enitachopco fault separates the Coosa block from the Tallapoosa block. The Enitachopco fault also divides the Coosa block into two subregional salient. The Project is located in the northeastern salient containing the Poe Bridge Mountain Group and the Mad Indian Group. The southwest salient contains the Wedowee Group, the Higgins Ferry Group and the Hatchet Creek Group (Raymond et al. 1988).

Mineral Resources in the Project Vicinity

Reportedly, during the late 1830s, gold discovered in Randolph County was found primarily in lode deposits associated with quartz veins. The only known placer deposits were in the Bradley prospect, which is flooded by the backwaters of Lake Harris. The only other gold prospect found within the Project area was the Morris Property prospect, a lode deposit. Many of the gold mines and prospects discovered within Randolph County were discovered southwest of Harris Dam (Beg 1987).

Systematic mica mining in Randolph County started around 1870. Mica is a platy mineral that splits into very thing tough sheets as small as 1/1000 of an inch. Muscovite mica is a very common mineral found in many of the granitic, gneissic, schistose and phyllitic rocks of Randolph County. Commercially, mica is divided into sheet mica and scrap mica. Scrap mica is commonly used as a filler in roofing and siding, shingles, wallboard, drilling mud, rubber, plastic, paints and other synthetic goods. Sheet mica is used as an electrical and heat insulation material. Many of the mica mines and prospects are located in northeastern Randolph County. A number of the prospects fall within Project lands or are covered by Lake Harris (Beg 1987).

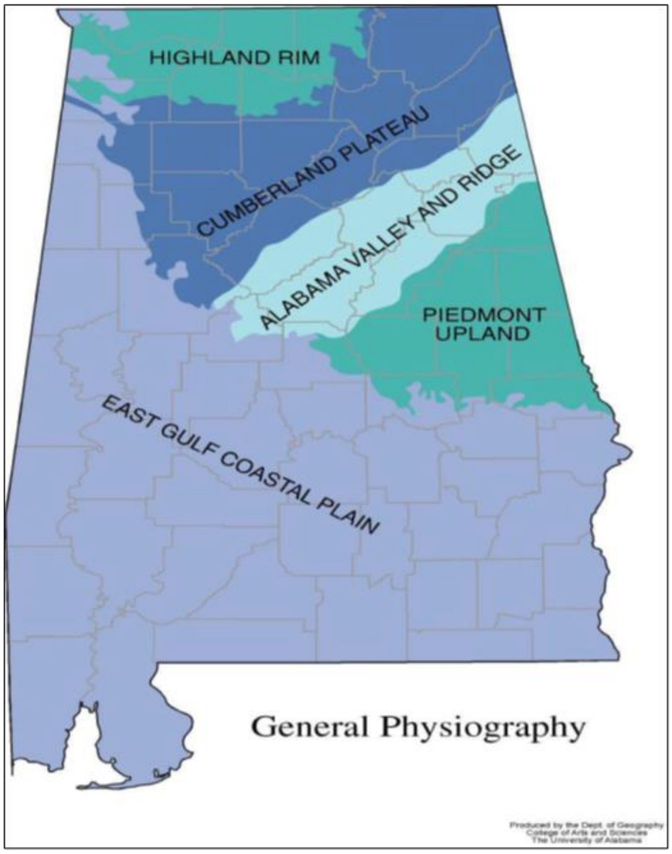
Three major varieties of granitic rock occur in Randolph County: the Almond Trondhjemite, the Bluff Springs Granite and the Rock Mills Granite Gneiss. The Almond Trondhjemite and the Bluff Springs Granite are present with the Project area. The Almond Trondhjemite is a light-colored equigranular rock that forms large pavement areas in the Blake Ferry and Almond plutons. The Blake Ferry pluton was quarried for the construction of the R.L. Harris Dam. The Bluff Springs Granite has not been quarried in Randolph County; however, it exhibits similar characteristics and composition to other granitic rocks used for road material and aggregate. The only granite quarry within the Project area was the quarry used during construction of the Harris Dam, which is now flooded by Lake Harris (Beg 1987).

Deposits of mixed sand, clay and gravel occur extensively in the fluvial deposits along the flood plains and low terraces of the major drainage systems within Randolph County. The most extensive deposits occur along the Tallapoosa and Little Tallapoosa rivers. Now many of these larger deposits, found within the Project area, are flooded by Lake Harris; however, deposits are located along the Little Tallapoosa upstream of the area of Project effect. There are six quarries located within the deposits along the Little Tallapoosa (Beg 1987).

References:
Beg, M. 1987. Mineral Resources of Randolph County, Alabama. Geological Survey of Alabama, Special Map 206. Available at: http://cartweb.geography.ua.edu/lizardtech/iserv/calcrgn?cat=North%20America%20and%20United%20States&item=States/Alabama/Counties/randolph/Randolph1987a.

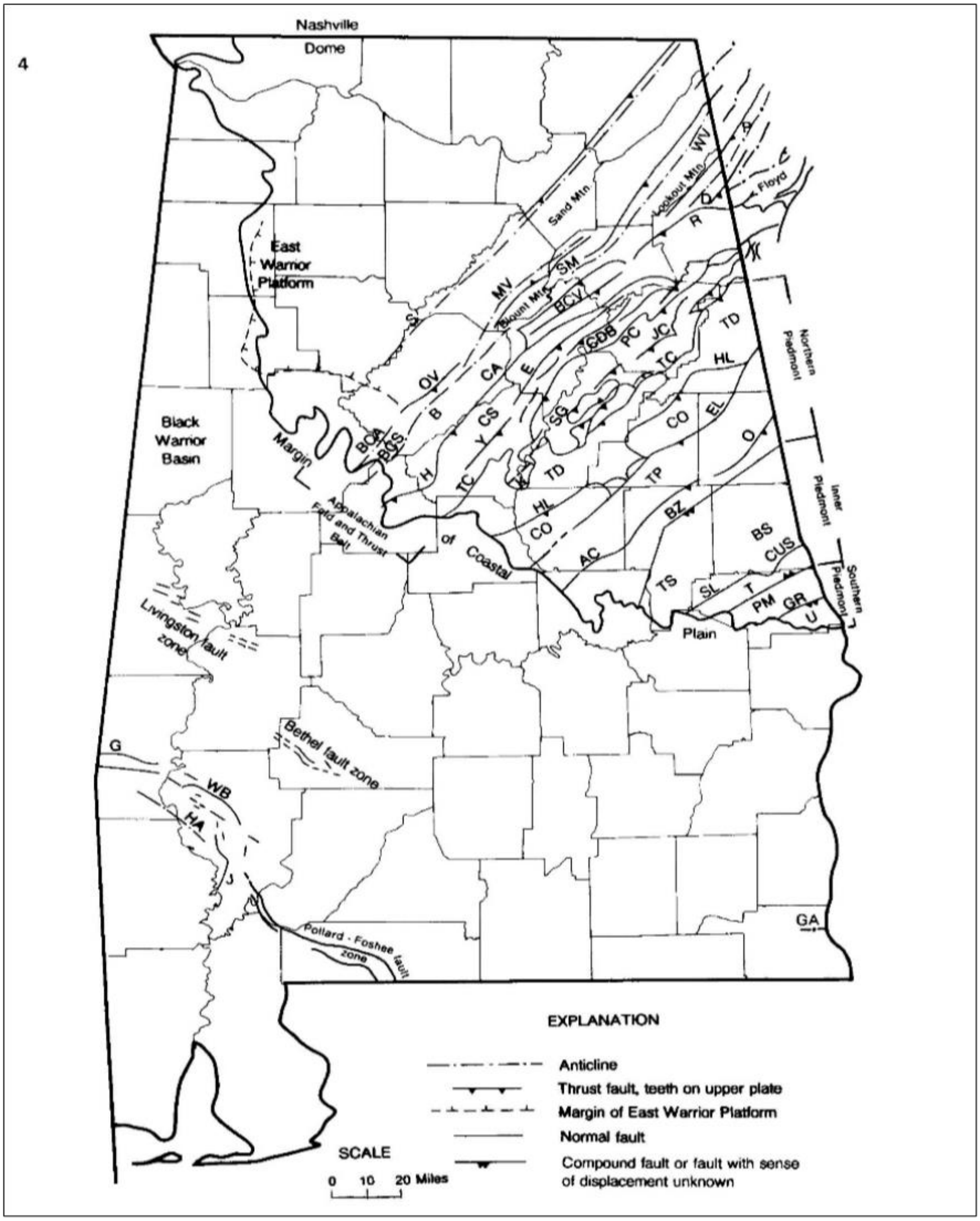
Raymond, D. E., W.E. Osborne, C.W. Copeland, and T.L. Neathery. 1988. Alabama Stratigraphy. Geological Survey of Alabama, Tuscaloosa, AL.

6. PHYSIOGRAPHY AND TOPOGRAPHY – LAKE HARRIS



Physiographic Regions of Alabama

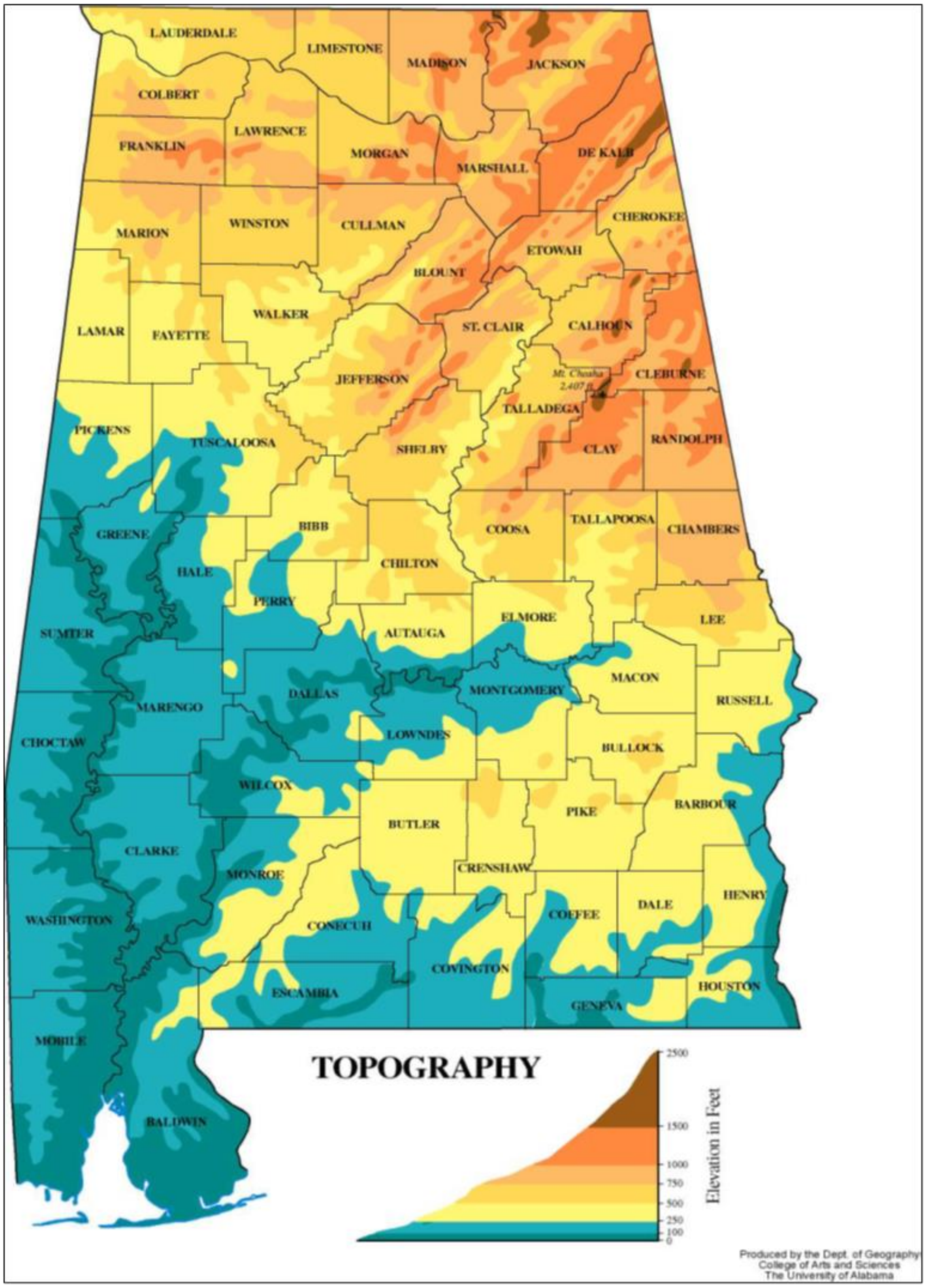
Reference:
University of Alabama. 2016a. General Physiography. Map. Available at: http://alabamamaps.ua.edu/contemporarymaps/alabama/physical/basemap6.pdf. Accessed November 2, 2016.



Structural Geology of the Piedmont Upland Physiographic Region

Reference:

Raymond, D. E., W.E. Osborne, C.W. Copeland, and T.L. Neathery. 1988. Alabama Stratigraphy. Geological Survey of Alabama, Tuscaloosa, AL.



Topography of Alabama

University of Alabama. 2016b. General Topography. Map. Available at: https://i.pinimg.com/736x/ad/a6/18/ada618d71947f7446d54987bb0d89d41--topographic-map-geography.jpg. Accessed November 2, 2016.

7. SOIL TYPES LOCATED IN LAKE HARRIS PROJECT VICINITY

Soil Types Located in the Lake Harris Vicinity

Clay County Soils

Soils in Clay County encompass approximately 29 acres of the approximate 19,194 acres within the Harris Project boundary. Soils encountered include the Chewacla-Riverview complex, the Grover association, the Madison-Riverview association and the Tatum-Tallapoosa-Riverview association.

- Chewacla is typically found in flood plains and derives from sedimentary rocks. Chewacla is generally described as a somewhat poorly drained silt loam with slopes of 0 to 2 percent.
- Riverview is found in flood plains and derives from sedimentary rocks. Riverview is generally described as a well-drained loam with slopes of zero to two percent and includes three horizons: silt loam, loam and fine sandy loam.
- Grover is typically found on ridges and derives from metamorphic rock. Grover is generally described as a well-drained loam with slopes of 2 to 12 percent and consists of five horizons: sandy loam, clay loam, loam, sandy clay loam and sandy loam.
- Madison is typically found on ridges and derives from schist. Madison is generally described as a well-drained loam with slopes of 3 to 15 percent and includes three horizons: loam, clay and sandy loam.
- Tatum is typically found on hills and derives from schist. Tatum is generally described as a well-drained clayey gravelly loam with slopes of 6 to 20 percent and includes three horizons: gravelly loam, clay and weathered bedrock.
- Tallapoosa is typically found on high hills and derives from slate. Tallapoosa is generally described as a well-drained gravelly loam with slopes of 15 to 45 percent. Tallapoosa includes three horizons: gravelly loam, gravelly loam and weathered bedrock (NRCS 2016).

Cleburne County Soils

Cleburne County soils encompass approximately 30 acres of the approximate 19,194 acres within the Harris Project boundary. Soils encountered include the Hiwassee-Gwinnett association, the Madison-Louisa association, the Riverview-State-Sylacauga complex, the state fine sandy loam and the Waynesboro-Holston complex.

- Hiwassee typically found on hills and derives from igneous rocks, is generally described as a well-drained clayey loam with slopes of 2 to 15 percent. Hiwassee consists of three horizons: clay loam, clay and loam.
- Gwinnett typically found on hills and derives from granite and gneiss, is generally described as sandy clayey loam with slopes of 2 to 15 percent. Gwinnett consists of four horizons: sandy clay loam, clay, sandy clay loam and weathered bedrock.
- Madison typically found on hills and derives from schist is generally described as a loam with slopes of 10 to 35 percent. Madison consists of four horizons: gravelly sandy loam, clay, sandy clay loam and sandy loam.
- Louisa typically found on hills and derives from mica schist is generally described as a gravelly sandy loam with slopes of 10 to 35 percent. Louisa consists of four horizons: gravelly sandy loam, gravelly sandy loam, channery loam and weathered bedrock.
- Riverview typically found in flood plains and derives from sedimentary rocks is generally described as a loam with slopes of 0 to 2 percent. Riverview consists of three horizons: loam, loam, and loamy fine sand.

- Slate typically found in stream terraces and derives from igneous and metamorphic rock is generally described as a loam with slopes of 0 to 2 percent. Slate consists of three horizons: loam, loam and fine sandy loam.
- Sylacauga typically found in stream terraces and derives from sedimentary rock is generally described as a silty clayey loam with slopes of 0 to 2 percent. Sylacauga consists of three horizons: silt loam, clay loam and loam.
- State, a fine sandy loam, typically found in stream terraces and derives from igneous; metamorphic rock is generally described as a loam with slopes of 0 to 2 percent. Slate consists of three loam horizons.
- Waynesboro typically found on hills and derives from sandstone and shale is generally described as a loam with slopes from 2 to 10 percent. Waynesboro consists of three horizons: fine sandy loam, clay loam and clay.
- Holston typically found on terraces, derives from sandstone and shale is generally described as a loam with slopes of 2 to 10 percent. Holston consists of three horizons: loam, loam and clay loam (NRCS 2016).

Randolph County Soils

Randolph County soils encompass approximately 19,135 acres of the 19,194 acres within the Harris Project boundary. Soil units encountered include the Altavista, Appling, Augusta, Buncombe, Chewacla, Congaree, Davidson, Louisa, Louisburg, Madison, Mantachie, Ochlockonee, Wedowee, Wehadkee and Wickham. Other units identified within the Project area include Pits, Rock land, Stony rough land and Terrace escarpment. (NRCS 2016). (Note: citation pertains to information in the following list also.)

Altavista: generally described as a well-drained loam derived from sedimentary rock typically found on stream terraces. Multiple Altavista units identified within the Lake Harris Project area include:

- fine sandy loam with 2 to 6 percent slopes
- gravelly fine sandy loam with 2 to 6 percent slopes
- gravelly fine sandy loam with 6 to 10 percent slopes

Appling: generally described as a well-drained loam derived from igneous and metamorphic rock typically found on hills and hillslopes. Multiple Appling units identified within the Lake Harris Project area include:

- a gravelly sandy loam with 2 to 6 percent slopes
- gravelly sandy loam with 6 to 10 percent slopes
- sandy loam with 2 to 6 percent slopes
- sandy loam with 6 to 10 percent slopes

Augusta: a fine sandy loam, generally described as somewhat poorly drained with slopes of 0 to 2 percent. Augusta typically found on stream terraces is derived from sedimentary rock.

Buncombe: loamy sand is generally described as being excessively drained with slopes of 0 to 5 percent. Buncombe, typically found in levees, is derived from metamorphic rock.

Chewacla: silt loam is generally described as being somewhat poorly drained with slopes of 0 to 2 percent. Chewacla, typically found in flood plains, is derived from loamy alluvium.

Congaree: silt loam is generally described as being moderately well drained with slopes of 0 to 2 percent. Congaree, typically found in flood plains, is derived from sedimentary rock.

Davidson: multiple units were identified within the Lake Harris Project area. Davidson is generally described as well-drained loam derived from metamorphic rocks typically found on hillslopes. These units included:

- gravelly clay loam with 6 to 10 percent slopes
- gravelly clay loam with 10 to 15 percent slopes

Louisa: multiple units were identified within the Lake Harris Project area. Louisa is generally described as a well-drained to somewhat excessively drained loam derived from mica schist, is typically found on hillslopes. These units include:

- gravelly clay loam with 6 to 10 percent slopes
- gravelly sandy loam with 10 to 15 percent slopes
- gravelly sandy loam with 15 to 40 percent slopes
- slaty loam with 10 to 15 percent slopes
- slaty loam with 15 to 40 percent slopes
- stony sandy clay loam with 6 to 10 percent slopes
- stony sandy clay loam with 10 to 15 percent slopes
- stony sandy clay loam with 15 to 40 percent slopes
- stony sandy loam with 10 to 15 percent slopes
- stony sandy loam with 15 to 40 percent slopes

Louisburg: multiple units were identified within the Lake Harris Project area. Louisburg is generally described as a well-drained loam derived from igneous and metamorphic rocks typically found on hillslopes. These units include a stony sandy loam with 6 to 10 percent slopes and a stony sandy loam with 10 to 25 percent slopes.

Madison: multiple units were identified within the Lake Harris Project area. Madison is generally described as a well-drained loam derived from schist typically found on hillslopes. These units include:

- gravelly clay loam with 6 to 10 percent slopes
- gravelly clay loam with 10 to 15 percent slopes
- gravelly clay loam with 15 to 25 percent slopes
- gravelly fine sandy loam with 2 to 6 percent slopes
- gravelly fine sandy loam with 6 to 10 percent slopes
- gravelly fine sandy loam with 10 to 15 percent slopes

Mantachie: a fine sandy loam generally described as somewhat poorly drained with slopes of 0 to 2 percent. Mantachie typically found in flood plains is derived from sedimentary rock.

Ochlockonee: multiple units were identified within the Lake Harris Project area. These units include a fine sandy loam with 0 to 2 percent slopes and a fine sandy loam of local alluvium with 0 to 3 percent slopes. Ochlockonee is generally described as being moderately well drained loam derived from sedimentary rock typically found in flood plains.

Wedowee: gravelly sandy loam generally described as well drained with slopes of 10 to 15 percent. Wedowee, typically found on hillslopes, is derived from igneous rock.

Wehadkee: multiple units were identified within the Lake Harris Project area. Wehadkee generally described as being a poorly drained loam derived from igneous and metamorphic rock is typically found in drainage ways. These units include a fine sandy loam with 0 to 2 percent slopes and the Wehadkee and Mantachie soils with 0 to 2 percent slopes.

Wickham: multiple units were identified within the Lake Harris Project area. Wickham generally described as being a well-drained loam is derived from sedimentary rocks found on stream terraces. These units include:

- fine sandy loam with 2 to 6 percent slopes
- fine sandy loam with 6 to 10 percent slopes
- fine sandy loam with 10 to 15 percent slopes
- gravelly fine sandy loam with 6 to 10 percent slopes
- gravelly fine sandy loam with 10 to 15 percent slopes

Note: There may be a discrepancy in the total number of acres reported as Harris Project acres due to map inconsistencies.

Reference:
NRCS 2016 - Natural Resources Conservation Service (NRCS). 2016. Web Soil Survey. Available at: http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed November 2, 2016.

8. SOILS WITHIN THE LAKE HARRIS PROJECT BOUNDARY - TABLE

Table 1 Soils within the Lake Harris Project Boundary

Map Unit Symbol	Map Unit Name	Acres in Project Boundary	Percent of Project Boundary
Clay County, Alabama (AL027)			
Ch	Chewacla-Riverview complex	19.1	0.1%
GVC	Grover association, rolling	4.2	0.0%
MRD	Madison-Riverview association, hilly	0.6	0.0%
TRE	Tatum-Tallapoosa-Riverview association, steep	0.8	0.0%
W	Water	3.8	0.0%
Subtotals for Soil Survey Area		**28.5**	**0.1%**
Totals for Project Boundary		**19,194.0**	**100.0%**
Cleburne County, Alabama (AL029)			
HGH	Hiwassee-Gwinnett association, hilly	1.1	0.0%
MLS	Madison-Louisa association, steep	1.1	0.0%
Rs	Riverview-State-Sylacauga complex	2.7	0.0%
St	State fine sandy loam	6.8	0.0%
W	Water	15.1	0.1%
WhC	Waynesboro-Holston complex, 2 to 10 percent slopes	3.4	0.0%
Subtotals for Soil Survey Area		**30.2**	**0.2%**
Totals for Project Boundary		**19,194.0**	**100.0%**
Randolph County, Alabama (AL111)			
AaB	Altavista fine sandy loam, 2 to 6 percent slopes	3.5	0.0%
AgB	Altavista gravelly fine sandy loam, 2 to 6 percent slopes	5.2	0.0%
AgC2	Altavista gravelly fine sandy loam, 6 to 10 percent slopes, eroded	20.7	0.1%
AlB2	Appling gravelly sandy loam, 2 to 6 percent slopes, eroded	1.1	0.0%
AlC2	Appling gravelly sandy loam, 6 to 10 percent slopes, eroded	2.2	0.0%
ApB2	Appling sandy loam, 2 to 6 percent slopes, eroded	13.9	0.1%
ApC2	Appling sandy loam, 6 to 10 percent slopes	35.8	0.2%
AuA	Augusta fine sandy loam, 0 to 2 percent slopes	1.5	0.0%
Bu	Buncombe loamy sand	47.7	0.2%
Cn	Chewacla silt loam, 0 to 2 percent slopes, occasionally flooded	14.0	0.1%
Co	Congaree silt loam	3.7	0.0%
DaC3	Davidson gravelly clay loam, 6 to 10 percent slopes, severely eroded	8.8	0.0%
DaD3	Davidson gravelly clay loam, 10 to 15 percent slopes, severely eroded	7.1	0.0%
LgC	Louisa gravelly sandy loam, 6 to 10 percent slopes	42.3	0.2%

Map Unit Symbol	Map Unit Name	Acres in Project Boundary	Percent of Project Boundary
LgD	Louisa gravelly sandy loam, 10 to 15 percent slopes	62.2	0.3%
LgE	Louisa gravelly sandy loam, 15 to 40 percent slopes	620.8	3.2%
LoD	Louisa slaty loam, 10 to 15 percent slopes	52.9	0.3%
LoE	Louisa slaty loam, 15 to 40 percent slopes	1,429.5	7.4%
LsC2	Louisa stony sandy clay loam, 6 to 10 percent slopes, eroded	0.8	0.0%
LsD2	Louisa stony sandy clay loam, 10 to 15 percent slopes, eroded	21.8	0.1%
LsE2	Louisa stony sandy clay loam, 15 to 40 percent slopes, eroded	81.8	0.4%
LtD	Louisa stony sandy loam, 10 to 15 percent slopes	64.3	0.3%
LtE	Louisa stony sandy loam, 15 to 40 percent slopes	5,671.7	29.5%
LuC2	Louisburg stony sandy loam, 6 to 10 percent slopes, eroded	6.9	0.0%
LuD2	Louisburg stony sandy loam, 10 to 25 percent slopes, eroded	27.9	0.1%
MaC3	Madison gravelly clay loam, 6 to 10 percent slopes, severely eroded	174.0	0.9%
MaD3	Madison gravelly clay loam, 10 to 15 percent slopes, severely eroded	612.9	3.2%
MaE3	Madison gravelly clay loam, 15 to 25 percent slopes, severely eroded	3.2	0.0%
MdB2	Madison gravelly fine sandy loam, 2 to 6 percent slopes, eroded	11.6	0.1%
MdC2	Madison gravelly fine sandy loam, 6 to 10 percent slopes, eroded	224.4	1.2%
MdD2	Madison gravelly fine sandy loam, 10 to 15 percent slopes, eroded	142.7	0.7%
Mt	Mantachie fine sandy loam	284.1	1.5%
Oc	Ochlockonee fine sandy loam (toccoa)	221.7	1.2%
Ok	Ochlockonee fine sandy loam, local alluvium (toccoa)	22.7	0.1%
Pt	Pits	6.6	0.0%
Ro	Rock land	41.8	0.2%
Sr	Stony rough land	107.9	0.6%
Te	Terrace escarpment	1.2	0.0%
W	Water	8,787.5	45.8%
WgD2	Wedowee gravelly sandy loam, 10 to 15 percent slopes, eroded	1.7	0.0%
Wh	Wehadkee fine sandy loam	6.2	0.0%
Wk	Wehadkee and Mantachie soils	145.1	0.8%

Map Unit Symbol	Map Unit Name	Acres in Project Boundary	Percent of Project Boundary
WmB2	Wickham fine sandy loam, 2 to 6 percent slopes, eroded	6.0	0.0%
WmC2	Wickham fine sandy loam, 6 to 10 percent slopes	14.4	0.1%
WmD2	Wickham fine sandy loam, 10 to 15 percent slopes, eroded	12.2	0.1%
WnC2	Wickham gravelly fine sandy loam, 6 to 10 percent slopes, eroded	41.6	0.2%
WnD2	Wickham gravelly fine sandy loam, 10 to 15 percent slopes, eroded	17.8	0.1%
Subtotals for Soil Survey Area		**19,135.4**	**99.7%**
Totals for Project Boundary		**19,194.0**	**100.0%**

Source: NRCS 2016

Note there may be a discrepancy in the total number of acres reported as Lake Harris Project acres due to map inconsistencies.

Reference:

Natural Resources Conservation Service (NRCS). 2016. Web Soil Survey. Available at: http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed November 2, 2016.

9. PHYSIOGRAPHY OF THE TALLAPOOSA RIVER DOWNSTREAM OF HARRIS DAM

Physiography of the Tallapoosa River Downstream of Harris Dam

The Inner Piedmont

The Inner Piedmont consists of the Dadeville Complex and the Opelika Complex. The Tallapoosa River occurs within the Dadeville Complex, located within the northwestern two-thirds of the Inner Piedmont. The Dadeville consists of two lithodemic sequences: (1) a mafic volcaniclastic sequence composed of chlorite-actinolite schist and chlorite quartzite (Waresville Schist), an amphibolite(Ropes Creek Amphibolite), and a felsic volcaniclastic sequence composed of hornblende gneiss, muscovite schist, and quartzite (Waverly Gneiss) that forms the major rock assemblage of the synform and (2) a sequence of interlayered biotite-garnet-muscovite schist, biotite-muscovite schist, biotite gneiss, and thin amphibolite units (Agricola Schist) that define the core of the synform (Raymond et al. 1988).

Structural Features

The dominant features in the Piedmont are northeast-trending ridges underlain by resistant quartzite and quartz-rich schists. The linear ridges to the northwest and northeast of the dam site are a result of tectonic movement approximately 500 million years ago. Triassic dikes intruded into the area approximately 200 million years ago and show no sign of any movement since that time. The general distribution of foliations in the Inner Piedmont defines a system of northeast plunging folds. Mesoscopic and megascopic structures indicate highly ductile deformation with a major transport from the southeast. The largest fold is the Tallassee synform which occupies the western part of the outcrop area of the Dadeville Complex (Raymond et al. 1988).

Mineral Resources

The are no reported current or historical quarries or mines located on the Tallapoosa River between Lake Harris and Lake Martin.

References:

Raymond, D. E., W.E. Osborne, C.W. Copeland, and T.L. Neathery. 1988. Alabama Stratigraphy. Geological Survey of Alabama, Tuscaloosa, AL.

10. SOIL TYPES LOCATED IN THE VICINITY OF THE TALLAPOOSA RIVER DOWNSTREAM OF HARRIS DAM

Soil Types Located in the Vicinity of the Tallapoosa River Downstream of Harris Dam

Randolph County Soils

Randolph County soils encompass approximately 1,329 acres of the 3,815 acres of soils within 200 ft of the Tallapoosa River downstream of Lake Harris. Soil units include the Buncombe, Chewacla, Congaree, Louisa, Louisburg, Madison, Mantachie, Ochlockonee, Wehadkee and Mantachie, and Wickham. One additional unit included is Rock Land (NRCS 2021).

Buncombe: generally described as an excessively drained sand derived from metamorphic rock typically found on levees with slopes of 0 to 5 percent.

Chewacla: generally described as a somewhat poorly drained loam derived from loamy alluvium typically found in flood plains with slopes of 0 to 2 percent.

Congaree: generally described as a well-drained loam derived from loamy fluviomarine deposits from sedimentary rock typically found in flood plains with slopes of 0 to 2 percent.

Louisa: generally described as a well-drained loam derived from mica schist found on hillslopes. Multiple Louisa units identified within the area of interest (AOI) surrounding the Tallapoosa River include:

- Gravelly sandy loam with 15 to 40 percent slopes
- Slaty loam with 15 to 40 percent slopes
- Stony sandy clay loam with 15 to 40 percent slopes

Louisburg: generally described as a well-drained loam derived from igneous and metamorphic rock typically found on hillslopes with 10 to 25 percent slopes.

Madison: generally described as a well-drained loam derived from mica schist and/or residuum weathered from gneiss found on hills. Multiple Madison units identified within the AOI surrounding the Tallapoosa River include:

- Severely eroded gravelly clay loam with 6 to 10 percent slopes
- Severely eroded gravelly clay loam with 10 to 15 percent slopes
- Moderately eroded gravelly fine sandy loam with 10 to 15 percent slopes

Mantachie: generally described as a somewhat poorly drained loam derived from sedimentary rock typically found in flood plains with 0 to 2 percent slopes.

Ochlockonee: generally described as a moderately well-drained loam derived from sandy marine deposits from sedimentary rock typically found in flood plains. Multiple Ochlockonee units identified within the AOI surrounding the Tallapoosa River include:

- Fine sandy loam (toccoa) with 0 to 2 percent slopes
- Fine sandy loadm, local alluvium (toccoa) with 0 to 3 percent slopes

Wehadkee and Mantachie: generally described as a poorly drained loam derived from igneous and metamorphic rock typically found in drainageways with 0 to 2 percent slopes.

Wickham: generally described as a well-drained loam derived from alluvium typically found on stream terraces with 10 to 15 percent slopes.

Chambers County Soils

Chambers County soils encompass approximately 1,007 acres of the 3,815 acres of soils within 200 ft of the Tallapoosa River downstream of Lake Harris. Soil units include the Altavista, Appling, Buncombe, Cecil, Chewacla, Congaree, Hiwassee, Lloyd, Louisa, Madison, Starr, Wickham, and Worsham. Other units identified include gullied land, rough broken land, sandy alluvial land, shallow land, and stony land. (NRCS 2021).

Altavista: generally described as a well-drained loam derived from sedimentary rocks typically found on terraces with slopes of 2 to 6 percent.

Appling: generally described as a well drained loam derived from igneous and metamorphic rock typically found on ridges with 2 to 6 percent slopes.

Buncombe: generally described as an excessively drained sand derived from metamorphic rock typically found on levees with slopes of 0 to 5 percent.

Cecil: generally described as a well-drained loam derived from granite and gneiss found on hills. Multiple Cecil units identified within the AOI surrounding the Tallapoosa River include:

- Severely eroded sloping gravelly clay loam with 6 to 10 percent slopes
- Severely eroded strongly sloping gravelly clay loam with 10 to 15 percent slopes
- Very severely eroded strongly sloping gravelly clay loam with 10 to 15 percent slopes
- Eroded strongly sloping gravelly sandy loam with 10 to 15 percent slopes
- Moderately steep gravelly sandy loam with 15 to 25 percent slopes
- Moderately eroded sandy loam with 6 to 10 percent slopes.

Chewacla: generally described as a somewhat poorly drained loam derived from sedimentary rock and typically found in flood plains. Multiple Chewacla units identified within the AOI surrounding the Tallapoosa River include:

- Loam with 0 to 2 percent slopes
- Sandy loam with 0 to 2 percent slopes

Congaree: generally described as a moderately well-drained loam derived from sedimentary rock typically found in flood plains with slopes of 0 to2 percent.

Hiwassee: generally described as a well-drained loam derived from igneous rock typically found on hills with slopes of 6 to 10 slopes.

Lloyd: generally described as a well-drained loam derived from igneous and metamorphic rock typically found on hills with 15 to 25 percent slopes.

Louisa: generally described as a well-drained to somewhat excessively drained loam derived from mica schist and typically found on hills. Multiple Louisa units identified within the area of interest (AOI) surrounding the Tallapoosa River include:

- Gravelly sandy loam moderately steep and steep with 15 to 25 percent slopes

- Stony sandy loam, steep with 25 to 50 percent slopes

Madison: generally described as a well-drained loam derived from mica schist and/or residuum weathered from gneiss found on hills. Multiple Madison units identified within the AOI surrounding the Tallapoosa River include:

- Severely eroded gravelly clay loam with 6 to 10 percent slopes
- Severely eroded gravelly clay loam with 10 to 15 percent slopes
- Moderately steep severely eroded gravelly clay loam with 15 to 25 percent slopes
- Gravelly fine sandy loam with 15 to 25 percent slopes
- Graphitic soils eroded strongly sloping with 10 to 15 percent slopes

Starr: generally described as well-drained loam derived from igneous and metamorphic rock typically found on terraces with 0 to 6 percent slopes.

Wickham: generally described as a well-drained loam derived from alluvium and typically found on stream terraces. Multiple Wickham units identified within the AOI surrounding the Tallapoosa River include:

- Fine sandy loam with 6 to 10 percent slopes
- Fine sandy loam with 10 to 15 percent slopes

Worsham: generally described as poorly drained loam derived from metamorphic rock typically found in depressions with 0 to 2 percent slopes.

Tallapoosa County Soils

Tallapoosa County soils encompass approximately 1,478 acres of the 3,815 acres of soils within 200 ft of the Tallapoosa River downstream of Lake Harris. Soil units include the Altavista, Badin-Tallapoosa-Fruithurst complex, Buncombe, Chewacla Cartecay and Toccoa soils, Gwinnett-Lloyd complex, Gwinnett-Agricola, Pacolet-Rion complex, Tallapoosa-Badin-Fruithurst complex, Tallapoosa-Fruithurst complex, Toccoa, Wehadkee, and Wickham. (NRCS 2021).

Altavista: generally described as a moderately well-drained loam derived from alluvial sediments typically found on stream terraces with slopes of 2 to 6 percent.

Badin-Tallapoosa-Fruithurst complex: generally described as a well-drained loam/clay derived from phyllite residuum weathered from schist typically found on ridges with 3 to 10 percent slopes.

Buncombe: generally described as a excessively drained sand derived from gneiss typically found in flood plains with 0 to 2 percent slopes.

Chewacla, Cartecay and Toccoa soils: generally described as a somewhat poorly drained clay loam derived from loamy alluvium typically found in flood plains with 0 to 1 percent slopes.

Gwinnett-Lloyd complex: generally described as a well-drained loam derived from gneiss and schist typically found on hillslopes with 6 to 15 percent slopes.

Gwinnett-Agricola complex: generally described as a well-drained loam derived from crystalline rock typically found on hillslopes with 15 to 25 percent slopes.

Pacolet-Rion complex: generally described as a well-drained loam/clay derived from felsic igneous and metamorphic rock typically found on hillslopes. Multiple Pacolet-Rion complex units identified within the AOI surrounding the Tallapoosa River include:

- Stony moderately eroded with 6 to 15 percent slopes
- Stony moderately eroded with 15 to 25 percent slopes

Tallapoosa-Badin-Fruithurst complex: generally described as a well-drained loam derived from sericite schist and/or phyllite typically found on hillslopes with 6 to 15 percent slopes

Tallapoosa-Fruithurst complex: generally described as a well-drained loam derived from phyllite typically found on hillslopes with 15 to 40 percent slopes

Toccoa: generally described as a well-drained sandy loam derived from sandy and loamy alluvium typically found in flood plains with 0 to 2 percent slopes.

Wedowee: generally described as a well-drained loam derived from felsic crystalline rock typically found on hillslopes with 6 to 15 percent slopes.

Wehadkee: generally described as a poorly drained loam derived from loamy alluvium typically found in flood plains with 0 to 1 percent slopes.

Wickham: generally described as a well drained loam derived from alluvium typically found on stream terraces. Multiple Wickham units identified within the AOI surrounding the Tallapoosa River include:

- Rarely flooded sandy loam with 0 to 2 percent slopes
- Rarely flooded sandy loam with 2 to 6 percent slopes

Reference:

Natural Resources Conservation Service (NRCS). 2021. Custom Soil Resource Report for Chambers County, Alabama, Randolph County, Alabama, and Tallapoosa County, Alabama.

11. SOILS WITHIN THE AREA OF INTEREST IN THE TALLAPOOSA RIVER DOWNSTREAM OF HARRIS DAM - TABLE

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Chambers County, AL			
AaB	Altavista fine sandy loam, gently sloping	14.9	0.4%
AcB	Appling gravelly sandy loam, gently sloping	0.1	0.0%
Ba	Buncombe loamy sand	292.0	7.7%
CaC3	Cecil gravelly clay loam, severely eroded, sloping	1.0	0.0%
CaD3	Cecil gravelly clay loam, severely eroded, strongly sloping	0.5	0.0%
CaD4	Cecil gravelly clay loam, very severely eroded, strongly sloping	0.0	0.0%
CbD2	Cecil gravelly sandy loam, eroded, strongly sloping	1.2	0.0%
CbE2	Cecil gravelly sandy loam, eroded, moderately steep	5.5	0.1%
CcC2	Cecil sandy loam, 6 to 10 percent slopes, moderately eroded	0.2	0.0%
Cd	Chewacla loam	19.1	0.5%
Ce	Chewacla sandy loam	6.4	0.2%
Ch	Congaree loam	124.2	3.3%
Ga	Gullied land	0.1	0.0%
HbC2	Hiwassee fine sandy loam, eroded, sloping	1.6	0.0%
LdE	Lloyd gravelly sandy loam, moderately steep	1.5	0.0%
LhE	Louisa gravelly sandy loam, moderately steep and steep	21.6	0.6%
LkF	Louisa stony sandy loam, steep	1.6	0.0%
MbC3	Madison gravelly clay loam, 6 to 10 percent slopes, severely eroded	0.0	0.0%
MbD3	Madison gravelly clay loam, 10 to 15 percent slopes, severely eroded	7.2	0.2%
MbE3	Madison gravelly clay loam, severely eroded, moderately steep	2.0	0.1%
McE	Madison gravelly fine sandy loam, 15 to 25 percent slopes	2.2	0.1%
MdD2	Madison soils, eroded, strongly sloping, graphitic	30.6	0.8%
Rb	Rough broken land	14.5	0.4%
Sa	Sandy alluvial land, poorly to somewhat poorly drained	6.9	0.2%
ScD	Shallow land, strongly sloping	11.5	0.3%
Sd	Starr soils	0.9	0.0%

Se	Stony land	1.8	0.0%
W	Water	428.2	11.2%
WaC2	Wickham fine sandy loam, 6 to 10 percent slopes	7.2	0.2%
WaD2	Wickham fine sandy loam, 10 to 15 percent slopes	1.7	0.0%
Wb	Worsham sandy loam	1.0	0.0%
Subtotals for Soil Survey Area		**1,007.3**	**26.4%**
Totals for Area of Interest (AOI = 200 ft buffer along Tallapoosa River streambanks)		**3,814.8**	**100.0%**
Randolph County, AL			
Bu	Buncombe loamy sand	51.7	1.4%
Cn	Chewacla silt loam, 0 to 2 percent slopes, occasionally flooded	4.4	0.1%
Co	Congaree silt loam	46.4	1.2%
LgE	Louisa gravelly sandy loam, 15 to 40 percent slopes	9.1	0.2%
LoE	Louisa slaty loam, 15 to 40 percent slopes	82.9	2.2%
LsE2	Louisa stony sandy clay loam, 15 to 40 percent slopes, eroded	0.0	0.0%
LtE	Louisa stony sandy loam, 15 to 40 percent slopes	122.2	3.2%
LuD2	Louisburg stony sandy loam, 10 to 25 percent slopes, eroded	0.4	0.0%
MaC3	Madison gravelly clay loam, 6 to 10 percent slopes, severely eroded	0.8	0.0%
MaD3	Madison gravelly clay loam, 10 to 15 percent slopes, severely eroded	1.2	0.0%
MdD2	Madison gravelly fine sandy loam, 10 to 15 percent slopes, moderately eroded	1.6	0.0%
Mt	Mantachie fine sandy loam	23.2	0.6%
Oc	Ochlockonee fine sandy loam (toccoa)	336.8	8.8%
Ok	Ochlockonee fine sandy loam, local alluvium (toccoa)	1.4	0.0%
Ro	Rock land	0.5	0.0%
W	Water	643.3	16.9%
Wk	Wehadkee and Mantachie soils	0.9	0.0%
WmD2	Wickham fine sandy loam, 10 to 15 percent slopes	2.6	0.1%
Subtotals for Soil Survey Area		**1,329.4**	**34.8%**
Totals for Area of Interest (AOI = 200 ft buffer along Tallapoosa River streambanks)		**3,814.8**	**100.0%**

Tallapoosa County, AL			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
AtB	Altavista fine sandy loam, 2 to 6 percent slopes, rarely flooded	4.1	0.1%
BfC	Badin-Tallapoosa-Fruithurst complex, 3 to 10 percent slopes	4.8	0.1%
BuA	Buncombe loamy sand, 0 to 2 percent slopes, frequently flooded	61.0	1.6%
CHA	Chewacla, Cartecay and Toccoa soils, 0 to 1 percent slopes, frequently flooded	36.0	0.9%
GvD2	Gwinnett-Lloyd complex, 6 to 15 percent slopes, moderately eroded	4.4	0.1%
GwE2	Gwinnett-Agricola complex, 15 to 25 percent slopes, moderately eroded	22.9	0.6%
PrD2	Pacolet-Rion complex, 6 to 15 percent slopes, moderately eroded, stony	14.1	0.4%
PrE2	Pacolet-Rion complex, 15 to 25 percent slopes, moderately eroded, stony	52.3	1.4%
TbD2	Tallapoosa-Badin-Fruithurst complex, 6 to 15 percent slopes, moderately eroded	0.4	0.0%
TfE2	Tallapoosa-Fruithurst complex, 15 to 40 percent slopes, moderately eroded	73.8	1.9%
ToA	Toccoa fine sandy loam, 0 to 2 percent slopes, occasionally flooded	598.7	15.7%
W	Water	588.3	15.4%
WeD2	Wedowee gravelly sandy loam, 6 to 15 percent slopes, moderately eroded	2.9	0.1%
WhA	Wehadkee silt loam, 0 to 2 percent slopes, frequently flooded	0.9	0.0%
WkA	Wickham sandy loam, 0 to 2 percent slopes, rarely flooded	9.8	0.3%
WkB	Wickham sandy loam, 2 to 6 percent slopes, rarely flooded	4.0	0.1%
Subtotals for Soil Survey Area		**1,478.2**	**38.7%**
Totals for Area of Interest (AOI = 200 ft buffer along Tallapoosa River streambanks)		**3,814.8**	**100.0%**

Source: NRCS 2021

Reference:

Natural Resources Conservation Service (NRCS). 2021. Web Soil Survey. Available at: http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed October 20, 2021.

APPENDIX D

WILDLIFE AND TERRESTRIAL RESOURCES

1. WILDLIFE SPECIES POTENTIALLY OCCURRING IN THE HARRIS PROJECT VICINITY - TABLE
2. REPRESENTATIVE RIPARIAN AND LITTORAL BOTANICAL SPECIES POTENTIALLY OCCURRING IN THE LAKE HARRIS VICINITY - TABLE
3. BIRDS OF CONSERVATION CONCERN FOUND IN THE SKYLINE AND LAKE HARRIS PROJECT VICINITY
4. FOREST TYPES AT SKYLINE
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6. 2020 SKYLINE CAVE ASSESSMENT

1. WILDLIFE SPECIES POTENTIALLY OCCURRING IN THE HARRIS PROJECT VICINITY - TABLE

Table 1: BIRD SPECIES POTENTIALLY OCCURRING IN THE HARRIS PROJECT VICINITY

FAMILY	COMMON NAME	SCIENTIFIC NAME	BREEDS IN PROJECT AREA	ABUNDANCE/ SEASONALITY	HABITAT
Anatidae	Canada Goose	*Branta Canadensis*	X	Fairly common in all seasons	Freshwater marshes, agricultural fields, and on lakes
Anatidae	Wood Duck	*Aix sponsa*	X	Common in all seasons	Wooded swamps, beaver ponds, bottomlands, creeks, and lakes
Anatidae	Gadwall	*Anas strepera*		Fairly common in winter and uncommon in fall and spring	Shallow freshwater ponds and lakes with abundant aquatic vegetation
Anatidae	American Wigeon	*Anas Americana*		Fairly common in winter, spring, and fall	Shallow freshwater ponds and lakes with abundant aquatic vegetation
Anatidae	Mallard	*Anas platyrhynchos*	X	Common in winter, fairly common in spring and fall, and uncommon in summer	Shallow water of ponds, lakes, and flooded fields
Anatidae	Blue-winged Teal	*Anas discors*		Common to fairly common in spring and fall	Shallow freshwater ponds, sloughs, creeks, and on lake mudflats
Anatidae	Northern Shoveler	*Anas clypeata*		Common in winter, spring and fall	Freshwater ponds, swamps, and on lakes
Anatidae	Northern Pintail	*Anas acuta*		Fairly common in winter, spring, and fall	Freshwater marshes, agricultural fields, and shallow portions of lakes, ponds, and rivers
Anatidae	Green-winged Teal	*Anas cerci*		Common in winter, spring, and fall	Shallow freshwater marshes, and on creeks, lakes, and mudflats
Anatidae	Ring-necked Duck	*Aythya collaris*		Common in winter, early spring, and late fall	Shallow, wooded, freshwater ponds, swamps, and lakes
Anatidae	Lesser Scaup	*Aythya affinisthrus*		Fairly common in winter, spring, and fall	Larger lakes and rivers
Anatidae	Bufflehead	*Bucephala albeola*		Common in winter, early spring, and late fall	Larger lakes and slow-moving rivers
Anatidae	Hooded Merganser	*Lophodytes cucullatus*	X	Fairly common in winter, spring, and fall, and rare in summer	Wooded freshwater ponds, lakes, and slow water river systems
Anatidae	Ruddy Duck	*Oxyura jamaicensis*		Fairly common in winter	Freshwater ponds, lakes, and slow-moving rivers
Phasianidae	Wild Turkey	*Meleagris gallopavo*	X	Fairly common in all seasons	Forested and partially forested habitats

FAMILY	COMMON NAME	SCIENTIFIC NAME	BREEDS IN PROJECT AREA	ABUNDANCE/ SEASONALITY	HABITAT
Odontophoridae	Northern Bobwhite	*Colinus virginianus*	X	Fairly common in all seasons in early successional habitats	Farms, along woodland edges, recently cut-over forest land, and in open country habitats dominated by old fields
Podicipedidae	Pied-billed Grebe	*Podilymbus podiceps*	X	Fairly common in spring, winter, and fall	Lakes and marshy ponds
Phalacrocoracidae	Double-crested Cormorant	*Phalacrocorax auritus*		Fairly common in fall, winter, and spring and uncommon in summer	Larger lakes, ponds, and rivers
Ardeidae	Great Blue Heron	*Ardea herodias*	X	Common in all seasons	Shallow water of ponds, lakes, and rivers
Ardeidae	Great Egret	*Ardea alba*	X	Common to fairly common in spring, summer, but uncommon to rare in winter	Shallow water of ponds, lakes, and rivers
Ardeidae	Little Blue Heron	*Egretta caerulea*	X	Rare to uncommon in spring to mid-summer, but fairly common in late summer and early fall	Shallow water of ponds, lakes, and rivers
Ardeidae	Green Heron	*Butorides virescens*	X	Common in spring, summer, and fall, but rare in winter	Edge of ponds, lakes, and rivers
Cathartidae	Black Vulture	*Coragyps atratus*	X	Common throughout year	Agricultural and livestock areas
Cathartidae	Turkey Vulture	*Cathartes aura*	X	Common in all seasons and regions	Wooded as well as open areas
Accipitridae	Osprey	*Pandion haliaetus*	X	Fairly common in spring and fall, and uncommon in summer	Large lakes and rivers
Accipitridae	Northern Harrier	*Circus cyaneus*		Fairly common in winter, spring, and fall	In and over old fields, marshes, meadows, and grasslands
Accipitradae	Red-shouldered Hawk	*Buteo lineatus*	X	Fairly common in all seasons	Moist woodlands and swamps
Accipitradae	Broad-winged Hawk	*Buteo platypterus*	X	Fairly common in spring and summer, common in fall, but rare in winter	Deciduous woodlands; during migration can be seen overhead of any habitat type
Accipitradae	Red-tailed Hawk	*Buteo jamaicensis*	X	Common winter and fairly common in spring, summer, and fall	Open country and woodland edges
Falconidae	American Kestrel	*Falco sparverius*	X	Common in winter, fairly common in spring and fall, but rare in summer	Open fields and woodland edges.
Rallidae	American Coot	*Fulica Americana*		Common in winter, common to uncommon in spring and fall, and rare in summer	Rivers, ponds, lakes, and swamps

FAMILY	COMMON NAME	SCIENTIFIC NAME	BREEDS IN PROJECT AREA	ABUNDANCE/ SEASONALITY	HABITAT
Charadriidae	American Golden-Plover	*Pluvialis dominica*		Fairly common in spring and uncommon to rare in fall	Short grasslands, flooded fields and on mudflats of lakes, ponds, and rivers
Charadriidae	Semipalmated Plover	*Charadrius semipalmatus*		Fairly common in spring and fall, and occasional in early winter	Mudflats of lakes, ponds, and rivers
Charadriidae	Killdeer	*Charadrius vociferous*	X	Common in all seasons	Short-grass fields, and mudflats and shorelines of lakes, ponds, and rivers
Scolopacidae	Greater Yellowlegs	*Tringa melanoleuca*		Fairly common in spring and fall, but uncommon in winter and late summer	Along shorelines of shallow ponds and lakes, marsh edges, in flooded fields, and on mudflats
Scolopacidae	Lesser Yellowlegs	*Tringa flavipes*		Common in spring and fall, rare in winter, uncommon to rare in summer	Along shorelines of shallow ponds and lakes, marsh edges, in flooded fields and on mudflats
Scolopacidae	Spotted Sandpiper	*Actitis macularius*	X	Common in spring, late summer and fall, but rare in winter	Along pond and lake margins, stream banks, and on mudflats
Scolopacidae	Solitary Sandpiper	*Tringa solitaria*		Common in spring, late summer, and fall	Along lake borders, stream banks, ponds, and marsh edges
Scolopacidae	Semipalmated Sandpiper	*Calidris pusilla*		Fairly common in spring and fall, and uncommon in late summer	On mudflats, and along pond edges and lakeshores
Scolopacidae	Least Sandpiper	*Calidris minutilla*		Common in spring, fairly common in fall, uncommon in winter and late summer, and occasional in early summer	On mudflats, and along pond edges and lakeshores
Scolopacidae	Pectoral Sandpiper	*Calidris melanotos*		Common in spring and fall, and uncommon in late summer	Wet meadows, flooded fields, on mudflats, and along shores of ponds, pools, and lakes
Scolopacidae	Common Snipe	*Gallinago*		Common in winter, spring, and fall	Marshes and wet grassy areas
Scolopacidae	American Woodcock	*Scolopax minor*	X	Fairly common in fall and winter, and occasional in spring	Moist shrubby woods, floodplains, thickets, and at edges of swamps
Laridae	Ring-billed Gull	*Larus delawarensis*		Fairly common in winter, spring and fall, and occasional in summer	Summer rivers, lakes, irrigated and plowed fields, and garbage dumps
Columbidae	Rock Pigeon	*Columba livia* *Exotic*	X	Common in all seasons	In cities, and on farms, bridges, cliffs
Columbidae	Mourning Dove	*Zenaida macroura*	X	Common in all seasons	Farms, and in towns, woodlots, agricultural fields, and grasslands
Cuculidae	Yellow-billed Cuckoo	*Coccyzus americanus*	X	Common in spring, summer, and fall	Woodlands, and on farmlands with scattered trees and orchards

FAMILY	COMMON NAME	SCIENTIFIC NAME	BREEDS IN PROJECT AREA	ABUNDANCE/ SEASONALITY	HABITAT
Strigidae	Eastern Screech-Owl	*Megascops asio*	X	Common in all seasons	Woodlands, especially near open areas
Strigidae	Great Horned Owl	*Bubo virginianus*	X	Fairly common in all seasons	Woodlands, parklands, and occasionally In wooded suburbs
Strigidae	Barred Owl	*Strix varia*	X	Common in all seasons	Moist woodlands and wooded swamps
Caprimulgidae	Chuck-will's-widow	*Anstrostomus carolinensis*	X	Common in spring, summer, and fall	Deciduous and pine woodlands
Caprimulgidae	Whip-poor-will	*Caprimulgus vociferous*	X	Locally common in spring, summer, and fall	Open and mix-forest woodlands
Apodidae	Chimney Swift	*Chaetura pelagica*	X	Common in spring, summer, and fall	Open areas, especially around human habitations
Trochilidae	Ruby-throated Hummingbird	*Archilochus colubris*	X	Common in spring, summer, and fall	Woodlands, gardens, along forest edges, and at feeders
Alcedinidae	Belted Kingfisher	*Ceryle alcyon*	X	Common in all seasons	Along wooded rivers, streams, lakes, ponds, and in marshes
Picidae	Red-headed Woodpecker	*Melanerpes erythrocephalus*	X	Fairly common in spring, summer, and fall, but uncommon in winter	Open woods, especially those containing numerous snags
Picidae	Red-bellied Woodpecker	*Melanerpes carolinus*	X	Common in all seasons	Woodlands
Picidae	Yellow-bellied Sapsucker	*Sphyrapicus varius*		Fairly common in winter, spring, and fall	Mixed hardwood and conifer forests
Picidae	Downy Woodpecker	*Picoides pubescens*	X	Common in all seasons	Woodlands, orchards, suburban areas, parks, and farm woodlots
Picidae	Red-cockaded Woodpecker	*Picoides borealis*	X	Rare and isolated in all seasons	Old growth pine with open mid-story
Picidae	Northern Flicker	*Colaptes auratus*	X	Fairly common in all seasons and regions	Open woodlands and fields, and on lawns and open meadows with large trees
Picidae	Pileated Woodpecker	*Dryocopus pileatus*	X	Fairly common in all	Mature woodlands with coniferous and hardwood trees
Tyrannidae	Eastern Wood-Pewee	*Contopus virens*	X	Common to fairly common in spring, summer, and fall	Open woodlands, parks, and along forest edges
Tyrannidae	Acadian Flycatcher	*Empidonax virescens*	X	Common in spring, summer, and fall	Moist deciduous woods, dense woodlands, and wooded swamps
Tyrannidae	Eastern Phoebe	*Sayornis phoebe*	X	Common in winter, spring, and fall	Open deciduous woodlands near bridges, cliffs, and eaves

FAMILY	COMMON NAME	SCIENTIFIC NAME	BREEDS IN PROJECT AREA	ABUNDANCE/ SEASONALITY	HABITAT
Tyrannidae	Great Crested Flycatcher	*Myiarchus crinitus*	X	Common in spring, summer, and fall	Woodlands, open country with scattered trees, and parks
Tyrannidae	Eastern Kingbird	*Tyrannus*	X	Common in spring, summer, and fall	Open rural areas with scattered trees and shrubs, along woodland edges, and in agricultural fields with hedgerows, especially near ponds or rivers
Laniidae	Loggerhead Shrike	*Lanius ludovicianus*	X	Fairly common in winter, spring, and fall, and uncommon in summer	Open country with scattered trees and shrubs, and in hedgerows along agricultural fields
Vireonidae	White-eyed Vireo	*Vireo griseus*	X	Common in spring, summer, and fall	Undergrowth, early successional fields, streamside thickets, and along woodland edges
Vireonidae	Yellow-throated Vireo	*Vireo flavifrons*	X	Common in spring, summer, and fall	Tall, open woodlands, especially near water
Vireonidae	Red-eyed Vireo	*Vireo olivaceus*	X	Common in spring, summer, and fall	Deciduous woods, mixed forests, shade trees, and woodlots
Corvidae	Blue Jay	*Cyanocitta cristata*	X	Common in all seasons	Forests, open woodlands, wooded residential areas, and parks
Corvidae	American Crow	*Corvus brachyrhynchos*	X	Common	All woodlands, farmlands, and suburban areas
Corvidae	Fish Crow	*Corvus ossifragus*	X	Fairly common to locally common in all seasons	Around swamplands, riverine areas, large lakes, urban and suburban areas, and farmlands
Hirundinidae	Purple Martin	*Progne subis*	X	Common in spring, summer, and early fall	Open rural and suburban areas and open farmlands, especially near water
Hirundinidae	Tree Swallow	*Tachycineta bicolor*	X	Common in fall, fairly common in spring, and rare in winter and summer	Open areas, and over ponds and lakes; nests in cavities in dead, standing timber and boxes
Hirundinidae	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	X	Common in spring, summer, and fall	Open areas, fields, swamps, and over ponds and lakes; nests in burrows in road cuts and steep banks
Hirundinidae	Bank Swallow	*Riparia*		Fairly common in spring and fall, and occasional	Summer in open habitats, especially near water
Hirundinidae	Cliff Swallow	*Petrochelidon pyrrhonota*	X	Fairly common in spring, summer, and fall	Open habitats near water; nests on dams and bridges

FAMILY	COMMON NAME	SCIENTIFIC NAME	BREEDS IN PROJECT AREA	ABUNDANCE/ SEASONALITY	HABITAT
Hirundinidae	Barn Swallow	*Hirundo rustica*	X	Common in spring, summer, and fall	Open habitats, under bridges and culverts, and in barns
Paridae	Carolina Chickadee	*Poecile carolinensis*	X	Common in all seasons	Woodlands and wooded suburbs
Paridae	Tufted Titmouse	*Baeolophus bicolor*	X	Common in all seasons	Woodlands and wooded suburbs
Sittidae	Brown-headed Nuthatch	*Sitta pusilla*	X	Locally common in all seasons	Open pine forests
Troglodytidae	Carolina Wren	*Thryothorus ludovicianus*	X	Common in all seasons	Thickets in woodlands, farmlands, and suburbs
Troglodytidae	House Wren	*Troglodytes aedon*	X	Fairly common in fall, uncommon in spring, and rare in winter and summer	Farmlands, thickets, and suburban yards with dense hedgerows
Regulidae	Golden-crowned Kinglet	*Regulus satrapa*		Common in winter, spring, and fall	Woodlands, especially with conifers
Regulidae	Ruby-crowned Kinglet	*Regulus calendula*		Common in winter, spring, and fall	Woodlands
Sylviidae	Blue-gray Gnatcatcher	*Polioptila caerulea*	X	Common in spring, summer, and fall, and rare in winter	Open woodlands, forest edges, and tree-lined fence rows
Turdidae	Eastern Bluebird	*Sialia sialis*	X	Common in all seasons	Open rural areas, farmlands, fence rows, open suburban areas, and parks with scattered trees
Turdidae	Swainson's Thrush	*Catharus ustulatus*		Fairly common in spring and fall	Woodlands with dense undergrowth
Turdidae	Hermit Thrush	*Catharus guttatus*		Common in winter, spring, and fall	Woodlands with dense undergrowth
Turdidae	Wood Thrush	*Hylocichla mustelina*	X	Common in spring, summer, and fall	Woodlands and wooded suburbs with understory
Turdidae	American Robin	*Turdus migratorius*	X	Common in all seasons	Short grass areas with scattered trees
Mimidae	Gray Catbird	*Dumetella carolinensis*	X	Common in spring and fall	Hedgerows, thickets, fence rows, and dense brushy vegetation bordering ponds and lakes
Mimidae	Northern Mockingbird	*Mimus polyglottos*	X	Common in all seasons	Openings with short grass, scattered shrubs, and trees
Mimidae	Brown Thrasher	*Toxostoma rufum*	X	Common in all seasons	Short ground cover vegetation near dense thickets, hedgerows, and shrubs
Motacillidae	American Pipit	*Anthus rubescens*		Fairly common in winter, spring, and fall	Open country, especially on plowed fields and mudflats

FAMILY	COMMON NAME	SCIENTIFIC NAME	BREEDS IN PROJECT AREA	ABUNDANCE/ SEASONALITY	HABITAT
Bombycillidae	Cedar Waxwing	*Bombycilla cedrorum*	X	Common in winter, spring, and fall, and occasional in summer	Areas with trees and shrubs that produce fruits, such as hackberry, mulberry, cedar, cherry, and holly
Parulidae	Tennessee Warbler	*Vermivora peregrine*		Common in spring and fall	Woodlands
Parulidae	Northern Parula	*Parula Americana*	X	Fairly common in spring, summer, and fall	Tall trees along streams, swamps, and lakes; woodlands during migration
Parulidae	Yellow Warbler	*Dendroica petechia*	X	Common in spring and fall, and rare in summer	Small trees and shrubs near water
Parulidae	Magnolia Warbler	*Dendroica magnolia*		Common in fall, fairly common in spring, and occasional in summer	Woodlands
Parulidae	Yellow-rumped Warbler	*Dendroica coronata*		Common in winter, spring, and fall	Woodlands
Parulidae	Black-throated Green Warbler	*Dendroica virens*	X	Common in fall, fairly common in spring and summer	Coniferous and deciduous forests; in migration, found in woodlands
Parulidae	Yellow-throated Warbler	*Dendroica dominica*	X	Fairly common in spring, summer, and fall, and occasional in winter	Older pine forests, and woodlands with sycamores, especially near water; in migration, found in woodlands
Parulidae	Pine Warbler	*Dendroica pinus*	X	Common in all seasons	Mature pine woodlands
Parulidae	Prairie Warbler	*Setophaga discolor*	X	Common in spring, summer and fall, and occasional in winter	Brushy early successional growth, particularly regenerating clearcuts
Parulidae	Palm Warbler	*Dendroica palmarum*		Common in spring, fairly common in fall, and rare in winter	Open areas with scattered shrubs and trees
Parulidae	Bay-breasted Warbler	*Dendroica castanea*		Fairly common in spring and fall	Woodlands
Parulidae	Black-and-white Warbler	*Mniotilta varia*	X	Common in spring and fall	Hardwood and mixed hardwood-coniferous forests; in migration, found in woodlands
Parulidae	American Redstart	*Setophaga ruticilla*	X	Common in spring and fall, and fairly common in summer	In breeding season, found in deciduous woods, especially riverine systems; in migration, found in woodlands
Parulidae	Prothonotary Warbler	*Protonotaria citrea*	X	Common in spring, summer, and early fall	Swamp and bottomland forests
Parulidae	Swainson's Warbler	*Limnothlypis swainsonii*	X	Fairly common in spring and summer, and uncommon to rare in fall	Dense thickets in swamps, along streams, and in woodland areas

FAMILY	COMMON NAME	SCIENTIFIC NAME	BREEDS IN PROJECT AREA	ABUNDANCE/ SEASONALITY	HABITAT
Parulidae	Ovenbird	*Seiurus aurocapillus*	X	Fairly common in spring and fall	In breeding season, found in deciduous forests; in migration, found in woodlands, especially with dense understory
Parulidae	Northern Waterthrush	*Seiurus noveboracensis*		Fairly common in spring and fall	Along shorelines of swamps, lakes, ponds, and streams
Parulidae	Louisiana Waterthrush	*Parkesia motacilla*	X	Common in spring, summer, and early fall	Older bottomland forests along streams
Parulidae	Kentucky Warbler	*Oporornis formosus*	X	Fairly common in spring, summer, and fall	Moist woodlands with dense herbaceous ground cover
Parulidae	Common Yellowthroat	*Geothlypis trichas*	X	Common in spring, summer, and fall, and rare in winter	Along woodland edges, and in hedgerows, thickets, marshes, and wet meadows
Parulidae	Hooded Warbler	*Wilsonia citrine*	X	Common in spring, summer, and fall	In breeding season, found in shrubby forests; in migration, found in woodlands, especially in understory
Parulidae	Yellow-breasted Chat	*Icteria virens*	X	Common in spring, summer, and fall, and occasional in winter	Early successional growth areas
Thraupidae	Summer Tanager	*Piranga rubra*	X	Common in spring, summer, and fall, and occasional in winter	In breeding season, found in open, mixed hardwood-coniferous forests and along forest edges
Thraupidae	Scarlet Tanager	*Piranga olivacea*	X	Fairly common in spring, summer, and fall	In breeding season, found in hardwood forests; in migration, found in woodlands
Emberizidae	Eastern Towhee	*Pipilo erythrophthalmus*	X	Common in all seasons	Brushy woodlands and early successional growth
Emberizidae	Chipping Sparrow	*Spizella passerine*	X	Common in all seasons	Open areas with short grass and scattered trees, especially conifers
Emberizidae	Field Sparrow	*Spizella pusilla*	X	Common to fairly common in all seasons	Early successional growth areas, especially with dense ground cover
Emberizidae	Savannah Sparrow	*Passerculus sandwichensis*		Common in winter, spring, and fall	Open grassy fields
Emberizidae	Song Sparrow	*Melospiza melodia*	X	Common in winter, spring, and fall, and uncommon to rare in summer	Open brushy and weedy areas
Emberizidae	Swamp Sparrow	*Melospiza Georgiana*		Common to fairly common in winter, spring, and fall	Freshwater marshes, and shrubby and weedy areas, especially near water
Emberizidae	White-throated Sparrow	*Zonotrichia albicollis*		Common in winter, spring, and fall, and rare in summer	Thickets and shrubby areas

FAMILY	COMMON NAME	SCIENTIFIC NAME	BREEDS IN PROJECT AREA	ABUNDANCE/ SEASONALITY	HABITAT
Emberizidae	Dark-eyed Junco	*Junco hyemalis*		Common in winter, spring, and fall, and occasional in summer	Open woodlands, and brushy and grassy areas
Cardinalidae	Northern Cardinal	*Cardinalis*	X	Common in all seasons	Shrubby areas, hedgerows, thickets, and suburban gardens
Cardinalidae	Rose-breasted Grosbeak	*Pheucticus ludovicianus*		Fairly common in spring and uncommon in fall	Woodlands, especially in the canopy
Cardinalidae	Blue Grosbeak	*Passerina caerulea*	X	Common in spring, summer, and fall	Open thickets and hedgerows, especially along field borders
Cardinalidae	Indigo Bunting	*Passerina cyanea*	X	Common in spring, summer, and fall, and occasional in winter	Brushy and weedy area, in early successional stages and woodland openings, and along woodland and field borders
Icteridae	Red-winged Blackbird	*Agelaius phoeniceus*	X	Common in all seasons	Marshes, and brushy, weedy and grassy areas, especially when wet
Icteridae	Eastern Meadowlark	*Sturnella magna*	X	Common in all seasons	Grassy, weedy fields, especially high grass
Icteridae	Common Grackle	*Quiscalus quiscula*	X	Common in all seasons	Open woodlands, especially those with pines and grassy areas; also fields with short grasses or in cultivated fields
Icteridae	Brown-headed Cowbird	*Molothrus ater*	X	Common in all seasons	Open areas, especially with livestock
Icteridae	Orchard Oriole	*Icterus spurious*	X	Common in spring, summer, and fall	In breeding season, found in open areas, with scattered trees, especially near water. In migration, found in woodlands
Icteridae	Baltimore Oriole	*Icterus galbula*	X	Fairly common in spring and fall, but rare in summer and winter	In breeding season, found in open areas, with scattered trees, especially near water. In migration, found in woodlands
Fringillidae	House Finch	*Carpodacus mexicanus*	X	Common in all seasons	Open woodlands
Fringillidae	American Goldfinch	*Carduelis tristis*	X	Common in winter, spring, and fall	Open woodlands, brushy areas, and willow thickets
Passeridae	House Sparrow	*Passer domesticus Exotic*	X	Common in all seasons	Urban and suburban areas, and open farmland

Source: Mirarchi 2004, Causey 2006

Table 2: Mammal Species Potentially Occurring in the Harris Project Vicinity

FAMILY	COMMON NAME	SCIENTIFIC NAME	ABUNDANCE IN PROJECT AREA	DISTRIBUTION IN ALABAMA	HABITAT
Didelphidae	Virginia Opossum	*Didelphis virginiana*	Common	Found statewide	All habitats, including urban areas
Soricidae	Least Shrew	*Cryptotis parva*	Poorly known	Found statewide	Grasslands and other upland areas, weedy fencerows, fields, roadsides, and meadows
Soricidae	Southeastern Shrew	*Sorex longirostris*	Poorly known	Found statewide, except southern tier of counties	Occupies a variety of habitats from bogs and marshes to upland grassy areas and forests, and even bare hillsides and dry upland hardwoods. May favor moist areas bordering swamps, marshes, lakes, and streams
Talpidae	Eastern Mole	*Scalopus aquaticus*	Poorly known	Found statewide and common in a variety of habitats	In both forested and unforested areas. Occupies moist, loose, sandy or loamy soils, and spends most of life underground
Vespertilionidae	Gray Bat	*Myotis grisescens*		Found statewide, except for southwestern region	Occupies deep caves near permanent water in winter and summer. Forages primarily over water, along streams, and over lakes and ponds
Vespertilionidae	Northern Long-eared Bat	*Myotis septentrionalis*	Poorly known	Found statewide, except southwestern region	Forested ridges appear favored over riparian woodlands. Hibernacula include caves and mines, but may use crevices in walls or ceilings. Summer roosts include tree holes, birdhouses, or behind loose bark or shutters of buildings
Vespertilionidae	Indiana Bat	*Myotis sodalis*	Poorly known	Occurs in northern and eastern half of Alabama	Hibernates in caves, mostly in tight clusters. In summer, females form small maternity colonies in tree hollows and behind loose bark.
Vespertilionidae	Tricolored Bat	*Perimyotis subflavus*	Common	Found statewide	Occupies hollow trees, tree foliage, caves, mines, rock crevices, and buildings
Vespertilionidae	Big Brown Bat	*Eptesicus fuscus*	Common	Found statewide and common	Roosts typically in human-made structures, but also in caves, mines, hollow trees, and crevices, or behind loose bark. Commonly inhabits bat houses, attics, and louvered attic vents
Vespertilionidae	Eastern Red Bat	*Lasiurus borealis*	Common	Found statewide and common	Roosts in a variety of trees, but frequently uses clumps of Spanish moss

Vespertilionidae	Seminole Bat	*Lasiurus seminolus*	Common	Found statewide	Common in mixed coniferous and deciduous woodlands, often associated with Spanish moss. Mostly forages at tree-top level in forests, although also flies over open water, forest clearings, and along forest edges

FAMILY	COMMON NAME	SCIENTIFIC NAME	ABUNDANCE IN PROJECT AREA	DISTRIBUTION IN ALABAMA	HABITAT
Vespertilionidae	Evening Bat	*Nycticeius humeralis*	Common	Found statewide, but may be most common in southern half	Primary habitat is deciduous forest where it roosts in hollow trees, under loose bark, and in human-made structures, such as outbuildings, churches, belfries, and attics
Dasypodidae	Nine-banded Armadillo	*Dasypus novemcinctus*	Common	Found statewide	Woodlands, forest edges, savannas, and brushy areas
Leporidae	Swamp Rabbit	*Sylvilagus aquaticus*	Poorly known	Distributed statewide, except for southern tier of counties along Florida Panhandle	Floodplain forests, wooded bottomlands, briar and honeysuckle patches, and canebrakes
Leporidae	Eastern Cottontail	*Sylvilagus floridanus*	Common	Found statewide	Primarily occurs in deciduous forests and forest edges, but also in grasslands, along fencerows, and in urban areas
Sciuridae	Eastern Chipmunk	*Tamias striatus*	Common	Found statewide, except for extreme southwestern and southeastern regions	Occupies wooded areas with dense canopy and sparsely covered forest floor, open brushy habitats, ravines, deciduous growth along streams, and urban areas
Sciuridae	Woodchuck	*Marmota monax*	Poorly known	Distribution includes northern 2/3 of state	Occupies forest edges and open fields and pastures near brushy fencerows or other cover
Sciuridae	Gray Squirrel	*Sciurus carolinensis*	Common	Found statewide	Hardwood forests, mixed forests, and urban areas
Sciuridae	Fox Squirrel	*Sciurus niger*	Fairly Common	Found statewide	Favors mature deciduous and pine-oak woodlands, but also occurs at forest edges and in riparian woodlands
Sciuridae	Southern Flying Squirrel	*Glaucomys volans*	Common	Found statewide	Most common in mature, broad-leaved forests, but also found in coniferous-deciduous woodlands, and urban areas. Nocturnal existence belies its common occurrence
Castoridae	Beaver	*Castor Canadensis*	Common	Found statewide	All habitats with open water. Considered a pest in some areas
Muridae	Marsh Rice Rat	*Oryzomys palustris*	Common	Found statewide	Wet meadows and dense vegetation near marshes, swamps, streams, ponds, and ditches
Muridae	Eastern Harvest Mouse	*Reithrodontomys humulis*	Poorly known	Once common	Old fields containing dense stands of weeds and grasses, but may be declining in Alabama

FAMILY	COMMON NAME	SCIENTIFIC NAME	ABUNDANCE IN PROJECT AREA	DISTRIBUTION IN ALABAMA	HABITAT
Muridae	Cotton Mouse	*Peromyscus gossypinus*	Common	Found statewide	Dense underbrush, bottomland hardwood forests, and a variety of other habitats, including old fields, upland forests, hammocks, and swamps
Muridae	White-footed Mouse	*Peromyscus leucopus*	Poorly known	Occurs in northern 2/3 of state	Common in woodlands with fallen logs, brush piles, and rocks, and in shrubs along fencerows and streams
Muridae	Golden Mouse	*Ochrotomys nuttalli*	Common		Woodlands, floodplains, borders of fields, and thickets bordering swamps and dense woods
Muridae	Hispid Cotton Rat	*Sigmodon hispidus*	Found statewide	Populations fluctuate greatly among years.	Grassy areas of fields and along roadways,
Muridae	Eastern Woodrat	*Neotoma floridana*	Poorly known	No recent surveys; populations may be declining	Occupies woodland and brushy habitats south of Tennessee River. Usually found associated with rocky outcrops, but also in areas with dense vegetation
Muridae	Pine Vole	*Microtus pinetorum*		Found statewide, except for southwestern section	Occupies a wide range of habitats, including leaf litter, grassy fields with brush and brambles, and beneath mats of dense vegetation
Muridae	Muskrat	*Ondatra zibethicus*	Common	Found nearly statewide, except counties bordering Florida Panhandle	Habitats include saline, brackish, and freshwater streams; marshes; ponds; lakes; ditches; and rivers
Muridae	House Mouse	*Mus musculus Exotic*	Common	Found statewide	Often found in habitats associated with native rodents fairly distant from human habitation
Carnivora	Coyote	*Canis latrans*	Common in all habitats	Found statewide, including urban areas	Wide rage, upland forests and swamps to pastures and fields
Carnivora	Red Fox	*Vulpes*	Common	Found statewide	Forested uplands interspersed with pastures and farmland
Carnivora	Gray Fox	*Urocyon cinereoargenteus*	Common	Found statewide	Forested habitats statewide
Procyonidae	Raccoon	*Procyon lotor*	Common	Found statewide	All habitats statewide, including urban areas; often associated with water, especially bottomland swamps, marshes, and flooded woodlands

FAMILY	COMMON NAME	SCIENTIFIC NAME	ABUNDANCE IN PROJECT AREA	DISTRIBUTION IN ALABAMA	HABITAT
Mustelidae	Long-tailed Weasel	*Mustela frenata*	Poorly known	Probably found statewide, but little known about current status	Woodlands, forest edges, fencerows, agricultural, and urban areas
Mustelidae	Mink	*Mustela vison*	Poorly known	This semiaquatic species occurs statewide	Usually near permanent water
Mustelidae	River Otter	*Lontra Canadensis*	Poorly known	Probably present statewide	In association with rivers, creeks, and lakes, especially open water bordered with wooded habitat
Mephitidae	Striped Skunk	*Mephitis mephitis*	Common	Found statewide	Open areas, forest edges, and urban habitats
Mephitidae	Eastern Spotted Skunk	*Spilogale putorius*	Poorly known	Found statewide	Variety of habitats such as pastures, woodlands, forest edges, and farmlands
Felidae	Bobcat	*Lynx rufus*	Common	Found statewide	Wide array of habitats including dense understory, bottomland hardwood forests, swamps, and farmlands
Cervidae	White-tailed Deer	*Odocoileus virginianus*	Common and important game species	found statewide	Urban habitats
Suidae	Feral Swine	*Sus scrofa* *Exotic*	Fairly Common	Found statewide	Woodlands, swamps, and fields, primarily near water

Source: Mirarchi 2004, Causey 2006

Table 3: Reptile and Amphibian Species Potentially Occurring in the Harris Project Vicinity

FAMILY	COMMON NAME	SCIENTIFIC NAME	ABUNDANCE IN PROJECT AREA	HABITAT
		Amphibians		
Bufonidae	American toad	*Bufo americanus*	Common	Upland forests, suburban areas
Bufonidae	Fowler's toad	*Bufo woodhousii*	Common	Sandy areas around shores of lakes, or in river valleys
Hylidae	northern cricket frog	*Acris crepitans*	Common	Creekbanks, lakeshores, and mudflats
Hylidae	Cope's gray treefrog	*Hyla chrysoscelis*	Common	Small trees or shrubs, typically over standing water; on ground or at water's edge during breeding season
Hylidae	green treefrog	*Hyla cinerea*	Moderately common	Permanent aquatic habitats
Hylidae	mountain chorus frog	*Pseudacris brachyphona*	Moderately Common	Forested areas in most of northern Alabama
Hylidae	northern spring peeper	*Pseudacris crucifer*	Common	Ponds, pools and swamps
Hylidae	upland chorus frog	*Pseudacris triseriata feriarum*	Moderately Common	Grassy swales, moist woodlands, river-bottom swamps, and environs of ponds, bogs and marshes
Microhylidae	eastern narrow-mouthed toad	*Gastrophyrne carolinensis*	Common	Variety of habitats providing suitable cover and moisture, including under logs and or leaf litter
Pelobatidae	eastern spadefoot toad	*Scaphiopus holbrooki*	Moderately	Forested areas of sandy or loose soil
Ranidae	bullfrog	*Rana catesbeiana*	Common	Permanent aquatic habitats
Ranidae	bronze frog	*Rana clamitans spp.*	Moderately Common	Rocks, stumps, limestone crevices of stream environs, bayheads and swamps
Ranidae	wood frog	*Rana sylvatica*	Uncommon	Moist wooded areas
Ranidae	southern leopard frog	*Rana pipiens sphenocephala*	Moderately Common, believed to be declining	All types of aquatic to slightly-brackish habitats
Ambystomatidae	spotted salamander	*Ambystoma maculatum*	Moderately Common, believed to be declining	Bottomland hardwoods, woodland pools
Ambystomatidae	marbled salamander	*Ambystoma opacum*	Common	Bottomland hardwoods, woodland pools
Plethodontidae	spotted dusky salamander	*Desmongnathus conanti*	Common	Damp habitats, seepage areas
Plethodontidae	Southern two-lined salamander	*Eurycea cirrigera*	Common	Shaded aquatic habitats
Plethodontidae	three-lined salamander	*Eurycea guttolineata*	Common	Shaded aquatic habitats, forested floodplains

FAMILY	COMMON NAME	SCIENTIFIC NAME	ABUNDANCE IN PROJECT AREA	HABITAT
Plethodontidae	Webster's salamander	*Plethodon websteri*	Moderately Common	Damp deciduous forest
Plethodontidae	Northern slimy salamander	*Plethodon glutinosus*	Common	Wide variety of habitats
Plethodontidae	Northern red salamander	*Pseudotriton ruber*	Common	Aquatic margins in forested areas
Salamandridae	Eastern newt	*Notophthalmus viridescens louisianensis*	Moderately Common	Terrestrial or aquatic habitats, depending on life stage
Salamandridae	central newt	*Notophthalmus viridescens*	Moderately Common	Terrestrial or aquatic habitats, depending on life stage
Reptiles				
Chelydridae	common snapping turtle	*Chelydra serpentina*	Common	Aquatic habitats
Emydidae	painted turtle	*Chrysemys picta ssp.*	Moderately Common	Lakes, rivers, and ponds
Emydidae	Alabama map turtle	*Graptemys pulchra*	Moderately Common	Rivers and large streams in AL
Emydidae	river cooter	*Pseudemys concinna*	Common	Rivers, streams, and some lakes
Emydidae	eastern box turtle	*Terrapene carolina*	Common	Wooded uplands
Emydidae	yellow-bellied pond slider	*Pseudemys scripta*	Common	Ponds, rivers, creeks, and open swamps
Emydidae	red-eared pond slider	*Pseudemys scripta elegans*	Common	Ponds, rivers, creeks, and open swamps
Kinosternidae	eastern mud turtle	*Kinosternon subrubrum*	Common	Sluggish aquatic habitats
Kinosternidae	Loggerhead musk turtle	*Sternotherus minor ssp.*	Moderately Common	Creeks and rivers
Kinosternidae	Stinkpot	*Sternotherus odoratus*	Common	Sluggish aquatic habitats
Iguanidae	green anole	*Anolis carolinensis*	Common	Wide range of upland and riparian areas
Scincidae	common five-lined skink	*Eumeces fasciatus*	Common	Forests and a variety of other habitats
Scincidae	southern five-lined skink	*Eumeces inexpectatus*	Uncommon	Dry and relatively open forestlands
Scincidae	broad-headed skink	*Eumeces laticeps*	Moderately Common	Rotting logs, stumps, and tree cavities
Scincidae	ground skink	*Scincella lateralis*	Common, believed to be declining	Forested areas
Iguanidae	Eastern fence lizard	*Sceloporus undulatus*	Common	Wide range of upland and riparian areas

FAMILY	COMMON NAME	SCIENTIFIC NAME	ABUNDANCE IN PROJECT AREA	HABITAT
Colubridae	worm snake	*Carphophis amoenus ssp.*	Moderately Common	Fossorial, under rocks and in rotting logs
Colubridae	scarlet snake	*Cemphora coccinea*	Common, but believed to be declining	Areas with loose, well drained soils
Colubridae	black racer	*Coluber constrictor ssp.*	Common, believed to be declining	In or near water, streams passing through cypress swamps
Colubridae	ringneck snake	*Diadophis punctatus ssp.*	Common	Under shelter in upland areas near water
Colubridae	corn snake	*Elaphe guttata*	Moderately Common	Wide range of upland and riparian areas
Colubridae	rat snake	*Elaphe obsoleta ssp.*	Common	Wide range of upland and riparian areas
Colubridae	gray rat snake	*Elaphe obsoleta*	Common	Wide range of upland and riparian areas
Colubridae	eastern hognose snake	*Heterodon platyrhinos*	Uncommon, believed to be declining	Fields, open woods, disturbed areas
Colubridae	black kingsnake	*Lampropeltis getula niger*	Moderately Common	Dry rocky hills, open woods, dry prairies, and stream valleys
Colubridae	scarlet kingsnake	*Lampropeltis triangulum elapsoides*	Uncommon, believed to be declining	In or near woodlands, especially pinelands
Colubridae	Plain-bellied water snake	*Natrix erythrogaster ssp.*	Common	Riverbottoms, swamps, marshes, and river/lake edges
Colubridae	queen snake	*Regina septemvittata*	Common, believed to be declining	Streams and impoundments
Colubridae	Dekay’s brown snake	*Storeria dekayi ssp.*	Common	Environs of Bogs, swaps, freshwater marshes, moist woods and hillsides
Colubridae	northern red-bellied snake	*Storeria occipitomaculata*	Common, believed to be declining	Mesic habitats in or near open woods; in or near sphagnum bogs
Colubridae	eastern ribbon snake	*Thamnophis sauritus*	Moderately Common	Semi-Aquatic
Colubridae	eastern garter snake	*Thamnophis sirtalis*	Moderately Common	Wide range of upland and riparian areas
Colubridae	rough earth snake	*Virginia striatula*	Moderately Common	Abandoned fields, deciduous forests
Colubridae	eastern smooth earth snake	*Virginia valeriae*	Moderately Common	Abandoned fields near deciduous forests
Viperidae	southern copperhead	*Agkistrodon contortrix*	Common	Upland forests and riparian zones
Viperidae	northern copperhead	*Agkistrodon contortrix mokeson*	Common	Upland forests and riparian zones
Viperidae	eastern cottonmouth	*Agkistrodon piscivorus*	Common	Aquatic
Viperidae	Florida cottonmouth	*Agkistrodon piscivorus conanti*	Common	Aquatic

FAMILY	COMMON NAME	SCIENTIFIC NAME	ABUNDANCE IN PROJECT AREA	HABITAT
Viperidae	western cottonmouth	*Agkistrodon piscivorus leucostoma*	Common	Aquatic
Viperidae	timber rattlesnake	*Crotalus horridus*	Common	Upland and bottomland forests, riparian zones

Source: Mirarchi 2004, Causey 2006

Mirarchi, Ralph E., ed. 2004. Alabama Wildlife, Volume One. A Checklist of Vertebrates and Selected Invertebrates: Aquatic Mollusks, Fishes, Amphibians, Reptiles, Birds and Mammals. The University of Alabama Press, Tuscaloosa, AL

2. REPRESENTATIVE RIPARIAN AND LITTORAL BOTANICAL SPECIES POTENTIALLY OCCURRING IN THE LAKE HARRIS VICINITY - TABLE

Table 1: Representative Riparian and Littoral Botanical Species Potentially Occurring in the Lake Harris Vicinity

FAMILY	SCIENTIFIC NAME	COMMON NAME
Aceraceae	*Acer barbatum*	southern sugar maple
Aceraceae	*Acer leucoderme*	chalk maple
Aceraceae	*Acer negundo*	box elder
Aceraceae	*Acer rubrum*	red maple
Aceraceae	*Acer saccharum*	sugar maple
Aquifoliaceae	*Ilex decidua*	possumhaw
Aquifoliaceae	*Ilex vomitoria*	yaupon holly
Araceae	*Arisaema triphyllum*	jack-in-the-pulpit
Aristolochiaceae	*Hexastylis arifolia*	littlebrownjug
Aspleniaceae	*Asplenium montanum*	mountain spleenwort
Aspleniaceae	*Asplenium ruta-muraria*	wall rue
Asteraceae	*Coreopsis major*	greater tickseed
Asteraceae	*Pityopsis graminifolia*	narrowleaf silkgrass
Asteraceae	*Verbesina alternifolia*	crownbeard
Betulaceae	*Betula nigra*	river birch
Caprifoliaceae	*Symphoricarpos orbiculatus*	coralberry
Caprifoliaceae	*Viburnum acerifolium*	mapleleaf viburnum
Caryophyllaceae	*Silene rotundifolia*	roundleaf catchfly
Celastraceae	*Euonymus americanus*	bursting-heart
Cornaceae	*Cornus florida*	flowering dogwood
Cupressaceae	*Juniperus virginiana*	eastern red cedar
Cupressaceae	*Thuja occidentalis*	northern white cedar
Cyperaceae	*Carex crinita*	fringed sedge
Cyperaceae	*Carex picta*	Boott’s sedge
Diapensiaceae	*Galax urceolata*	wandflower
Dryopteridaceae	*Athyrium filix-femina ssp. Asplenioides*	southern lady fern
Dryopteridaceae	*Onoclea sensibilis*	sensitive fern
Ericaceae	*Gaylussacia baccata*	black huckleberry
Ericaceae	*Gaylussacia ursina*	bear huckleberry
Ericaceae	*Vaccinium angustifolium*	lowbush blueberry
Ericaceae	*Vaccinium arboretum*	farkleberry
Ericaceae	*Vaccinium pallidum*	hillside blueberry
Ericaceae	*Vaccinium stamineum*	deerberry
Ericaceae	*Vaccinium stamineum*	deerberry
Ericaceae	*Kalmia latifolia*	mountain laurel
Ericaceae	*Rhododendron catawbiense*	purple rhododendron
Fabaceae	*Tephrosia virginiana*	goat’s rue
Fabaceae	*Desmodium nudiflorum*	nakedflower tick trefoil
Fabaceae	*Robinia pseudoacacia*	black locust
Fagaceae	*Castanea dentate*	American chestnut
Fagaceae	*Fagus grandifolia*	American beech

FAMILY	SCIENTIFIC NAME	COMMON NAME
Fagaceae	*Quercus alba*	white oak
Fagaceae	*Quercus coccinea*	scarlet oak
Fagaceae	*Quercus falcate*	southern red oak
Fagaceae	*Quercus michauxii*	swamp chestnut oak
Fagaceae	*Quercus muehlenbergii*	chinkapin oak
Fagaceae	*Quercus pagoda*	cherrybark oak
Fagaceae	*Quercus prinus*	chestnut oak
Fagaceae	*Quercus rubra*	red oak
Fagaceae	*Quercus shumardii*	Shumard's oak
Fagaceae	*Quercus stellate*	post oak
Fagaceae	*Quercus velutina*	black oak
Hamamelidaceae	*Hamamelis virginiana*	American witch-hazel
Hamamelidaceae	*Liquidambar styraciflua*	American sweetgum
Hippocastanaceae	*Aesculus sylvatica*	painted buckeye
Hydrangeaceae	*Hydrangea quercifolia*	oakleaf hydrangea
Iridaceae	*Iris verna var. smalliana*	dwarf violet iris
Juglandaceae	*Carya alba*	mockernut hickory
Juglandaceae	*Carya glabra*	pignut hickory
Juglandaceae	*Juglans nigra*	eastern black walnut
Lauraceae	*Lindera benzoin*	spicebush
Magnoliaceae	*Liriodendron tulipifera*	tulip tree
Magnoliaceae	*Magnolia acuminate*	cucumber tree
Oleaceae	*Fraxinus Americana*	white ash
Oleaceae	*Fraxinus pennsylvanica*	green ash
Pinaceae	*Pinus echinata*	shortleaf pine
Pinaceae	*Pinus echinata*	Shortleaf pine
Pinaceae	*Pinus rigida*	pitch pine
Pinaceae	*Pinus strobus*	white pine
Pinaceae	*Pinus taeda*	loblolly pine
Pinaceae	*Pinus virginiana*	Virginia pine
Platanaceae	*Platanus occidentalis*	American sycamore
Poaceae	*Chasmanthium sessiliflorum*	longleaf woodoats
Poaceae	*Piptochaetium avenaceum*	black seed speargrass
Poaceae	*Danthonia spicata*	poverty oatgrass
Poaceae	*Schizachyrium scoparium*	little bluestem
Pteridaceae	*Adiantum pedatum*	northern maidenhair
Pteridaceae	*Pellaea atropurpurea*	purple cliffbrake
Ranunculaceae	*Actaea racemose*	black cohosh
Rubiaceae	*Galium circaezans*	licorice bedstraw
Rubiaceae	*Houstonia purpurea*	Venus' pride
Saxifragaceae	*Saxifraga virginiensis*	early saxifrage
Saxifragaceae	*Heuchera* spp	coral bell
Staphyleaceae	*Staphylea trifolia*	bladdernut
Symplocaceae	*Symplocos tinctoria*	common sweetleaf

FAMILY	SCIENTIFIC NAME	COMMON NAME
Tiliaceae	*Tilia Americana*	American basswood
Ulmaceae	*Celtis laevigata*	sugarberry

Source: NatureServe 2009

Table 2: Representative Botanical Species Potentially Occurring in the Skyline Vicinity

FAMILY	SCIENTIFIC NAME	COMMON NAME
Acanthaceae	*Justicia americana*	American water-willow
Aceraceae	*Acer negundo*	box elder
Aceraceae	*Acer rubrum*	red maple
Aceraceae	*Ageratina altissima*	white snakeroot
Anacardiaceae	*Toxicodendron radicans*	eastern poison ivy
Annonaceae	*Asimina triloba*	pawpaw
Aquifoliaceae	*Ilex decidua*	possumhaw
Aquifoliaceae	*Ilex vomitoria*	yaupon holly
Araceae	*Arisaema triphyllum*	jack-in-the-pulpit
Asteraceae	*Eupatorium serotinum*	late flowering thoroughwort
Asteraceae	*Eurybia mirabilis*	bouquet aster
Asteraceae	*Rudbeckia auriculata*	eared coneflower
Asteraceae	*Solidago plumosa*	plumed goldenrod
Betulaceae	*Carpinus caroliniana*	American hornbeam
Betulaceae	*Betula nigra*	river birch
Boraginaceae	*Mertensia virginica*	Virginia bluebells
Cyperaceae	*Carex blanda*	eastern woodland sedge
Cyperaceae	*Carex crinita*	fringed sedge
Cyperaceae	*Carex grayi*	Gray's sedge
Cyperaceae	*Carex typhina*	cattail sedge
Cyperaceae	*Cyperus squarrosus*	bearded flatsedge
Dryopteridaceae	*Onoclea sensibilis*	sensitive fern
Ericaceae	*Kalmia latifolia*	mountain laurel
Fagaceae	*Fagus grandifolia*	American beech
Fagaceae	*Quercus michauxii*	swamp chestnut oak
Fagaceae	*Quercus pagoda*	cherrybark oak
Hamamelidaceae	*Hamamelis virginiana*	American witch-hazel
Hamamelidaceae	*Liquidambar styraciflua*	American sweetgum
Lauraceae	*Lindera benzoin*	spicebush
Magnoliaceae	*Liriodendron tulipifera*	tulip tree
Oleaceae	*Fraxinus pennsylvanica*	green ash
Onagraceae	*Ludwigia palustris*	marsh seedbox
Pinaceae	*Pinus taeda*	loblolly pine
Pinaceae	*Pinus virginiana*	Virginia pine
Platanaceae	*Platanus occidentalis*	American sycamore
Poaceae	*Chasmanthium latifolium*	Indian woodoats
Poaceae	*Eragrostis hypnoides*	teal lovegrass
Poaceae	*Elymus hystrix*	eastern bottlebrush grass
Poaceae	*Elymus virginicus*	Virginia wildrye
Polygonaceae	*Polygonum lapathifolium*	curlytop knotweed
Polygonaceae	*Polygonum pensylvanicum*	Pennsylvania smartweed
Polygonaceae	*Polygonum punctatum*	dotted smartweed

FAMILY	SCIENTIFIC NAME	COMMON NAME
Ranunculaceae	*Xanthorihiza simplicissima*	yellowroot
Salicaceae	*Salix nigra*	black willow
Scrophulariaceae	*Lindernia dubia*	yellowseed false pimpernel
Ulmaceae	*Celtis laevigata*	sugarberry
Urticaceae	*Boehmeria cylindrica*	smallspike false nettle
Urticaceae	*Laportea canadensis*	Canadian woodnettle

Source: NatureServe 2009

Reference:

NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 06 February 2009. Available at: http://downloads.natureserve.org/get_data/data_sets/veg_data/nsDescriptions.pdf. Accessed November 11, 2016.

3. BIRDS OF CONSERVATION CONCERN FOUND IN THE SKYLINE AND LAKE HARRIS PROJECT VICINITY

BIRDS OF CONSERVATION CONCERN FOUND IN THE SKYLINE PROJECT VICINITY

COMMON NAME	SCIENTIFIC NAME	SEASON
Bald Eagle	*Haliaeetus leucocephalus*	Year-round
Blue-winged Warbler	*Vermivora cyanoptera*	Breeding
Chuck-will's-widow	*Antrostomus carolinensis*	Breeding
Dickcissel	*Spiza americana*	Breeding
Fox Sparrow	*Passerella iliaca*	Wintering
Kentucky Warbler	*Geothlypis formosus*	Breeding
Least Bittern	*Ixobrychus exilis*	Breeding
Loggerhead Shrike	*Lanius ludovicianus*	Year-round
Louisiana Waterthrush	*Parkesia motacilla*	Breeding
Prairie Warbler	*Setophaga discolor*	Breeding
Prothonotary Warbler	*Protonotaria citrea*	Breeding
Red Crossbill	*Loxia curvirostra*	Year-round
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Year-round
Rusty Blackbird	*Euphagus carolinus*	Wintering
Short-eared Owl	*Asio flammeus*	Wintering
Wood Thrush	*Hylocichla mustelina*	Breeding
Worm Eating Warbler	*Helmitheros vermivorum*	Breeding

Source: USFWS 2016b

BIRDS OF CONSERVATION CONCERN FOUND IN THE LAKE HARRIS PROJECT VICINITY

COMMON NAME	SCIENTIFIC NAME	SEASON
American Bittern	*Botaurus lentiginosus*	Wintering
Bachman's Sparrow	*Aimophila aestivalis*	Year-round
Bald Eagle	*Haliaeetus leucocephalus*	Year-round
Blue-winged Warbler	*Vermivora cyanoptera*	Breeding
Brown-headed Nuthatch	*Sitta pusilla*	Year-round
Chuck-will's-widow	*Antrostomus carolinensis*	Breeding
Fox Sparrow	*Passerella iliaca*	Wintering
Kentucky Warbler	*Geothlypis formosa*	Breeding
Le Conte's Sparrow	*Ammodramus leconteii*	Wintering
Least Bittern	*Ixobrychus exilis*	Breeding
Loggerhead Shrike	*Lanius ludovicianus*	Year-round
Louisiana Waterthrush	*Parkesia motacilla*	Breeding
Prairie Warbler	*Setophaga discolor*	Breeding
Prothonotary Warbler	*Protonotaria citrea*	Breeding
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Year-round
Rusty Blackbird	*Euphagus carolinus*	Wintering
Short-eared Owl	*Asio flammeus*	Wintering
Swainson's Warbler	*Limnothlypis swainsonii*	Breeding
Wood Thrush	*Hylocichla mustelina*	Breeding
Worm Eating Warbler	*Helmitheros vermivorum*	Breeding

Source: USFWS 2016a

References:
U.S. Fish and Wildlife Service (USFWS). 2016a. IPaC Trust Resources Report. R.L. Harris Project Lands Near Reservoir. Accessed November 9, 2016.

U.S. Fish and Wildlife Service (USFWS). 2016b. IPaC Trust Resources Report. R.L. Harris Skyline Wildlife Management Area. Accessed November 9, 2016.

4. FOREST TYPES AT SKYLINE

Forest Types – Skyline

Southern Ridge and Valley / Cumberland Dry Calcareous Forest
The Southern Ridge and Valley/Cumberland Dry Calcareous forest is comprised of dry-to-dry mesic calcareous forests in a variety of landscape positions, including ridge tops and upper and mid-slopes. They dominate vegetation type under natural conditions. High quality examples are characteristically dominated by white oak, chinkapin oak (*Quercus muehlenbergii*), post oak, and Shumard's oak (*Quercus shumardii*), with varying amounts of hickory, sugar maple (*Acer saccharum*), southern sugar maple, chalk maple (*Acer leucoderme*), red maple, and other species. This system also includes successional communities resulting from logging or agriculture and are dominated by tulip tree, pine, eastern red cedar (*Juniperus virginiana*), and black locust (*Robinia pseudoacacia*) (NatureServe 2009).

South-Central Interior Mesophytic Forest
The South-Central Interior Mesophytic forest is primarily deciduous forests that typically occur in deep, enriched soils in protected landscape settings such as covers or lower slopes. This forest is generally highly diverse and is dominated by sugar maple, American beech, tulip tree, American basswood (*Tilia americana*), northern red oak, cucumber tree (*Magnolia acuminata*), and eastern black walnut (*Juglans nigra*). Eastern hemlock (*Tsuga canadensis*) may be present in some stands. Common shrubs include coralberry (*Symphoricarpos orbiculatus*), bladdernut (*Staphylea trifolia*), bursting-heart, and flowering dogwood. The herb layer is often very plentiful and may include licorice bedstraw (*Galium circaezans*), black cohosh (*Actaea racemosa*), southern lady fern (*Athyrium filix-femina ssp. asplenioides*), and crownbeard (*Verbesina alternifolia*).

Allegheny-Cumberland Dry Oak Forest and Woodland
The Allegheny-Cumberland Dry Oak forest and woodland consists of dry hardwood forests found in nutrient-poor or acidic substrates on plateaus or ridges. Typical dominants include white oak, southern red oak, chestnut oak (*Quercus prinus*), scarlet oak, with lesser amounts of red maple, pignut hickory, and mockernut hickory. Shortleaf pine (*Pinus echinata*) and/or Virginia pine may occur in smaller amounts, particularly adjacent to steep cliffs or slopes or in area impacted by fire. White pine (*Pinus strobus*) may be prominent in some stands in the absence of fire. American chestnut (*Castanea dentata*) saplings may be found where it was once a common tree. The shrub layer may include lowbush blueberry (*Vaccinium angustifolium*), bear huckleberry (*Gaylussacia ursina*), deerberry (*Vaccinium stamineum*), hillside blueberry (*Vaccinium pallidum),* oakleaf hydrangea (*Hydrangea quercifolia*), and mapleleaf viburnum (*Viburnum acerifolium*). Common herbs include Boott's sedge (*Carex picta*), black seed speargrass (*Piptochaetium avenaceum*), nakedflower tick trefoil (*Desmodium nudiflorum*), longleaf woodoats (*Chasmanthium sessiliflorum*), and dwarf violet iris (*Iris verna var. smalliana*).

References:

NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 06 February 2009. Available at: http://downloads.natureserve.org/get_data/data_sets/veg_data/nsDescriptions.pdf. Accessed November 11, 2016.

5. FOREST TYPES AT LAKE HARRIS AND DOWNSTREAM OF HARRIS DAM

Forest Types at Lake Harris and Downstream of Harris Dam

Southern Piedmont Dry Oak-(Pine) Forest

The Southern Piedmont Dry Oak forest occurs in upland ridges and mid-slopes and is typically comprised of upland oaks; pines may be a significant component, especially in the southern part of the range. Overstory vegetation commonly found within this forest type includes upland oaks such as white oak (Quercus alba), northern red oak (Quercus rubra), black oak (Quercus velutina), post oak (Quercus stellata), scarlet oak (Quercus coccinea), and southern red oak (Quercus falcata) as well as hickory species such as pignut hickory (Carya glabra) and mockernut hickory (Carya alba). Other common species include loblolly pine (Pinus taeda), shortleaf pine (Pinus echinata), Virginia pine (Pinus virginiana), red maple (Acer rubrum), American sweetgum (Liquidambar styraciflua), and tulip tree (Liriodendron tulipifera). Generally, there is a well-developed shrub layer, and species vary with soil chemistry. Shrub species may include mountain laurel (Kalmia latifolia), common sweetleaf (Symplocos tinctoria), flowering dogwood (Cornus florida), deerberry (Vaccinium stamineum), and farkleberry (Vaccinium arboretum). The herb layer is typically sparse (NatureServe 2009).

Reference:

NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 06 February 2009. Available at: http://downloads.natureserve.org/get_data/data_sets/veg_data/nsDescriptions.pdf. Accessed November 11, 2016.

6. 2020 SKYLINE CAVE ASSESSMENT

2020 SKYLINE CAVE ASSESSMENT

HARRIS HYDROELECTRIC PROJECT
FERC NO. 2628

Alabama Power Company

November 2021

2020 SKYLINE CAVE ASSESSMENT

HARRIS HYDROELECTRIC PROJECT
FERC NO. 2628

ALABAMA POWER COMPANY

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2020 SKYLINE CAVE ASSESSMENT

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FERC NO. 2628

ALABAMA POWER COMPANY

1.0 INTRODUCTION

Alabama Power Company (Alabama Power) owns and operates the R.L. Harris Project (FERC Project No. 2628) (Harris Project), licensed by the Federal Energy Regulatory Commission (FERC or Commission). Under the existing Harris Project license, the FERC Project Boundary encloses two distinct geographic areas. "Lake Harris" refers to the 9,870-acre reservoir, adjacent 7,545 acres of Project land, and the dam, spillway, and powerhouse. "Skyline" refers to the 15,063 acres of Project land within the Skyline Wildlife Management Area (Skyline WMA) in Jackson County, Alabama. The Skyline lands are located approximately 110 miles north of Lake Harris and were acquired and incorporated into the FERC Project Boundary as part of the FERC-approved Harris Project Wildlife Mitigative Plan and Wildlife Management Plan. These lands are leased to and managed by the Alabama Department of Conservation and Natural Resources (ADCNR) for wildlife management and public hunting and are part of the Skyline WMA.

Skyline falls within the range of the Gray Bat (*Myotis grisescens*), Indiana Bat (*Myotis sodalis*), and Northern Long-eared Bat (*Myotis septentrionalis*) and there is available habitat throughout the Skyline WMA and federally listed summer roosting bats are assumed present[1].

While not a formal bat survey, this report summarizes an assessment of a sample of caves in Alabama Power's Harris Project lands at Skyline that began on February 15, 2020, and concluded on March 1, 2020. While conducting a cultural resources survey of a sample of the more than 236 known caves on Alabama Power land, a visual inspection of bats in these caves was done as a secondary objective. Scott Shaw conducted the assessments, assisted by Austin and Sara Mullican. Scott has conducted bat assessments for the ADCNR, the USFWS, and the Tennessee Valley Authority (TVA). Austin and Sara Mullican have assisted with numerous bat assessments in caves

[1] As part of the relicensing process for the Harris Project, Alabama Power and the United States Fish and Wildlife Service (USFWS) are coordinating to develop a management strategy addressing timber harvest and federally listed bats.

and conducted bat surveys in culverts for ADCNR. During the assessments, bats encountered, including species, numbers, and any symptoms of white-nose syndrome were documented[2]. Shannon Holbrook with the USFWS concurred with the assessment protocols on February 13, 2020[3].

TABLE 1-1 SCOTT SHAW BAT ASSESSMENT EXPERIENCE SUMMARY

YEARS	ORGANIZATION
2015-present	Alabama Bat Working Group
2015-present	Tennessee Valley Authority
2015-present	Alabama Department of Conservation and Natural Resources
2004-present	United States Department of Agriculture (USDA), National Forest Service

[2] All clothing and gear were decontaminated in accordance the National White Nose Syndrome Decontamination Protocol- Version 04.12.2016.

[3] Personal Communication with Alabama Power

2.0 LOCATION AND DESCRIPTION OF STUDY AREA

Scott Shaw, along with the Office of Archeological Research (OAR), defined the study area as a sample of caves within Alabama Power's Harris Project lands at Skyline. The group investigated eight caves. Maps of the Harris Project lands at Skyline, locations of the caves in relation to the Project Boundary, and current habitat, depicted as both forested landscape and Karst landscape, of the Gray Bat, Indiana Bat, and Northern Long-eared Bat, are presented in Figure 2-1 to Figure 2-7.

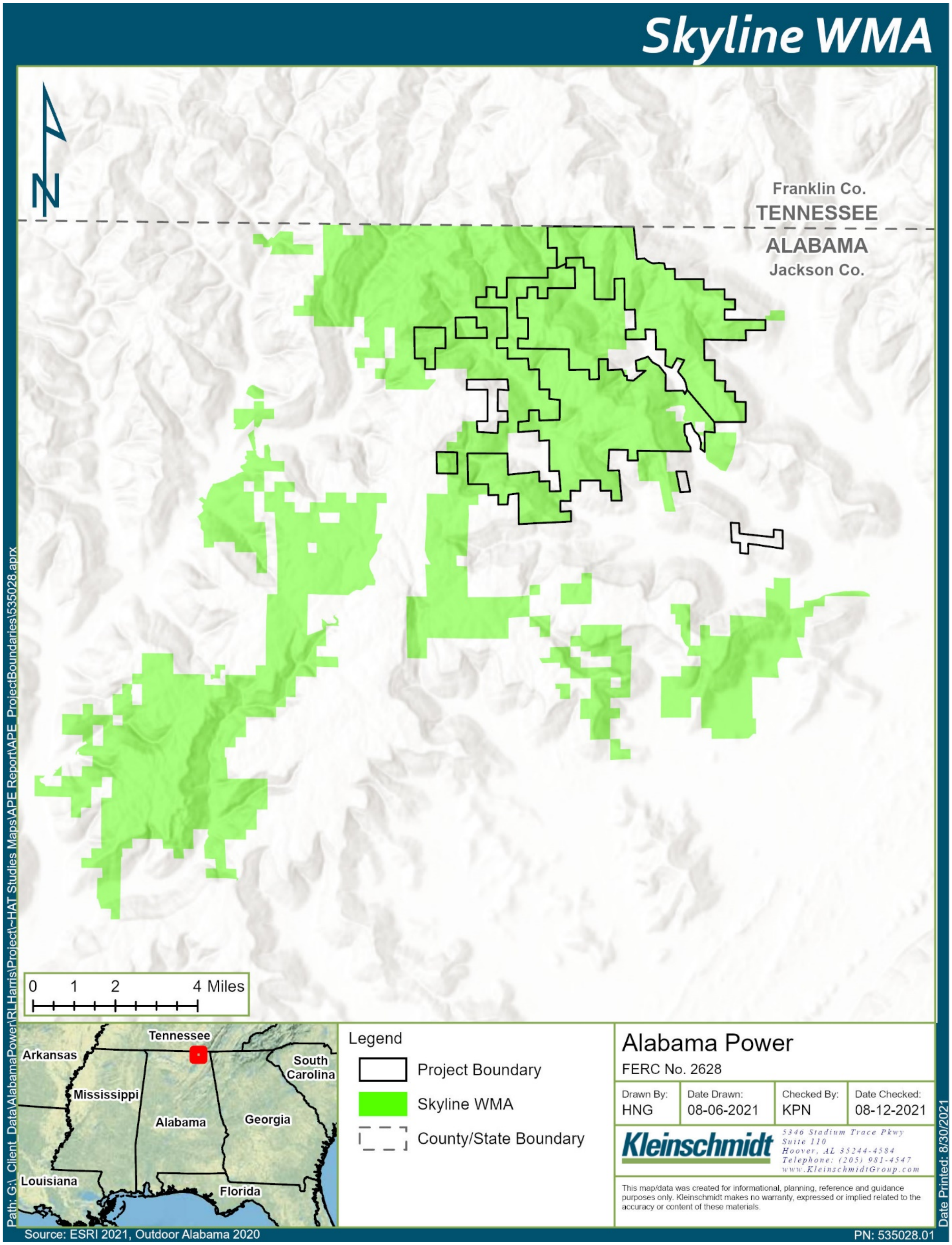

FIGURE 2–1 SKYLINE WMA

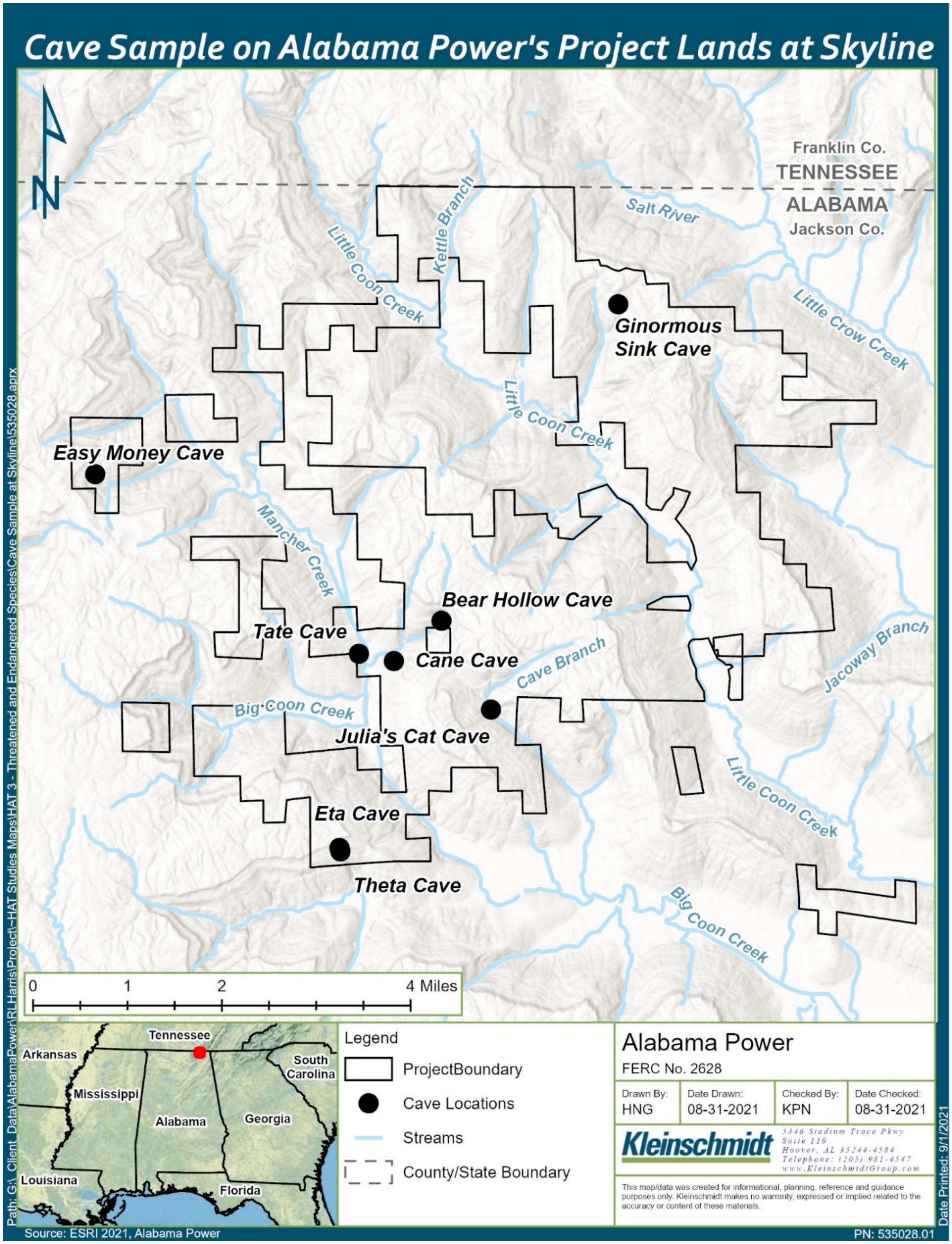

FIGURE 2–2 CAVE SAMPLE ON ALABAMA POWER'S PROJECT LANDS AT SKYLINE

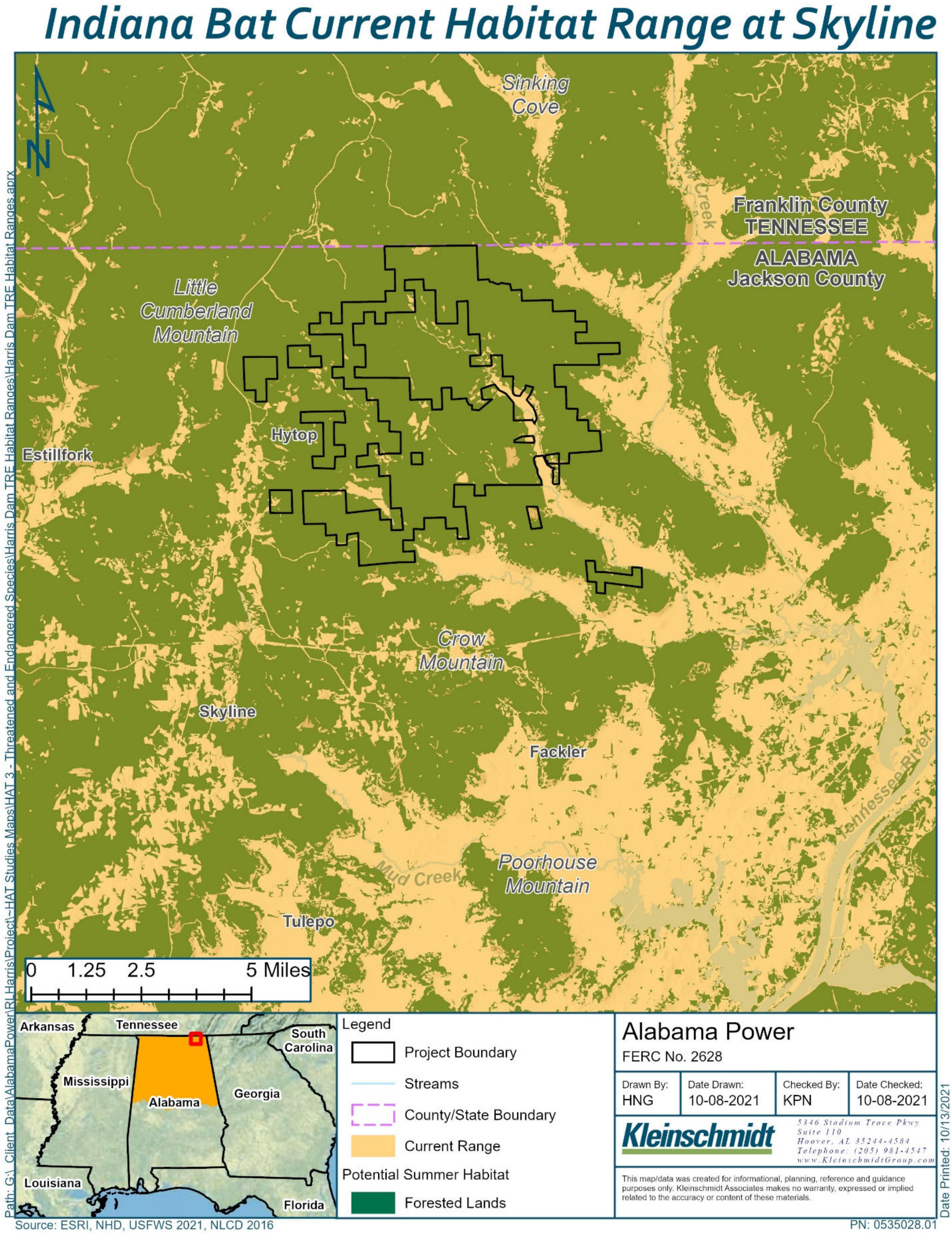

FIGURE 2–3 INDIANA BAT CURRENT HABITAT RANGE AND FORESTED LANDS AT SKYLINE

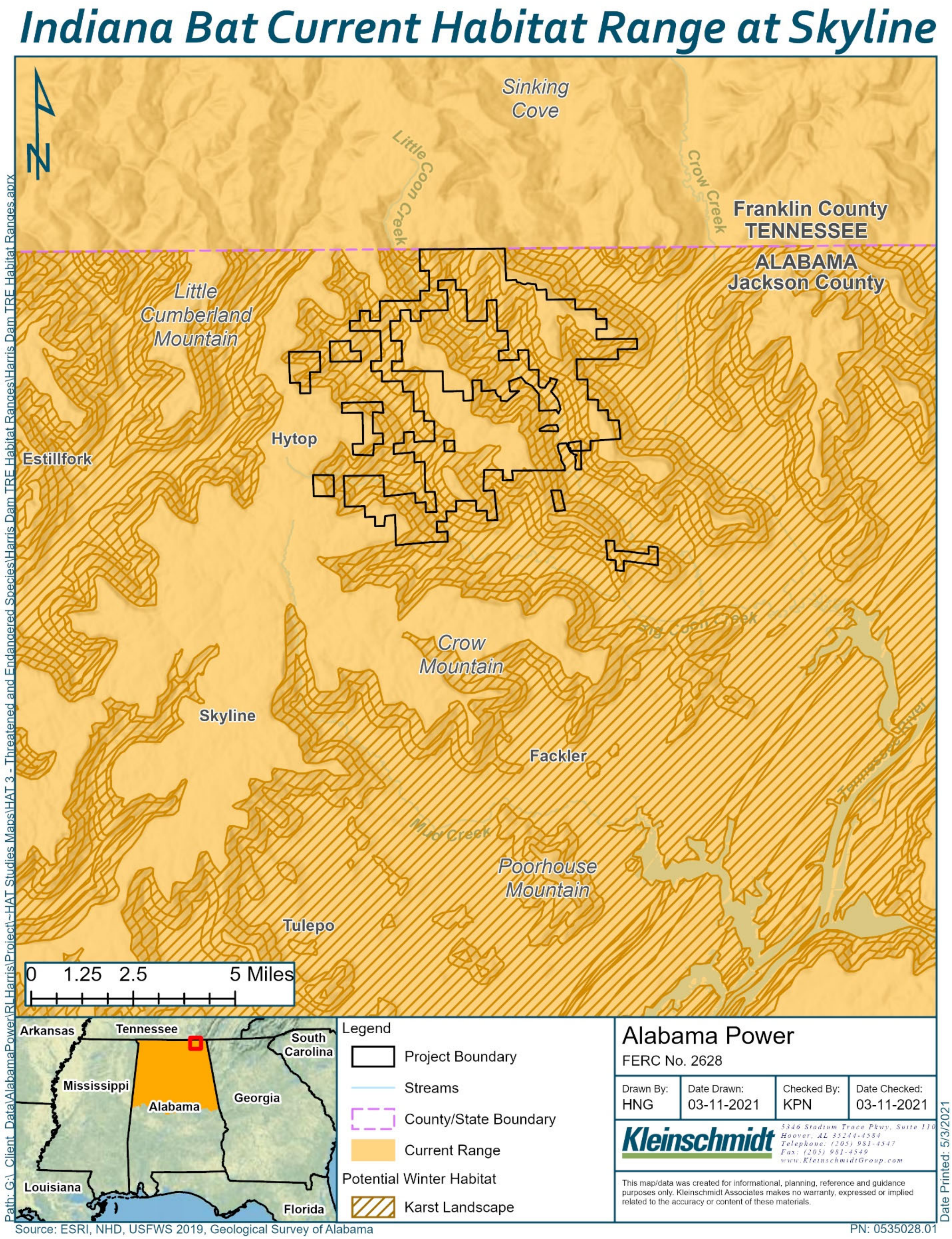

FIGURE 2–4 INDIANA BAT CURRENT HABITAT RANGE AND KARST LANDSCAPE AT SKYLINE

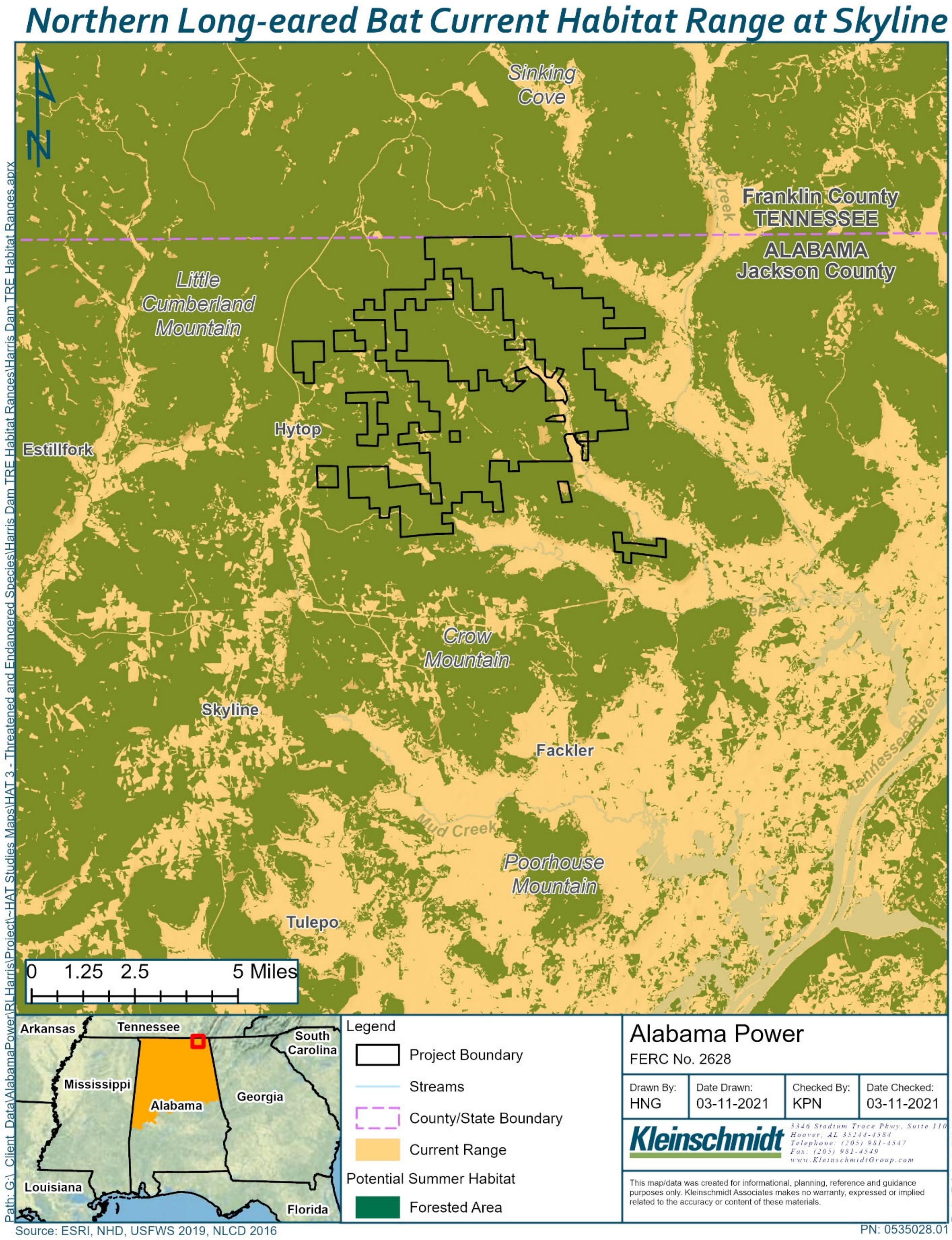

FIGURE 2–5 NORTHERN LONG-EARED BAT CURRENT HABITAT RANGE AND FORESTED LANDS AT SKYLINE

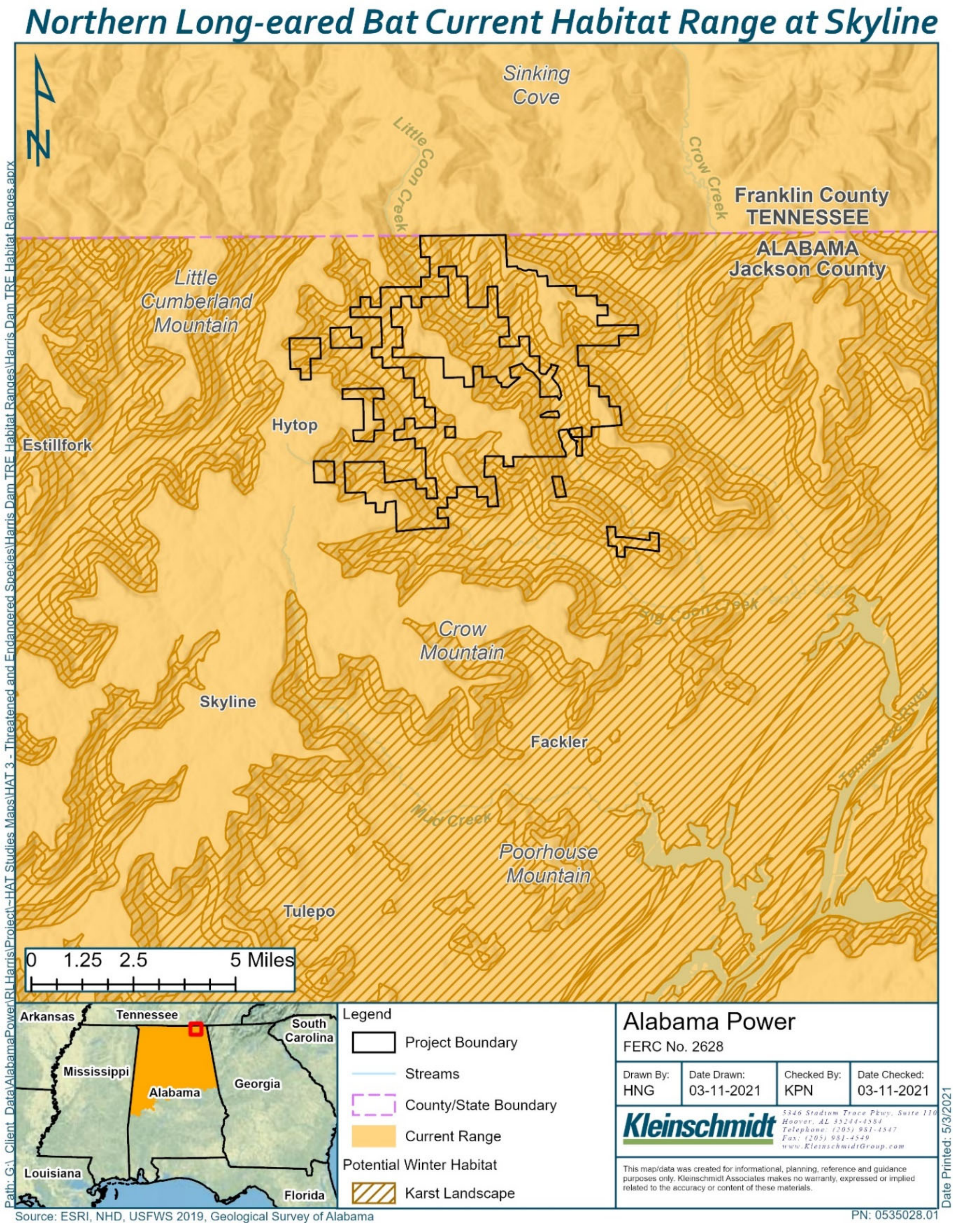

FIGURE 2–6 NORTHERN LONG-EARED BAT CURRENT HABITAT RANGE AT SKYLINE-KARST LANDSCAPE

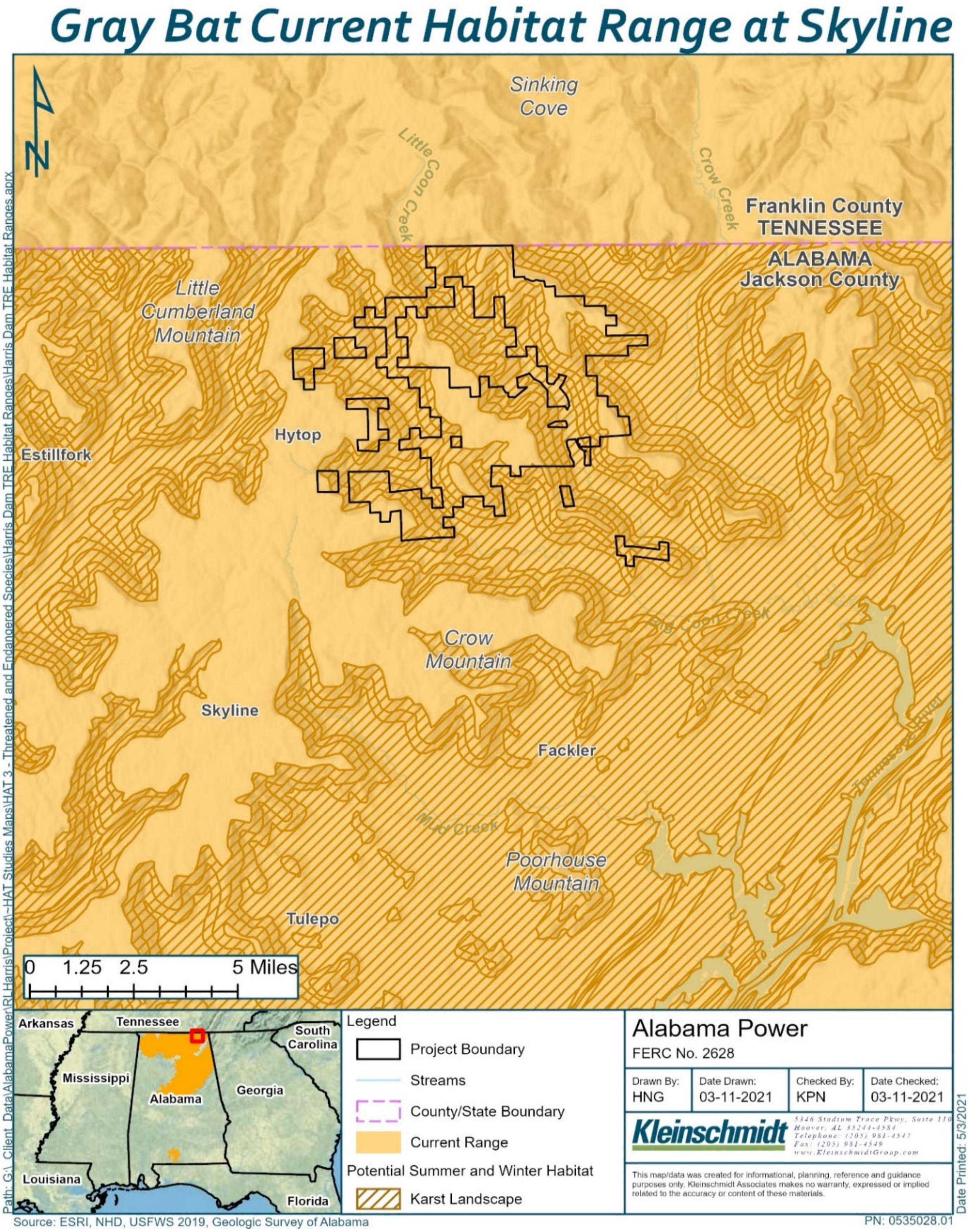

FIGURE 2–7 GRAY BAT CURRENT HABITAT RANGE AND KARST LANDSCAPE AT SKYLINE

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3.0 METHODS

Cave walls, cave ceilings, and accessible crevices were assessed upon entering and leaving the eight caves. Observers noted the number and species of bats in each of the caves. Bats were visually inspected for clinical signs of white-nose syndrome.

4.0 RESULTS

A summary of the number and species of bats observed in the sample of caves on Harris Project lands at Skyline is shown in Table 4-1. Photos of some of these are in Figures 4-1 to Figure 4-3. Signs of white-nose syndrome were not observed in any of the bats encountered. Observers did not indicate the presence of guano piles and stains, or the presence of salamanders, crayfish, cave fish, and other vertebrates and invertebrates.

TABLE 4-1 SUMMARY OF ASSESSMENT OF SKYLINE CAVES

CAVE	BAT SPECIES	NUMBER OF BATS
GINORMOUS SINK CAVE	TRICOLORED BAT	16*
TATE CAVE	TRICOLORED BAT	27
TATE CAVE	RAFINESQUE'S BIG-EARED BAT	1
CANE CAVE	TRICOLORED BAT	2
CANE CAVE	RAFINESQUE'S BIG-EARED BAT	1
CANE CAVE	UNIDENTIFIED	1
EASY MONEY CAVE		0
BEAR HOLLOW CAVE		0
JULIA'S CAT CAVE		0
ETA CAVE		0
THETA CAVE		0
TOTAL		**48**

* Plus, one dead Tricolored Bat in the water below a small waterfall. Most likely washed out of low passage by a flood surge.

FIGURE 4–1 RAFINESQUE'S BIG-EARED BAT, CANE CAVE

FIGURE 4–2 UNIDENTIFIED BAT, CANE CAVE

FIGURE 4–3 RAFINESQUE'S BIG-EARED BAT, TATE CAVE

5.0 SUMMARY AND CONCLUSIONS

No Gray Bats, Indiana Bats, or Northern Long-eared Bats were observed. A total of 48 bats, comprised of two species and one unidentified bat, were documented on Alabama Power Project lands at Skyline. None of the bats observed showed signs of white-nose syndrome.

APPENDIX E

THREATENED AND ENDANGERED SPECIES

1. ALABAMA STATE STATUS CODE DEFINITIONS
2. STATE PROTECTED SPECIES LIST

1. ALABAMA STATE STATUS CODE DEFINITIONS

State - Alabama Department of Conservation and Natural Resources (ADCNR)

Wildlife & Freshwater Fisheries Division

Alabama does not have a state law equivalent to the federal endangered species act so species do not have regulatory protection as state endangered or threatened species. However, some species do receive regulatory protection through the *Alabama Regulations on Game Fish and Fur Bearing Animals* published annually. These are the primary regulations affording state protection for some species in Alabama, and are administered by the Alabama Department of Conservation and Natural Resources. Copies of these regulations may be obtained from the Division of Wildlife & Freshwater Fisheries, Alabama Department of Conservation & Natural Resources, 64 North Union Street, Montgomery, AL 36104. A digital version of these regulations is available online at http://www.outdooralabama.com/season-and-bag-limits.

State Status Code Definitions

SP – State Protected: Species protected by Regulation 220-2-.92 (Nongame Species Regulation), 220-2-.98 (Invertebrate Species Regulation), 220-2-.26(4) (Protection of Sturgeon), 220-2-.94 (Prohibition of Taking or Possessing Paddlefish), or 220-2-.97 (Alligator Protection Regulation).

PSM – Partial Status Mussels: All mussel species not listed as a protected species under the Invertebrate Species Regulation are partially protected by other regulations of the Alabama Game, Fish, and Fur Bearing Animals Regulations. Regulation 220-2-.104 prohibits the commercial harvest of all but the 11 mussel species for which commercial harvest is legal. Regulation 220-2-.52 prohibits the take, capture, kill, or attempt to take, capture, or kill of any freshwater mussel from Wheeler Lake from Guntersville Dam downstream to the mouth of Shoal Creek and from the upstream end or head of Hobbs Island downstream to Whitesburg Bridge, Pickwick Lake from Wilson Dam downstream to the upper end or head of Seven Mile Island, Wilson Lake from Wheeler Dam downstream to the mouth of Town Creek on the south bank and the mouth of Bluewater Creek on the north bank, and the Cahaba River.

RT – Regulated Turtle: Species for which the Turtle Catcher/Dealer/Farmer Regulation (Regulation 220-2-.142) imposes a limit on the number which can be possessed or size limits.

GA – Game Animal (Managed hunting regulations).

GANOS – Game Animal - No Open Season: Species designated a game animal by Regulation 220-2-.07, but for which there is no open season.

GB – Game Bird (Managed hunting regulations).

GBNOS – Game Bird - No Open Season: Species designated a game bird by Regulation 220-2-.04, but for which there is no open season.

GF – Game Fish (Managed fishing regulations).

GF-HP – Game Fish – Harvest Prohibited: Species designated a game fish by Regulation 220-2-.34, but harvest of the species in the state is prohibited.

CNGF – Commercial or Non-Game Fish (Managed fishing regulations).

2. STATE PROTECTED SPECIES LIST

State Protected Species Occurring in Counties within the Project Vicinity						
	Family	**Scientific Name**		**Counties of Occurrence with Project Vicinity**	**Known Relationship to Project Vicinity**	**State Status**
Birds	Ardeidae	*Ixobrychus exilis*	Least Bittern	Jackson		SP
	Threskiornithidae	*Eudocimus albus*	White Ibis	Cleburne		SP
	Falconidae	*Falco sparverius*	American Kestrel	Clay, Jackson	Potentially occurs within Project Vicinity	SP
	Phasianidae	*Bonasa umbellus*	Ruffed Grouse	Jackson		GBNOS
	Scolopacidae	*Scolopax minor*	American Woodcock	Chambers, Cleburne, Jackson, Tallapoosa	Potentially occurs within Project Vicinity	GB
	Columbidae	*Columbina passerine*	Common Ground-dove	Chambers, Clay, Cleburne, Randolph, Tallapoosa		SP
	Cuculidae	*Coccyzus erythropthalmus*	Black-billed Cuckoo	Jackson		SP
	Picidae	*Picoides borealis*	Red-cockaded Woodpecker	Clay, Cleburne, Tallapoosa	See Kleinschmidt (2021c)	SP
	Tyrannidae	*Tyrannus forficatus*	Scissor-tailed Flycatcher	Jackson		SP
	Vireonidae	*Vireo solitarius*	Blue-headed Vireo	Clay, Cleburne, Jackson, Randolph, Tallapoosa		SP
		Vireo gilvus	Warbling Vireo	Jackson		SP
	Corvidae	*Corvus corax*	Common Raven	Jackson		SP
	Troglodytidae	*Thyromanes bewickii*	Bewick's Wren	Clay[1], Jackson[1], Randolph[1]		SP
	Parulidae	*Dendroica petechia*	Yellow Warbler	Jackson	Potentially occurs within Project Vicinity	SP
		Setophaga cerulea	Cerulean Warbler	Jackson		SP
	Emberizidae	*Peucaea aestivalis*	Bachman's Sparrow	Chambers, Cleburne, Jackson[1]	In Project Vicinity	SP
		Chondestes grammacus	Lark Sparrow	Jackson		SP
	Fringillidae	*Loxia curvirostra*	Red Crossbill	Cleburne	In Project Vicinity	SP
Mammals	Dipodidae	*Zapus hudsonius*	Meadow Jumping Mouse	Chambers		SP
	Leporidae	*Sylvilagus obscurus*	Appalachian Cottontail	Clay		GA
	Soricidae	*Sorex fumeus*	Smoky Shrew	Jackson		SP
		Sorex hoyi	American Pygmy Shrew	Jackson		SP
	Vespertilionidae	*Corynorhinus rafinesquii*	Rafinesque's Big-eared Bat	Jackson		SP
		Myotis grisescens	Gray Bat	Clay[2], Cleburne[2], Jackson	See Kleinschmidt (2021c)	SP
		Myotis septentrionalis	Northern Long-eared Bat	Clay[3], Cleburne[3], Randolph[3], Chambers[3], Tallapoosa[3], Jackson[3]	See Kleinschmidt (2021c)	SP
		Myotis sodalis	Indiana Bat	Clay, Cleburne[2], Jackson	See Kleinschmidt (2021c)	SP
	Ursidae	*Ursus americanus*	Black Bear[4]	Chambers, Cleburne, Randolph, Tallapoosa		SP
	Mustelidae	*Mustela frenata*	Long-tailed Weasel	Jackson	In Project Vicinity	SP
	Mephitidae	*Spilogale putorius*	Eastern Spotted Skunk	Chambers, Clay, Cleburne, Tallapoosa	In Project Vicinity	SP

State Protected Species Occurring in Counties within the Project Vicinity						
	Family	**Scientific Name**		**Counties of Occurrence with Project Vicinity**	**Known Relationship to Project Vicinity**	**State Status**
Amphibians	Cryptobranchidae	*Cryptobranchus alleganiensis*	Hellbender	Jackson		SP
	Plethodontidae	*Aneides aeneus*	Green Salamander	Jackson		SP
		Desmognathus aeneus	Seepage Salamander	Clay, Cleburne, Randolph		SP
		Desmognathus monticola	Seal Salamander	Chambers, Clay, Cleburne, Jackson, Randolph, Tallapoosa		SP5
		Gryinophilus palleucus palleucus	Pale Salamander	Jackson		SP
Reptiles	Anguidae	*Ophisaurus attenuatus*	Glass Lizard	Chambers, Cleburne, Tallapoosa		SP
	Scincidae	*Eumeces inexpectatus*	Southern Five-lined Skink	Chambers, Clay, Cleburne, Randolph, Tallapoosa	In Project Vicinity	SP
	Colubridae	*Coluber flagellum*	Coachwhip	Chambers, Tallapoosa		SP
		Lampropeltis getula	Eastern Kingsnake	Chambers		SP
		Pituophis melanoleucus melanoleucus	Northern Pinesnake	Jackson		SP
	Emydidae	*Graptemys pulchra*	Alabama Map Turtle	Tallapoosa	In Project Vicinity	SP
Fishes [6]	Lepisosteidae	*Lepisosteus platostomus*	Shortnose Gar	Jackson[1]		CNGF
	Cyprinidae	*Notropis albizonatus*	Palezone Shiner	Jackson	See Kleinschmidt (2021c)	SP
		Erimonax monachus	Spotfin Chub	Jackson[3]	See Kleinschmidt (2021c)	SP
	Catostomidae	*Moxostoma anisurum*	Silver Redhorse	Jackson	In Project Vicinity	CNGF
		Moxostoma breviceps	Shorthead Redhorse	Jackson	In Project Vicinity	CNGF
	Ictaluridae	*Ameiurus brunneus*	Snail Bullhead	Chambers, Randolph	See Alabama Power and Kleinschmidt (2021c)	CNGF
		Noturus crypticus	Chucky Madtom	Jackson[1]		CNGF
		Noturus elegans	Elegant Madtom	Jackson[1]	Historically In Project Vicinity	CNGF
	Amblyopsidae	*Typhlichthys subterraneus*	Southern Cavefish	Jackson	In Project Vicinity	SP
	Percidae	*Crystallaria asprella*	Crystal Darter	Tallapoosa		SP
		Etheostoma chuckwachatte	Lipstick Darter	Chambers, Clay, Cleburne, Randolph, Tallapoosa	In Project Vicinity	SP
		Percina burtoni	Blotchside Logperch	Jackson	In Project Vicinity	SP
Mussels	Unionidae	*Actinonaias ligamentina*	Mucket	Jackson[1]		PSM
		Actinonaias pectorosa	Pheasantshell	Jackson[1]		PSM
		Alasmidonta marginata	Elktoe	Jackson		PSM
		Alasmidonta viridis	Slippershell Mussel	Jackson		SP
		Cyprogenia stegaria	Fanshell	Jackson[1]		SP
		Dromus dromas	Dromedary Pearlymussel	Jackson[1]		SP

State Protected Species Occurring in Counties within the Project Vicinity						
	Family	**Scientific Name**		**Counties of Occurrence with Project Vicinity**	**Known Relationship to Project Vicinity**	**State Status**
		Elliptio arca	Alabama Spike	Chambers, Cleburne, Randolph	See Alabama Power and Kleinschmidt (2021c)	PSM
		Elliptio arctata	Delicate Spike	Cleburne, Randolph	See Alabama Power and Kleinschmidt (2021c)	PSM
		Elliptio dilatata	Spike	Jackson		PSM
		Epioblasma brevidens	Cumberlandian Combshell	Jackson[1]		SP
		Epioblasma capsaeformis	Oyster Mussel	Jackson		SP
		Epioblasma triquetra	Snuffbox	Jackson	See Kleinschmidt (2021c)	PSM
		Fusconaia cor	Shiny Pigtoe	Jackson	See Kleinschmidt (2021c)	SP
		Fusconaia cuneolus	Fine-rayed Pigtoe	Jackson	See Kleinschmidt (2021c)	SP
		Fusconaia subrotunda	Longsolid	Jackson		PSM
		Hamiota altilis[7]	Finelined Pocketbook	Clay, Cleburne	See Kleinschmidt (2021c)	SP
		Lampsilis abrupta	Pink Mucket	Jackson[1]		SP
		Lampsilis fasciola	Wavyrayed Lampmussel	Jackson		PSM
		Lampsilis ovata	Pocketbook	Jackson		PSM
		Lampsilis virescens	Alabama Lampmussel	Jackson	See Kleinschmidt (2021c)	SP
		Lasmigona complanata	White Heelsplitter	Jackson		PSM
		Lasmigona costata	Flutedshell	Jackson		PSM
		Lasmigonia etowaensis	Etowah Heelsplitter	Cleburne		PSM
		Lasmigona holstonia	Tennessee Heelsplitter	Jackson		PSM
		Lemiox rimosus	Birdwing Pearlymussel	Jackson[1]		SP
		Ligumia recta	Black Sandshell	Jackson		PSM
		Medionidus conradicus	Cumberland Moccasinshell	Jackson		SP
		Obovaria retusa	Ring Pink	Jackson		SP
		Obovaria subrotunda	Round Hickorynut	Jackson		PSM
		Plethobasus cicatricosus	White Wartyback	Jackson		SP
		Plethobasus cooperianus	Orangefoot Pimpleback	Jackson[1]		SP
		Plethobasus cyphyus	Sheepnose	Jackson		SP
		Pleurobema clava	Clubshell	Jackson		SP
		Pleurobema cordatum	Ohio Pigtoe	Jackson[1]		PSM
		Pleurobema decisum	Southern Clubshell	Cleburne		SP
		Pleurobema georgianum	Southern Pigtoe	Clay, Cleburne	See Kleinschmidt (2021c)	SP
		Pleurobema hanleyianum	Georgia Pigtoe	Clay[1]		SP
		Pleurobema oviforme	Tennessee Clubshell	Jackson		PSM
		Pleurobema plenum	Rough Pigtoe	Jackson[1]		SP
		Pleurobema rubrum	Pyramid Pigtoe	Jackson[1]		SP
		Pleurobema sintoxia	Round Pigtoe	Jackson[1]		SP

State Protected Species Occurring in Counties within the Project Vicinity						
	Family	**Scientific Name**		**Counties of Occurrence with Project Vicinity**	**Known Relationship to Project Vicinity**	**State Status**
		Pleuronaia barnesiana	Tennessee Pigtoe	Jackson		PSM
		Pleuronaia dolabelloides	Slabside Pearlymussel	Jackson	See Kleinschmidt (2021c)	SP
		Potamilus ohiensis	Pink Papershell	Jackson		PSM
		Ptychobranchus fasciolaris	Kidneyshell	Jackson		PSM
		Ptychobranchus foremanianus	Rayed Kidneyshell	Cleburne		SP
		Ptychobranchus subtentus	Fluted Kidneyshell	Jackson		SP
		Pyganodon cataracta	Eastern Floater	Tallapoosa		PSM
		Quadrula cylindrica cylindrica	Rabbitsfoot	Jackson	See Kleinschmidt (2021c)	SP
		Quadrula infucata	Sculptured Pigtoe	Chambers[1]		PSM
		Quadrula metanevra	Monkeyface	Jackson		PSM
		Strophitus connasaugaensis	Alabama Creekmussel	Clay, Cleburne		PSM
		Toxolasma corvunculus	Southern Purple Lilliput	Clay		PSM
		Toxolasma cylindrellus	Pale Lilliput	Jackson	See Kleinschmidt (2021c)	SP
		Toxolasma lividum	Purple Lilliput	Jackson		PSM
		Toxolasma parvum	Lilliput	Clay, Jackson, Tallapoosa		PSM
		Truncilla donaciformis	Fawnsfoot	Jackson		PSM
		Truncilla truncata	Deertoe	Jackson		PSM
		Villosa iris	Rainbow	Jackson		PSM
		Villosa nebulosa	Alabama Rainbow	Clay		PSM
		Villosa taeniata	Painted Creekshell	Jackson		PSM
		Villosa trabalis	Cumberland Bean	Jackson	See Kleinschmidt (2021c)	SP
		Villosa umbrans	Coosa Creekshell	Clay		PSM
		Villosa vanuxemensis	Mountain Creekshell	Jackson		PSM
Snails	Pleuroceridae	*Athearnia anthonyi*	Anthony Riversnail	Jackson		SP
		Elimia haysiana	Silt Elimia[8]	unknown[9]	unknown[9]	SP
Crustaceans	Cambaridae	*Cambarus englishi*	Tallapoosa Crayfish	Clay, Cleburne, Randolph, Tallapoosa	See Kleinschmidt and Alabama Power (2021c)	SP
True Insects	Silphidae	*Nicrophorus americanus*	American Burying Beetle	unknown[9]	unknown[9]	SP
	Corduliidae	*Somatochlora hineana*	Hine's Emerald	Jackson[10]		SP
Sources: Alabama Natural Heritage Program® 2020; Mirarchi 2004; Causey 2006; Mettee et al. 1996; Boschung and Mayden 2004; Johnson 1997 as cited in Alabama Power and Kleinschmidt 2021c; Mirarchi et al. 2004 as cited in Kleinschmidt 2021c; USFWS 2016a as cited in Kleinschmidt 2021c; USFWS 2016b as cited in Kleinschmidt 2021c; Williams et al. 2008 as cited in Kleinschmidt 2021c; FERC 2018 as cited in Kleinschmidt 2021c; USFWS 2016a as cited in Alabama Power 2018; USFWS 2016b as cited in Alabama Power 2018						
1	Historic occurrence					
2	Historic occurrence, no recent information although it still likely occurs in the county					

State Protected Species Occurring in Counties within the Project Vicinity						
	Family	**Scientific Name**		**Counties of Occurrence with Project Vicinity**	**Known Relationship to Project Vicinity**	**State Status**
3	Alabama Natural Heritage Program® (2020) does not show this species as occurring in any counties within the Project Vicinity; however, Kleinschmidt (2021c) reports the species as potentially occurring in counties within the Project Vicinity.					
4	*Ursus americanus* is not included in the list of protected species in Nongame Species Regulation 220-2-.92, but is protected under Alabama Game, Fish and Wildlife Laws, Section 9-11-480-481 which makes it illegal to hunt, wound, injure, kill, trap, collect, or capture a black bear, or to attempt to engage in that conduct during the closed season for black bear. It is designated a game animal by Regulation 220-2-.06 of the Alabama Regulations on Game, Fish, and Fur Bearing Animals, but there is no open season for the species.					
5	Only populations of Coastal Plain origin are protected by the Nongame Species Regulation.					
6	Distribution information in Mettee et al. (1996) and Boschung and Mayden (2004) was used to narrow the Fishes category to species existing within the Project Vicinity. Therefore, fishes occurring in counties within the Project Vicinity but not within the Project Vicnity are not displayed in this table.					
7	Species in the genus *Hamiota* were previously considered to be in the genus *Lampsilis*. Species listed under the Endangered Species Act were listed under the genus *Lampsilis*. Roe and Hartfield (2005) placed these four species in the new genus *Hamiota*. The U.S. Fish and Wildlife Service still uses *Lampsilis* on their website except for *Hamiota australis*.					
8	Alabama endemic					
9	Distribution information is not provided					
10	Species may occur in any county if suitable habitat exists					

APPENDIX F

RECREATION

1. RV PARKS AND CAMPGROUNDS WITHIN 50 MILES OF LAKE HARRIS - TABLE

1. RV PARKS AND CAMPGROUNDS WITHIN 50 MILES OF LAKE HARRIS - TABLE

RV Parks and Campgrounds within 50 Miles of Lake Harris

Facility Name	Town	Distance (miles)	Ownership	RV Camping	Tent Camping	Primitive Camping
3 Creeks Campground	LaGrange, GA	25-50	Commercial	48		
Alabama Gold Camp	Lineville, AL	<10	Commercial	Available	Available	Available
Amity Campground	Lanett, AL	25-50	USACE	75		Available
Anniston Army Depot RV Park	Anniston, AL	25-50	Commercial	8		8
Auburn Legends Resort	Auburn, AL	25-50	Commercial	40		
Auburn RV Park at Leisure Time Campground	Auburn, AL	25-50	Commercial	Available	60	
B&B RV Park	Valley, AL	25-50	Commercial	25		
Bakers Trailer Park and Campground	Opelika, AL	25-50	Commercial	Available		
Banning Mills RV Park	Whitesburg, GA	25-50	Commercial	40		
Bar-W RV Park	Auburn, AL	50	Commercial	37		40
Big Oak RV Park	Tallapoosa, GA	25-50	Commercial	51		4
Bows Family RV Park	Eastaboga, AL	25-50	Commercial	9		
Caloosahatchee Campground	Ohatchee, AL	25-50	Commercial	Available		
Cane Creek RV Park & Campground	Heflin, AL	25-50	Commercial	39		5
Cedar Creek Campground	Fayetteville, AL	25-50	Commercial			
Chattahoochee Bend State Park	Newnan, GA	25-50	State	37		28
Cheaha State Park (Talladega National Forest)	Delta, AL	10-25	State	77	Available	54
Chewacla State Park	Auburn, AL	25-50	State	36		10
Chief Ladiga Trail Campground	Borden Springs, AL	25-50	Commercial	160		Available
Chinnabee Recreation Area (Talladega National Forest)	Talladega, AL	10-25	Federal			8
Clear Creek Cove RV Resort	Talladega, AL	25-50	Commercial	150		
Clear Creek Harbor	Talladega, AL	25-50	Commercial	Available	Available	

Facility Name	Town	Distance (miles)	Ownership	RV Camping	Tent Camping	Primitive Camping
Coleman Lake Recreation Area (Talladega National Forest)	Heflin, AL	25-50	Federal	39		39
Coosa River Camp Retreat	Harpersville, AL	25-50	Commercial	3		
Coosa Willow Point Campground & Marina	Ohatchee, AL	25-50	Commercial	Available	74	
Country Court RV Park	Anniston, AL	25-50	Commercial	68		
De Soto Caverns Park	Childersburg, AL	25-50	Commercial	16	Available	Available
Down in the Boondocks RV Park	Sylacauga, AL	25-50	Commercial	10		
Eagle Landing RV Park	Auburn, AL	25-50	Commercial	60		
Flat Creek Campground	Hogansville, GA	25-50	Commercial	5		
General Lee Marina & Campground	Cropwell, AL	25-50	Commercial	111	Available	Available
Georgia-Bama RV Park	Heflin, AL	25-50	Commercial	12		
Highland Marina Resort	LaGrange, GA	25-50	Commercial	Available		
Hilltop Campground	Wedowee, AL	<10	Commercial	87		
Holiday Campground/West Point Lake COE	LaGrange, GA	25-50	USACE	114		
John Tanner State Park	Carrolton, GA	25-50	State	31		Available
Knox Landing Campgrounds	Pell City, AL	25-50	Commercial			30
Kudzu Campground	Talladega, AL	25-50	Commercial	50		
Kymulga Grist Mill & Park	Childersburg, AL	25-50	Commercial	12	12	
Lake Hill RV & Mobile Home Park	Alexander City, AL	25-50	Commercial			
Lakeside Landing RV Park and Marina	Cropwell, AL	25-50	Commercial	180	180	
Lakeside RV Park	Opelika, AL	25-50	Commercial	86		Available
Lakeway Campground	Equality, AL	10-25	Commercial	17		
Little Tallapoosa Park	Carrolton, GA	25-50	Commercial	23	32	

Facility Name	Town	Distance (miles)	Ownership	RV Camping	Tent Camping	Primitive Camping
Logan Landing RV & Cabin Resort	Alpine, AL	25-50	Commercial	91		
McIntosh Reserve Park	Whitesburg, GA	25-50	Commercial			30
Memory Lane RV Park and Campground	Lincoln, AL	25-50	Commercial	50		Available
Michael Tucker Park & Campground	Anniston, AL	25-50	Commercial	Available	Available	Available
Old Shocco RV Park	Talladega, AL	25-50	Commercial	24	Available	
Pine Glen Recreation Area (Talladega National Forest)	Heflin, AL	25-50	Federal	21		
Powell's RV Park & Campground	Pell City, AL	25-50	Commercial	Available	Available	
R & R Campground	Lincoln, AL	25-50	Commercial			
R. Shaefer Heard COE	West Point, GA	25-50	USACE	117		
Real Island Marina and Campground	Equality, AL	10-25	Commercial			
Safe Harbor RV Park	Riverside, AL	25-50	Commercial	106		
Scenic Drive RV Park and Campground	Heflin, AL	25-50	Commercial	40		
Serenity Stables RV Park	Waverly, AL	25-50	Commercial	15		
Shady Oaks Campground	Lincoln, AL	25-50	Commercial	Available	Available	
Spring Villa Park	Opelika, AL	25-50	Commercial	30		
Sundance Marina	Cropwell, AL	25-50	Commercial	52		
Sunset Marina	Sylacauga, AL	10-25	Commercial	13		
Talladega Creekside Resort	Talladega, AL	25-50	Commercial	10	Available	
Talladega National Forest	Talladega, AL	25-50+	Federal			
Talladega RV Park	Lincoln, AL	25-50	Commercial	298		
Talladega Taz RV Park and Campground	Lincoln, AL	25-50	Commercial	200	Available	Available
Top Trails OHV Park	Talladega, AL	25-50	Commercial	25		Available

Facility Name	Town	Distance (miles)	Ownership	RV Camping	Tent Camping	Primitive Camping
Turnipseed Campground (Talladega National Forest)	Lineville, AL	10-25	Federal	8		8
Warden Station Camp (Talladega National Forest)	Heflin, AL	25-50	Federal	45		
Wazoo Campground	Lincoln, AL	25-50	Commercial			
Whispering Springs	Eclectic, AL	25-50	Commercial			
Whitetail Ridge	LaGrange, GA	25-50	USACE	58		
Wind Creek State Park	Alexander City, AL	25-50	State	586		
Yellowleaf Campground	Harpersville, AL	25-50	Commercial	Available		
Yogi Bear Jellystone Park	Bremen, GA	25-50	Commercial	90		Available

Source: Alabama RV Parks 2020; Georgia RV Parks 2020; All Campgrounds 2020; All Stays 2020

References:

All Campgrounds. 2020. http://www.allcampgrounds.com/al.html. Accessed October 2020.

All Stays. 2020. Map of all Alabama Campgrounds. Available at: https://www.allstays.com/Campgrounds/Alabama-campgrounds.htm. Accessed October 2020.

RV Park Reviews: Georgia (Georgia RV Parks). 2020. Available at: http://www.rvparkreviews.com/regions/georgia. Accessed October 2020.

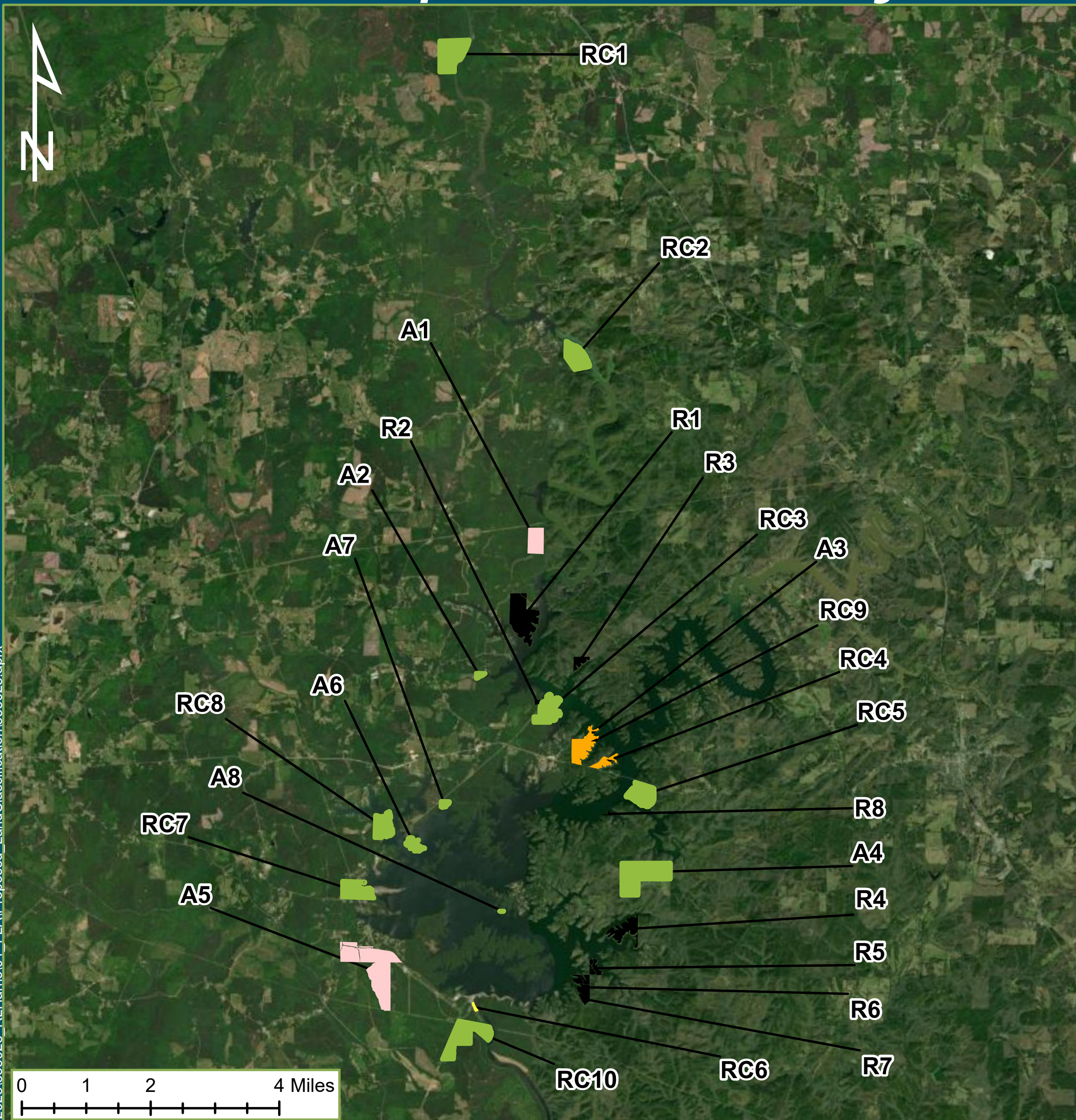
APPENDIX G

PROJECT LANDS

1. MAPS DEPICTING ALABAMA POWER'S LANDS PROPOSAL BY PARCEL

1. MAPS DEPICTING ALABAMA POWER'S LANDS PROPOSAL BY PARCEL-

Proposed Land Classification



Legend

Proposed Classification

Land Class

- Commerical Recreation
- Hunting
- Natural Undeveloped
- Non-Project Lands
- Recreation

Alabama Power

FERC No. 2628

Drawn By:	Date Drawn:	Checked By:	Date Checked:
HNG	11-09-2021	KPN	11-09-2021

Kleinschmidt

5346 Stadium Trace Pkwy
Suite 110
Hoover, AL 35244-4584
Telephone: (205) 981-4547
www.KleinschmidtGroup.com

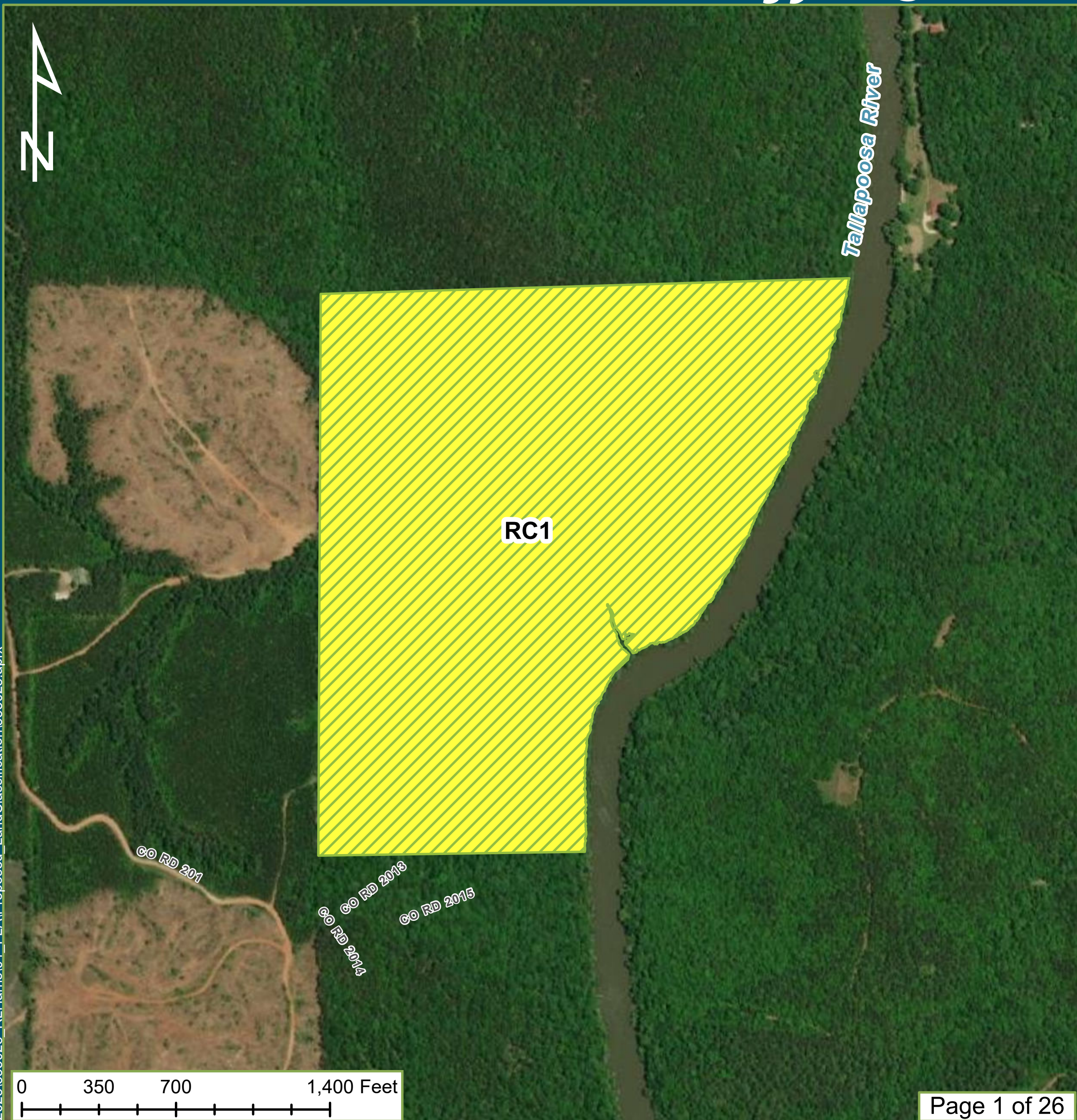
Path: Q:\Client Data\FERC Projects\P2628\535028_RLHarris\01_FLA\Proposed_LandClassification\535028.aprx

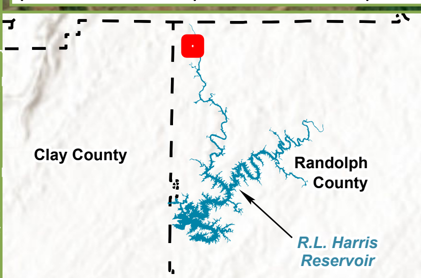
Date Printed: 11/11/2022

Source: APC 2021, ESRI 2021, NTD 2021

PN: 535028.01

RC1 - Reclassify 105 Acres





Legend

Baseline Classification Land Class	Proposed Classification Land Class
Flood Storage	Commercial Recreation
Hunting Lands	Flood Storage
Natural Undeveloped	Hunting
Non-Project Lands	Natural Undeveloped
Prohibited Access	Non-Project Lands
Recreation	Recreation
Scenic Easement	Scenic Easement

Alabama Power

FERC No. 2628

Drawn By:	Date Drawn:	Checked By:	Date Checked:
HNG	04-20-2022	KPN	04-20-2022

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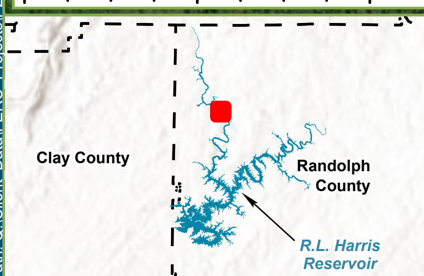
Date Printed: 11/11/2022

Source: APC 2021, ESRI 2021, NTD 2021

PN: 535028.01

RC2 - Reclassify 63 Acres



Legend

Baseline Classification Land Class	Proposed Classification Land Class
Flood Storage	Commercial Recreation
Hunting Lands	Flood Storage
Natural Undeveloped	Hunting
Non-Project Lands	Natural Undeveloped
Prohibited Access	Non-Project Lands
Recreation	Recreation
Scenic Easement	Scenic Easement

Alabama Power
FERC No. 2628

Drawn By:	Date Drawn:	Checked By:	Date Checked:
HNG	04-20-2022	KPN	04-20-2022

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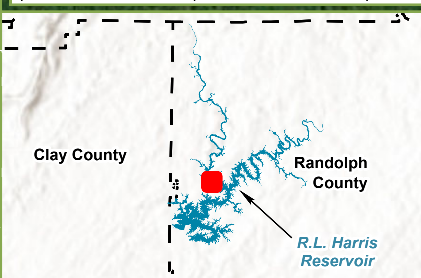
Date Printed: 11/11/2022

Source: APC 2021, ESRI 2021, NTD 2021

PN: 535028.01

RC3 - Reclassify 61 Acres



Legend

Baseline Classification Land Class	Proposed Classification Land Class
Flood Storage	Commercial Recreation
Hunting Lands	Flood Storage
Natural Undeveloped	Hunting
Non-Project Lands	Natural Undeveloped
Prohibited Access	Non-Project Lands
Recreation	Recreation
Scenic Easement	Scenic Easement

Alabama Power
FERC No. 2628

Drawn By:	Date Drawn:	Checked By:	Date Checked:
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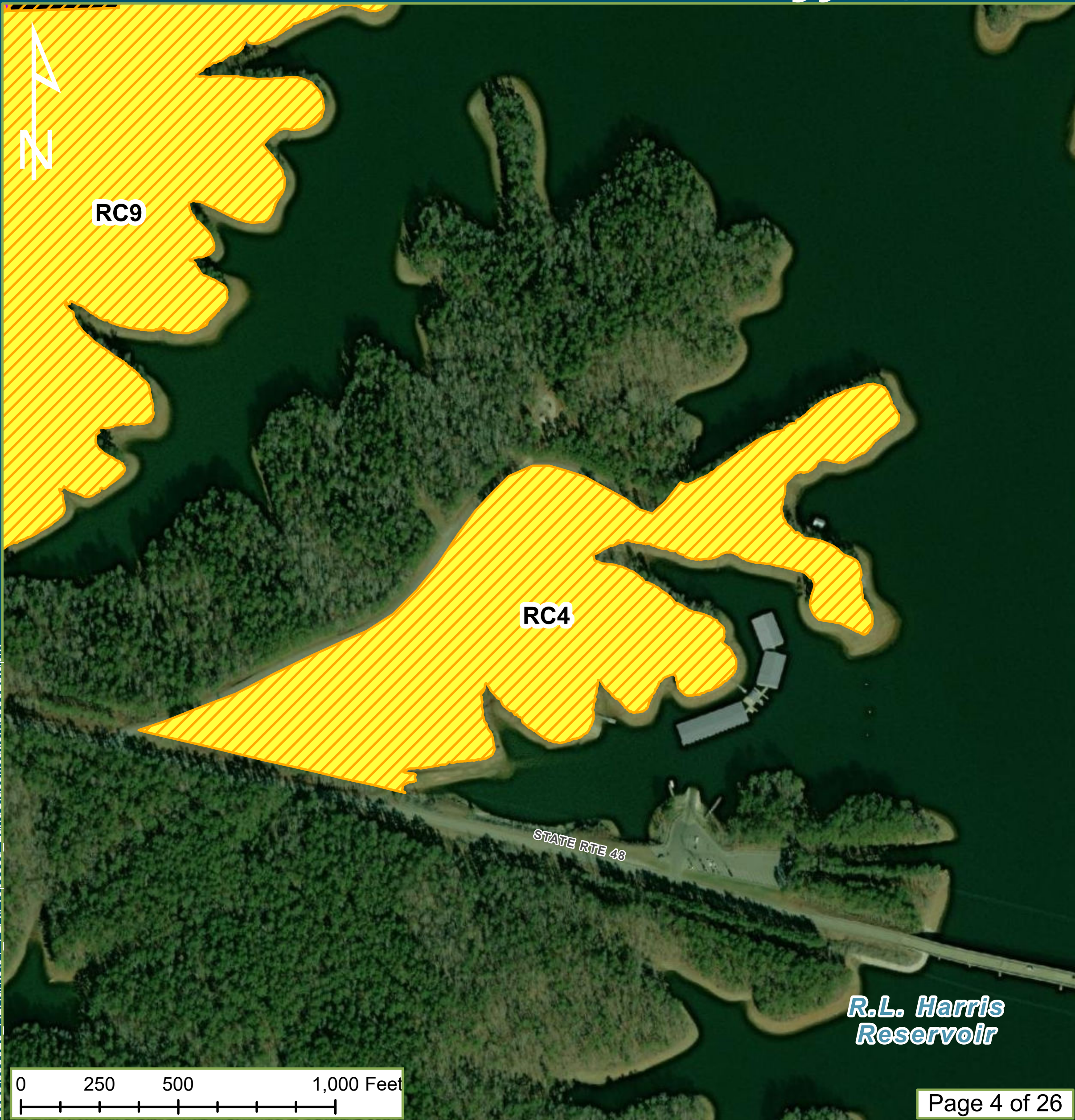
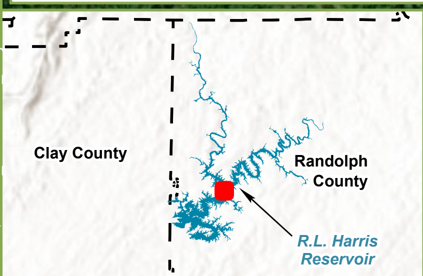
Date Printed: 11/11/2022

Source: APC 2021, ESRI 2021, NTD 2021

PN: 535028.01

RC4 - Reclassify 25 Acres





Legend

Baseline Classification Land Class	Proposed Classification Land Class
Flood Storage	Commercial Recreation
Hunting Lands	Flood Storage
Natural Undeveloped	Hunting
Non-Project Lands	Natural Undeveloped
Prohibited Access	Non-Project Lands
Recreation	Recreation
Scenic Easement	Scenic Easement

Alabama Power

FERC No. 2628

Drawn By:	Date Drawn:	Checked By:	Date Checked:
HNG	04-20-2022	KPN	04-20-2022

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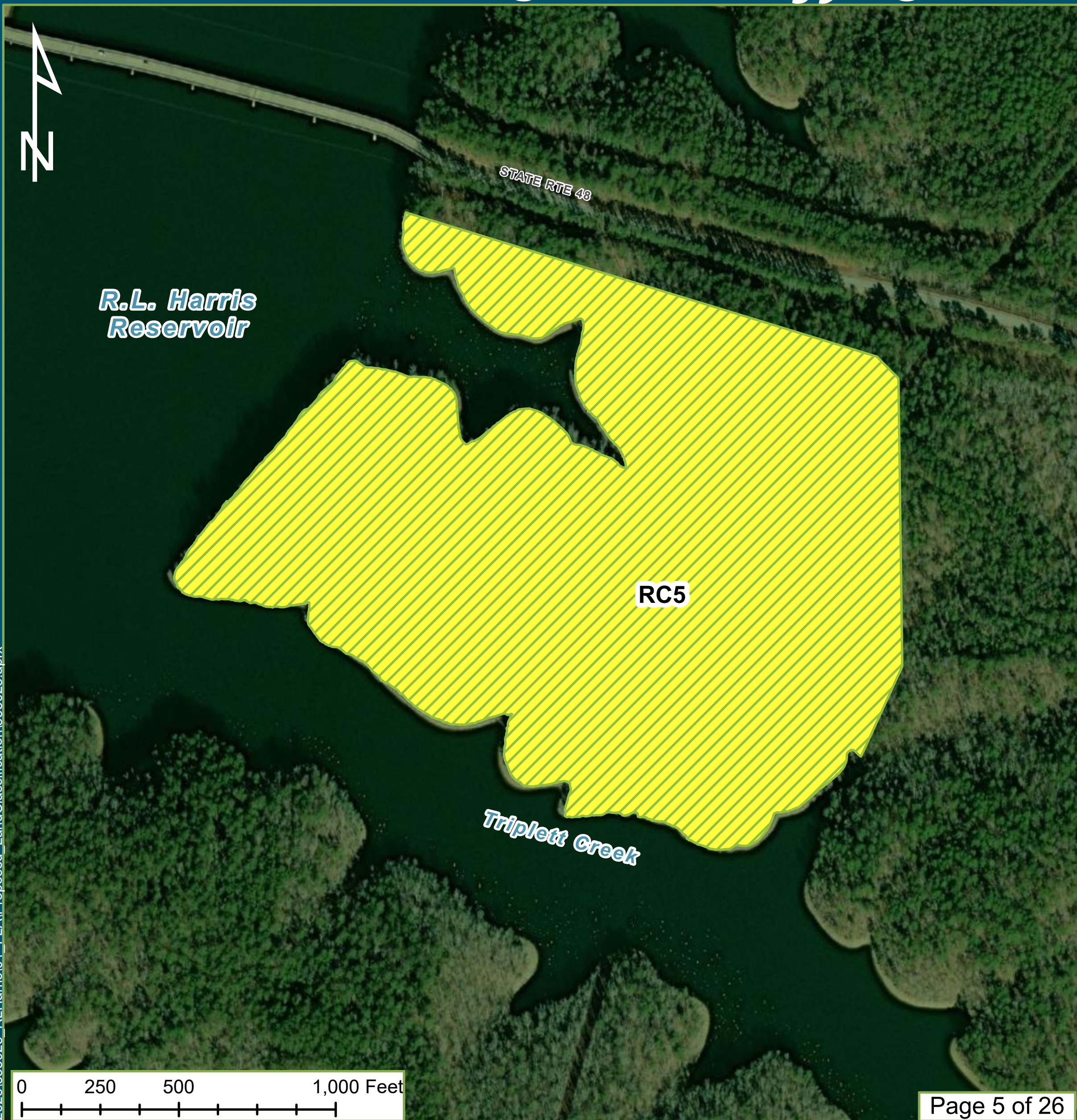
Date Printed: 11/11/2022

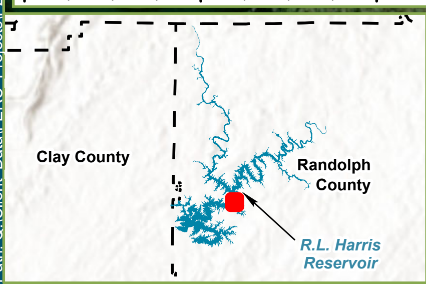
Source: APC 2021, ESRI 2021, NTD 2021

PN: 535028.01

RC5 - Reclassify 63 Acres



Page 5 of 26



Legend

Baseline Classification Land Class	Proposed Classification Land Class
Flood Storage	Commercial Recreation
Hunting Lands	Flood Storage
Natural Undeveloped	Hunting
Non-Project Lands	Natural Undeveloped
Prohibited Access	Non-Project Lands
Recreation	Recreation
Scenic Easement	Scenic Easement

Alabama Power

FERC No. 2628

Drawn By:	Date Drawn:	Checked By:	Date Checked:
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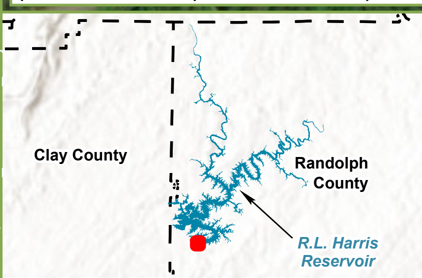
Date Printed: 11/11/2022

Source: APC 2021, ESRI 2021, NTD 2021

PN: 535028.01

RC6 - Reclassify 5 Acres



Legend

Baseline Classification Land Class	Proposed Classification Land Class
Flood Storage	Commercial Recreation
Hunting Lands	Flood Storage
Natural Undeveloped	Hunting
Non-Project Lands	Natural Undeveloped
Prohibited Access	Non-Project Lands
Recreation	Recreation
Scenic Easement	Scenic Easement

Alabama Power

FERC No. 2628

Drawn By:	Date Drawn:	Checked By:	Date Checked:
HNG	04-20-2022	KPN	04-20-2022

Kleinschmidt
5346 Stadium Trace Pkwy
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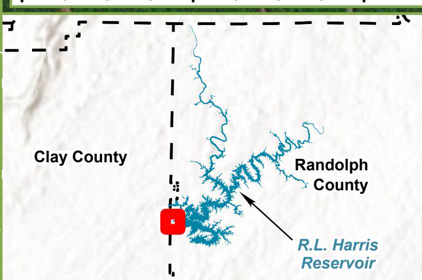
Date Printed: 11/11/2022

Source: APC 2021, ESRI 2021, NTD 2021

PN: 535028.01

RC7 - Reclassify 57 Acres



Legend

Baseline Classification Land Class	Proposed Classification Land Class
Flood Storage	Commercial Recreation
Hunting Lands	Flood Storage
Natural Undeveloped	Hunting
Non-Project Lands	Natural Undeveloped
Prohibited Access	Non-Project Lands
Recreation	Recreation
Scenic Easement	Scenic Easement

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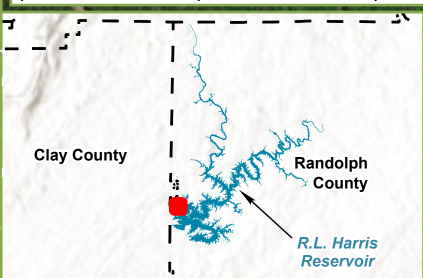
PN: 535028.01

RC8 - Reclassify 51 Acres



Legend

Baseline Classification Land Class	Proposed Classification Land Class
Flood Storage	Commercial Recreation
Hunting Lands	Flood Storage
Natural Undeveloped	Hunting
Non-Project Lands	Natural Undeveloped
Prohibited Access	Non-Project Lands
Recreation	Recreation
Scenic Easement	Scenic Easement

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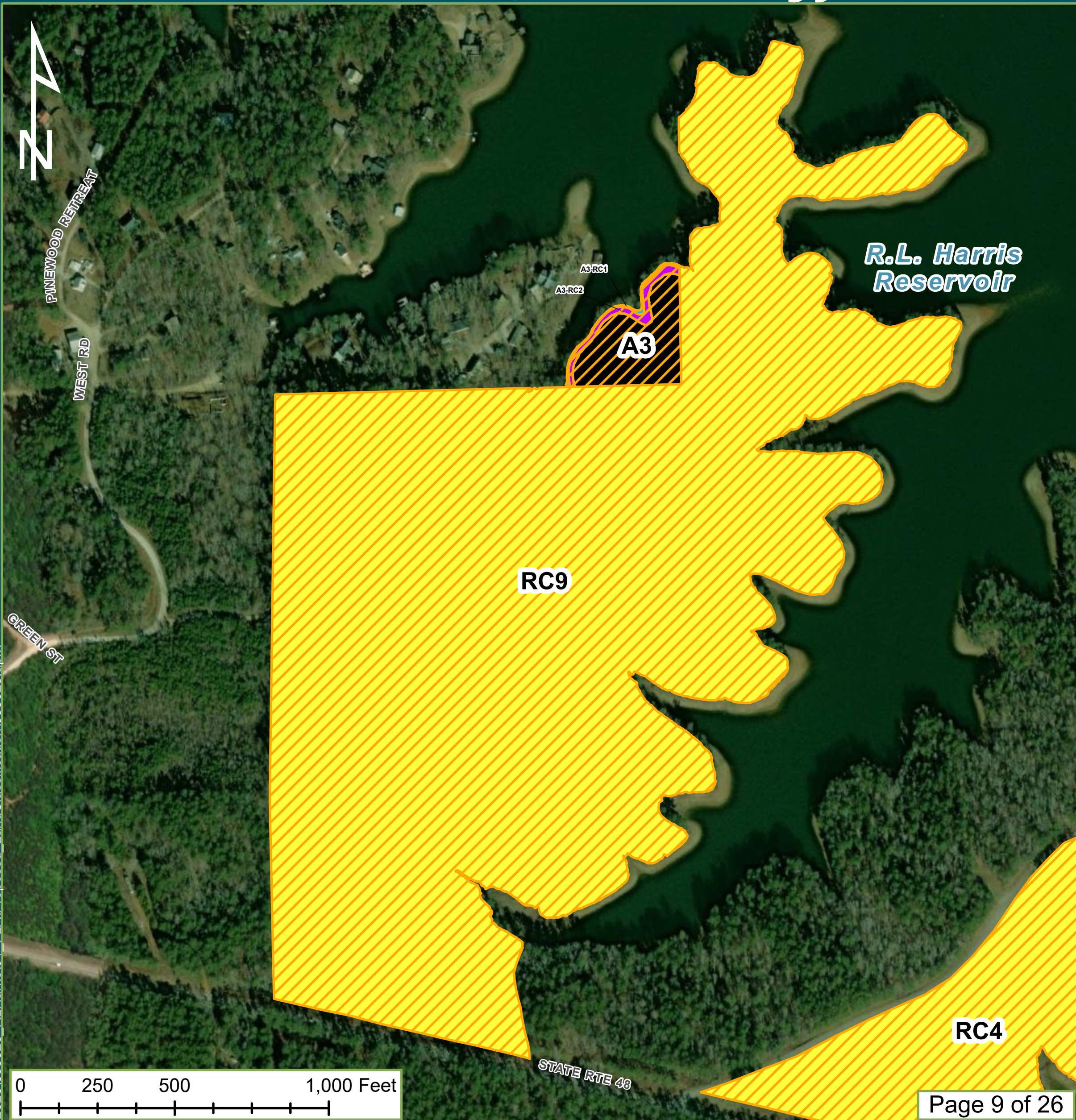
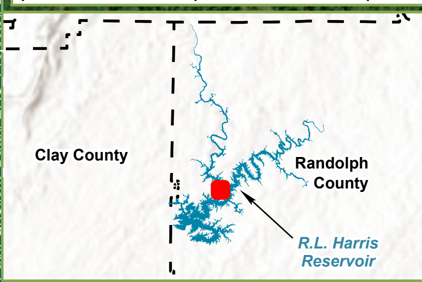
Source: APC 2021, ESRI 2021, NTD 2021

PN: 535028.01

RC9 - Reclassify 80 Acres





Legend

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Prohibited Access	Non-Project Lands
Recreation	Recreation
Scenic Easement	Scenic Easement

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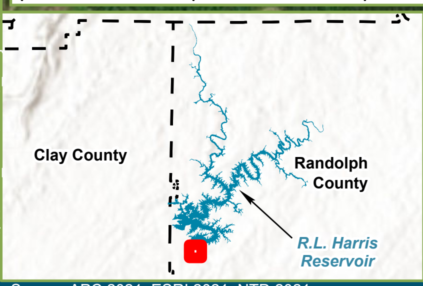
PN: 535028.01

RC10 - Reclassify 100 Acres



Legend

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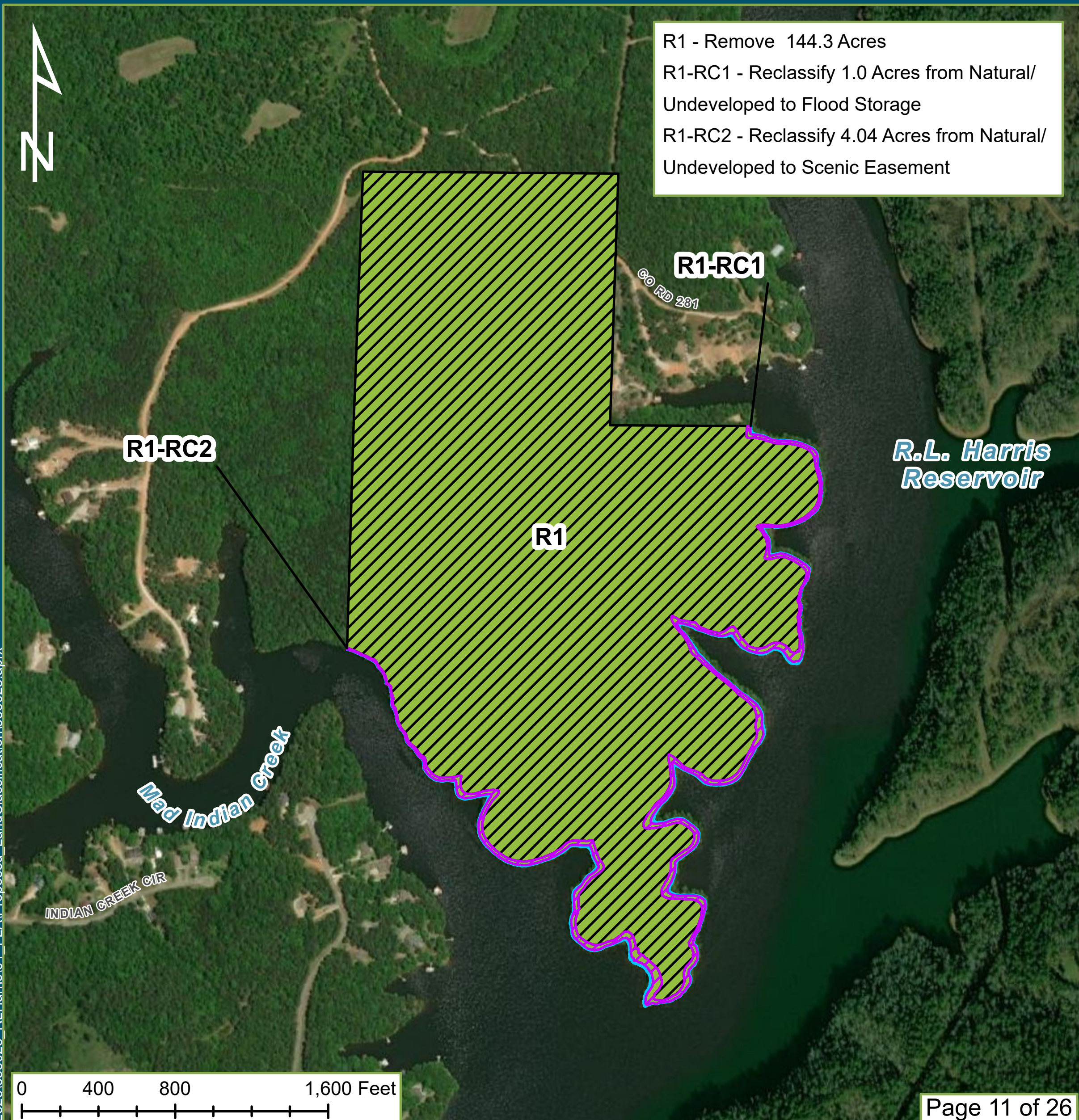

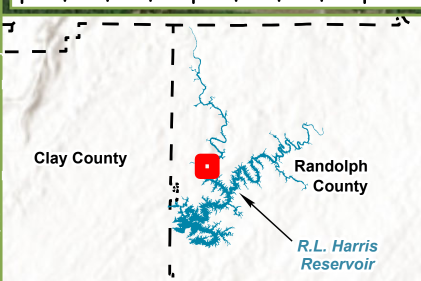

Legend

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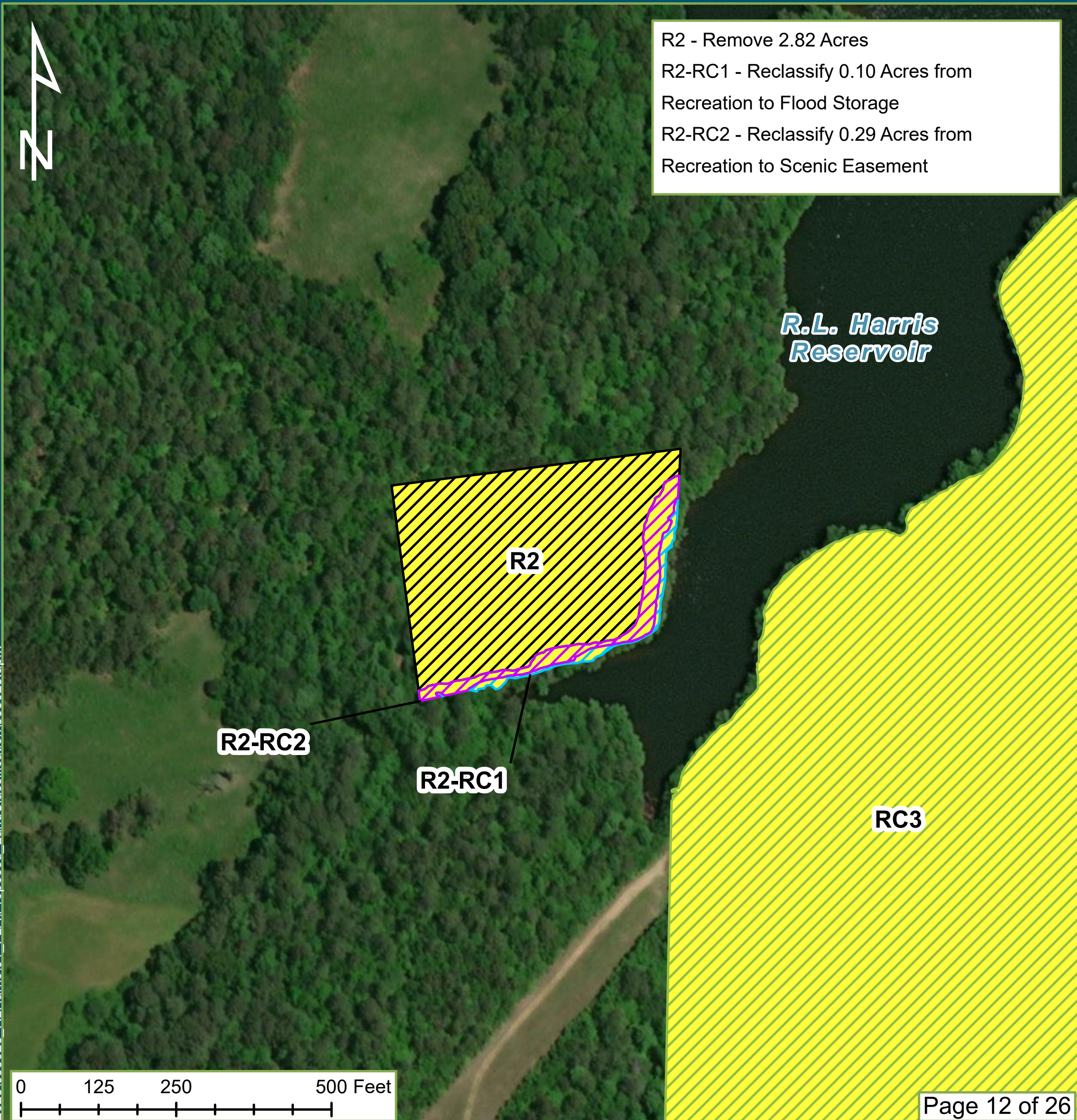

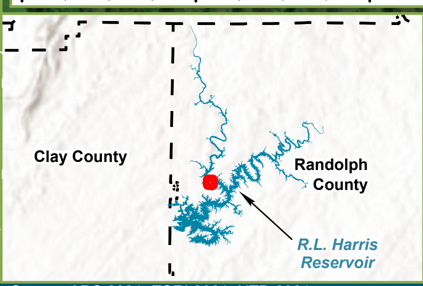

Legend

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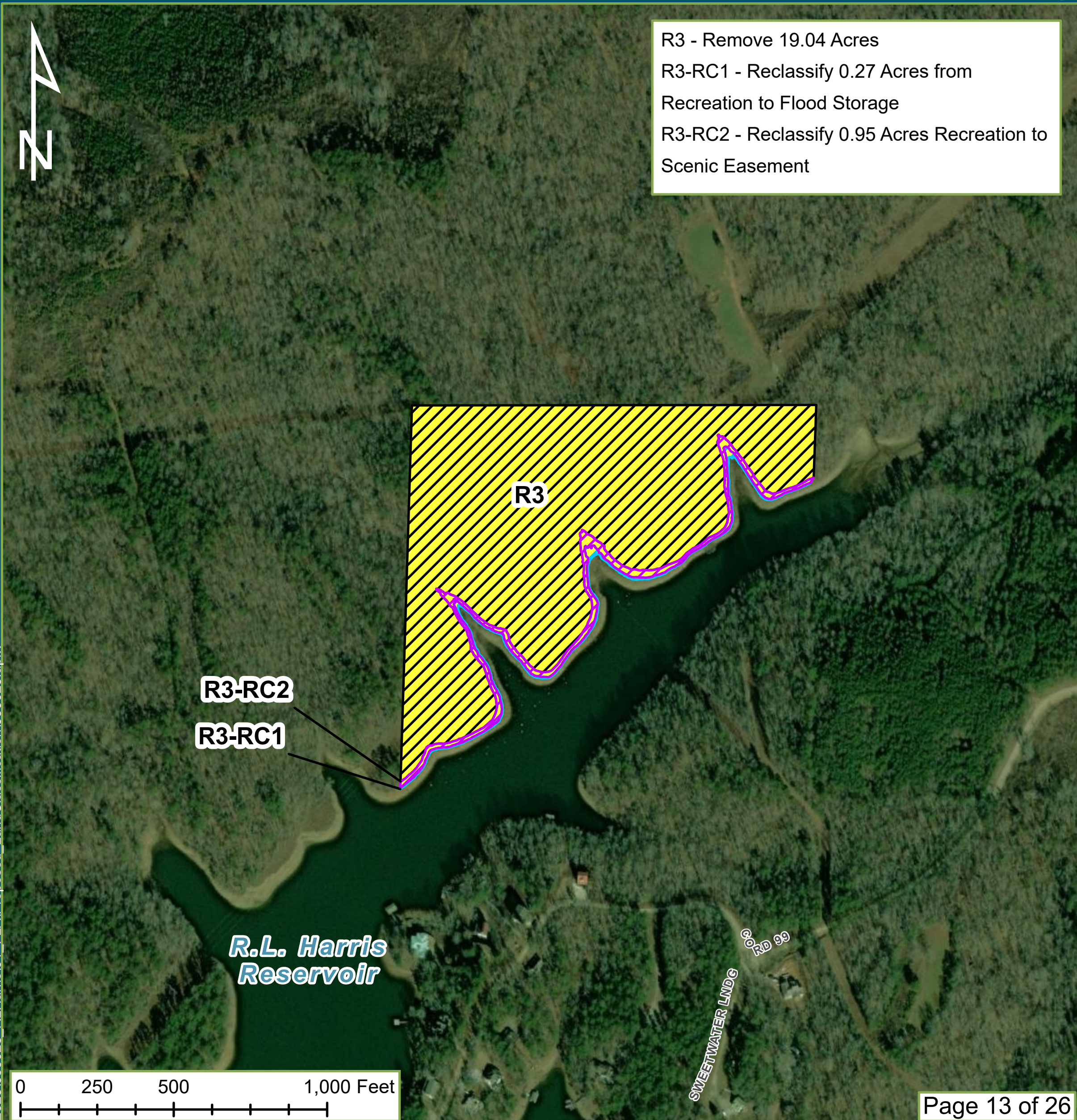
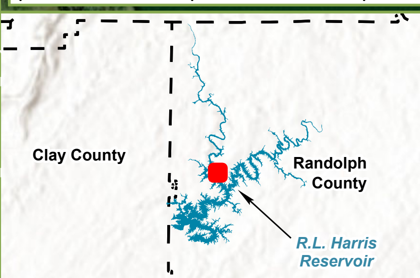
R3





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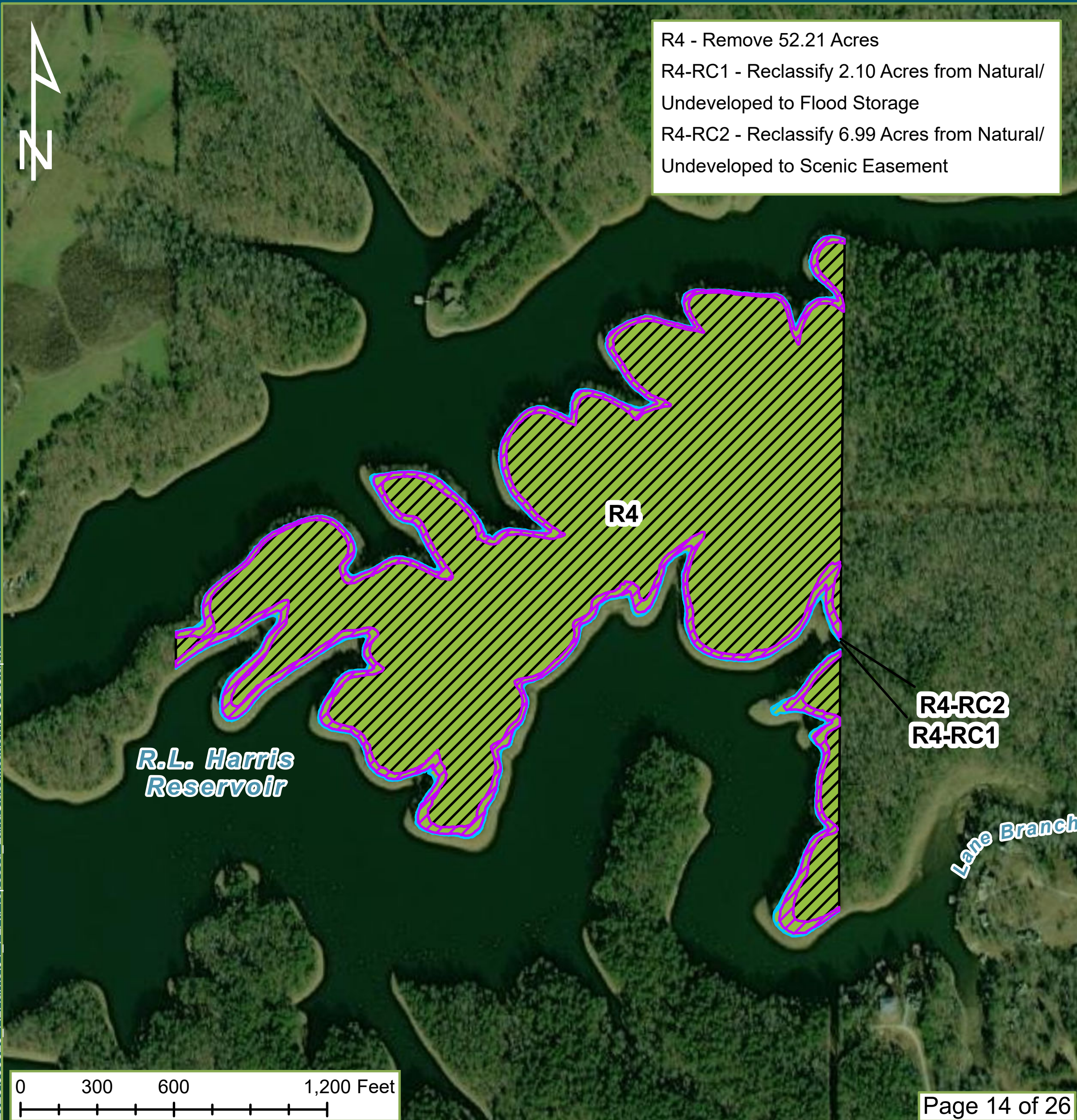

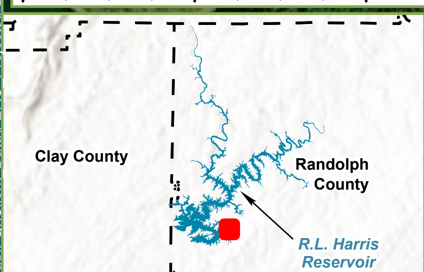

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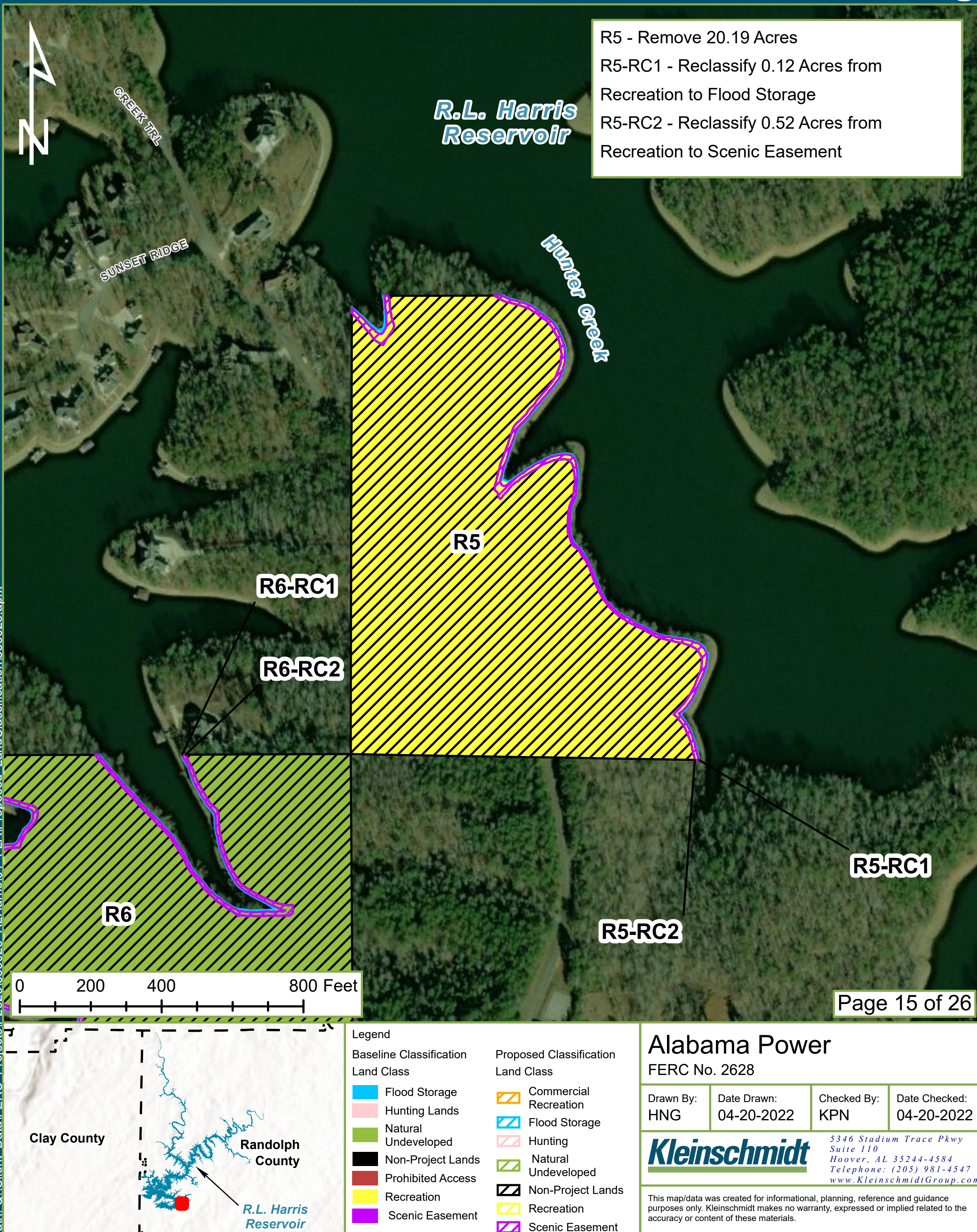

Legend

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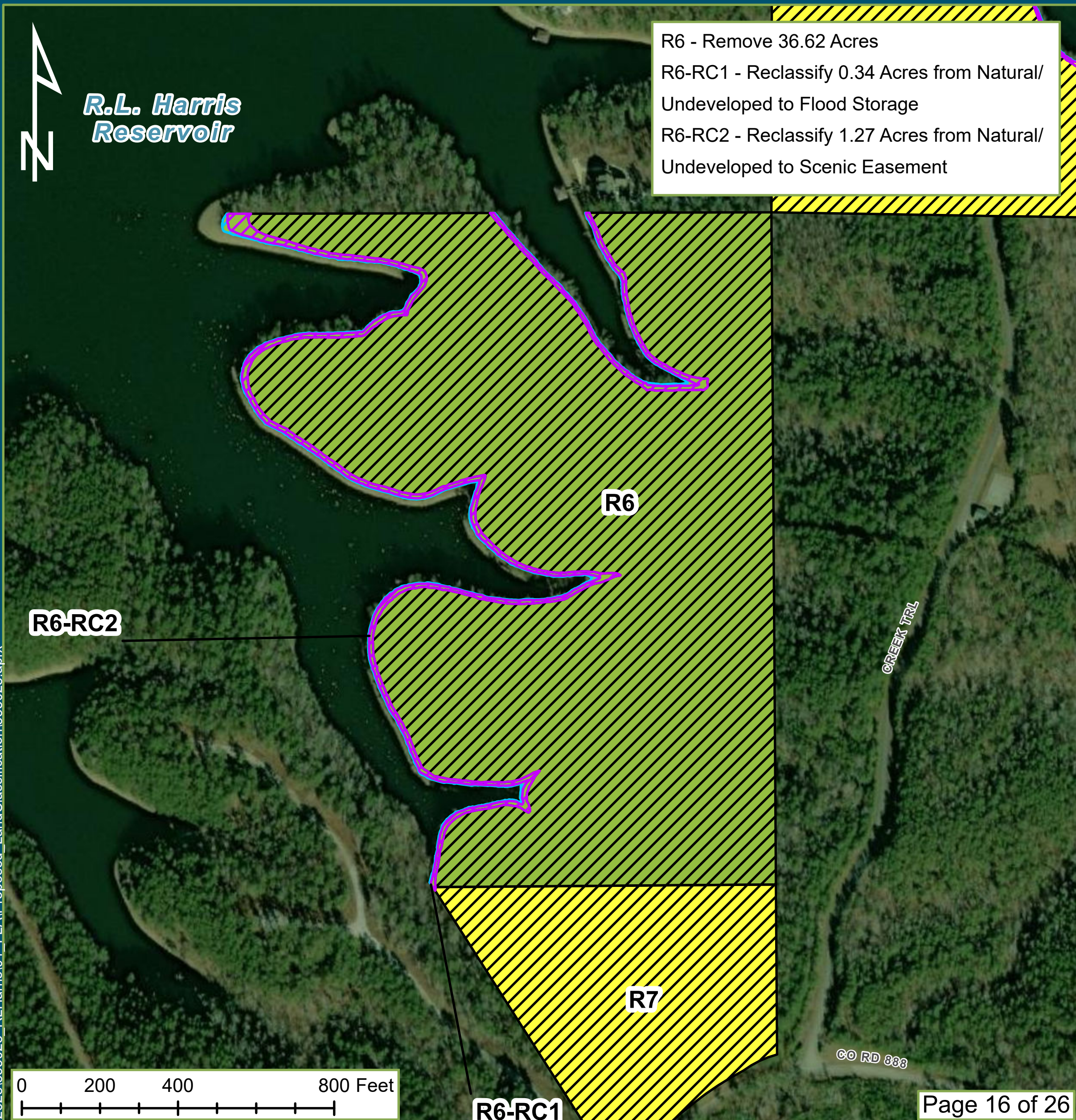

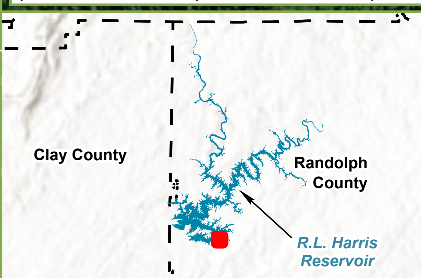

Legend

Baseline Classification Land Class	Proposed Classification Land Class
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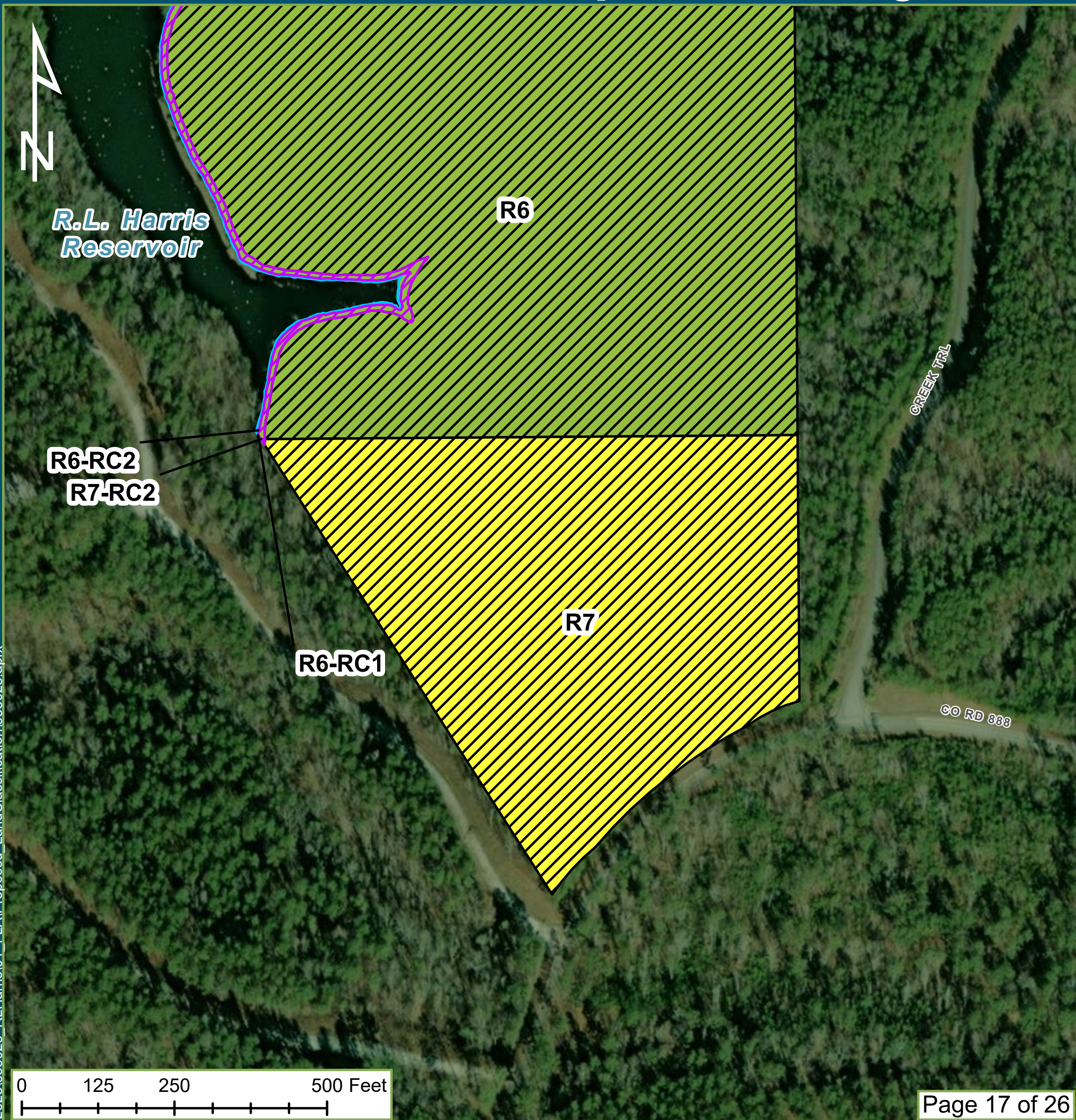
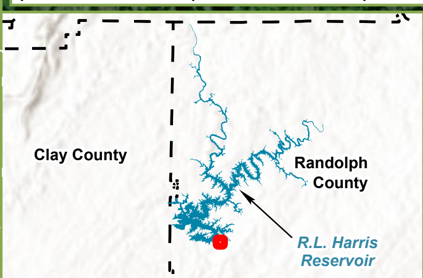
Source: APC 2021, ESRI 2021, NTD 2021

PN: 535028.01

R7 - Remove 9 Acres





Legend

Baseline Classification Land Class	Proposed Classification Land Class
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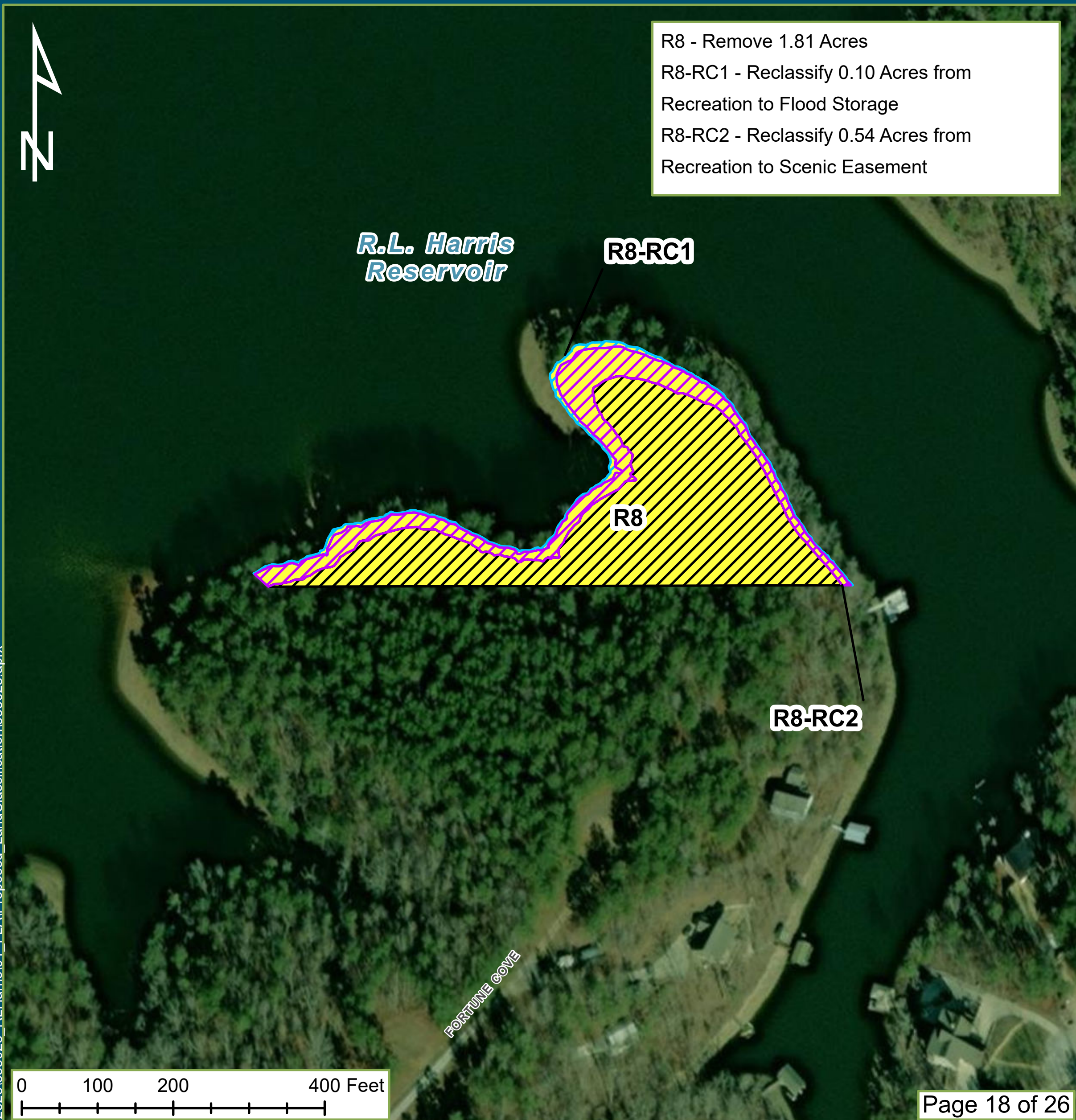

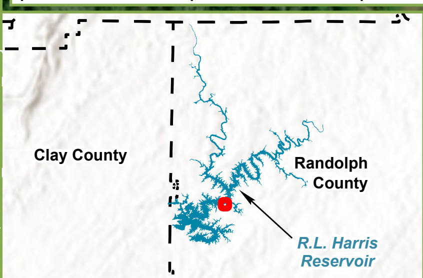

Legend

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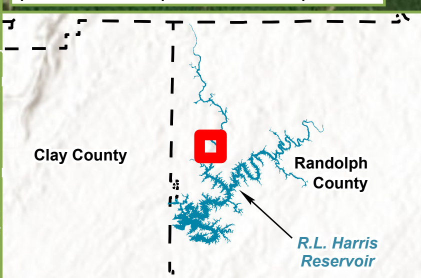
PN: 535028.01

A1 - Add 64 Acres



Legend

Baseline Classification Land Class
- Flood Storage
- Hunting Lands
- Natural Undeveloped
- Non-Project Lands
- Prohibited Access
- Recreation
- Scenic Easement

Proposed Classification Land Class
- Commercial Recreation
- Flood Storage
- Hunting
- Natural Undeveloped
- Non-Project Lands
- Recreation
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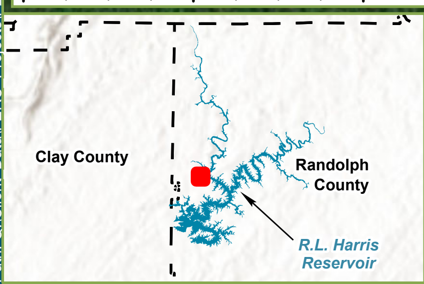

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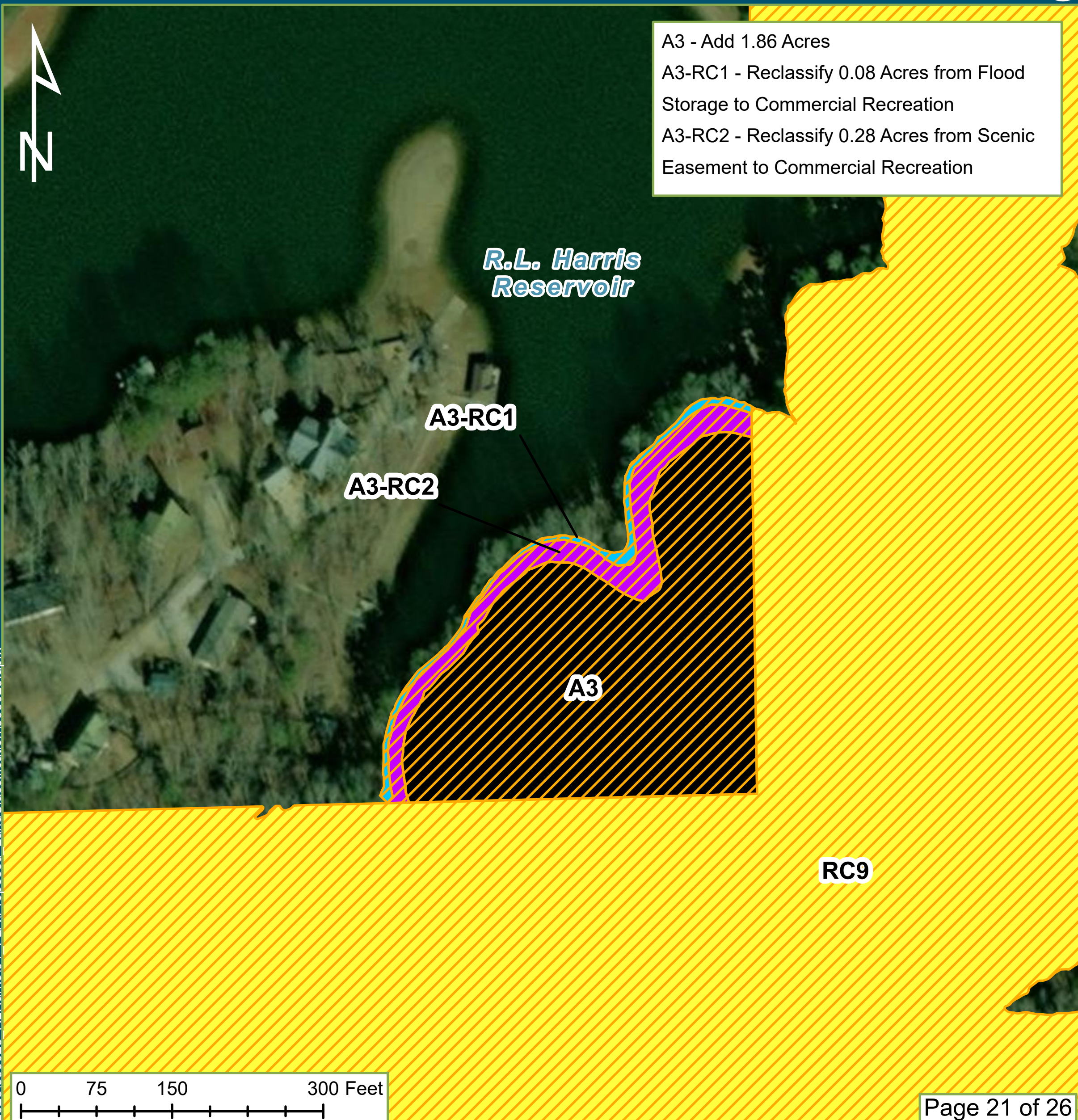
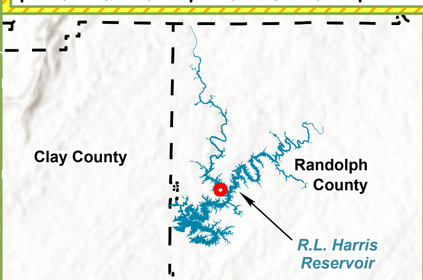
A3





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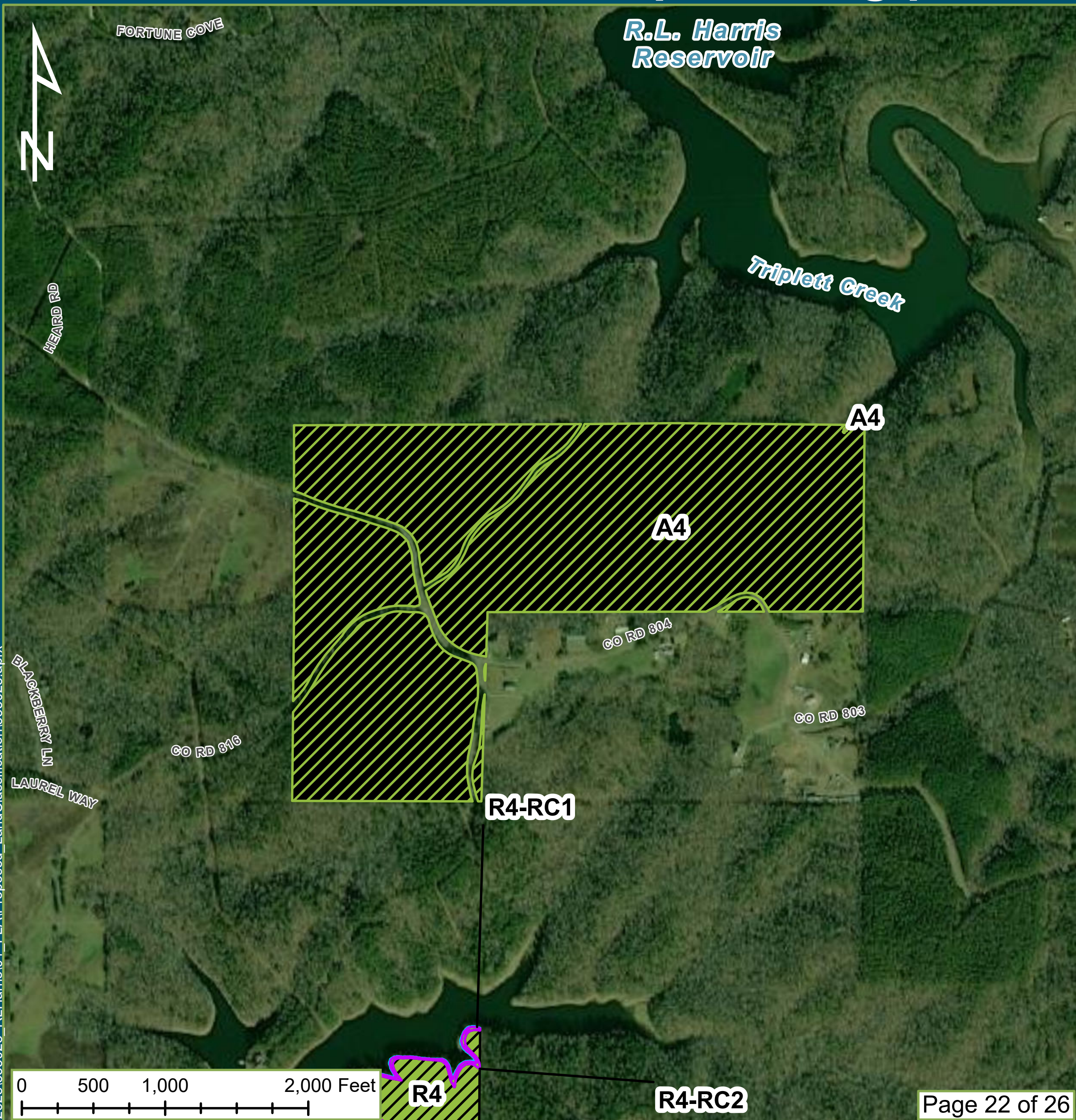
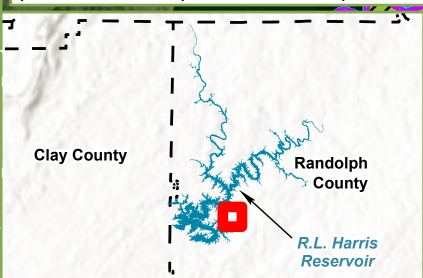
A4 - Add 154 Acres





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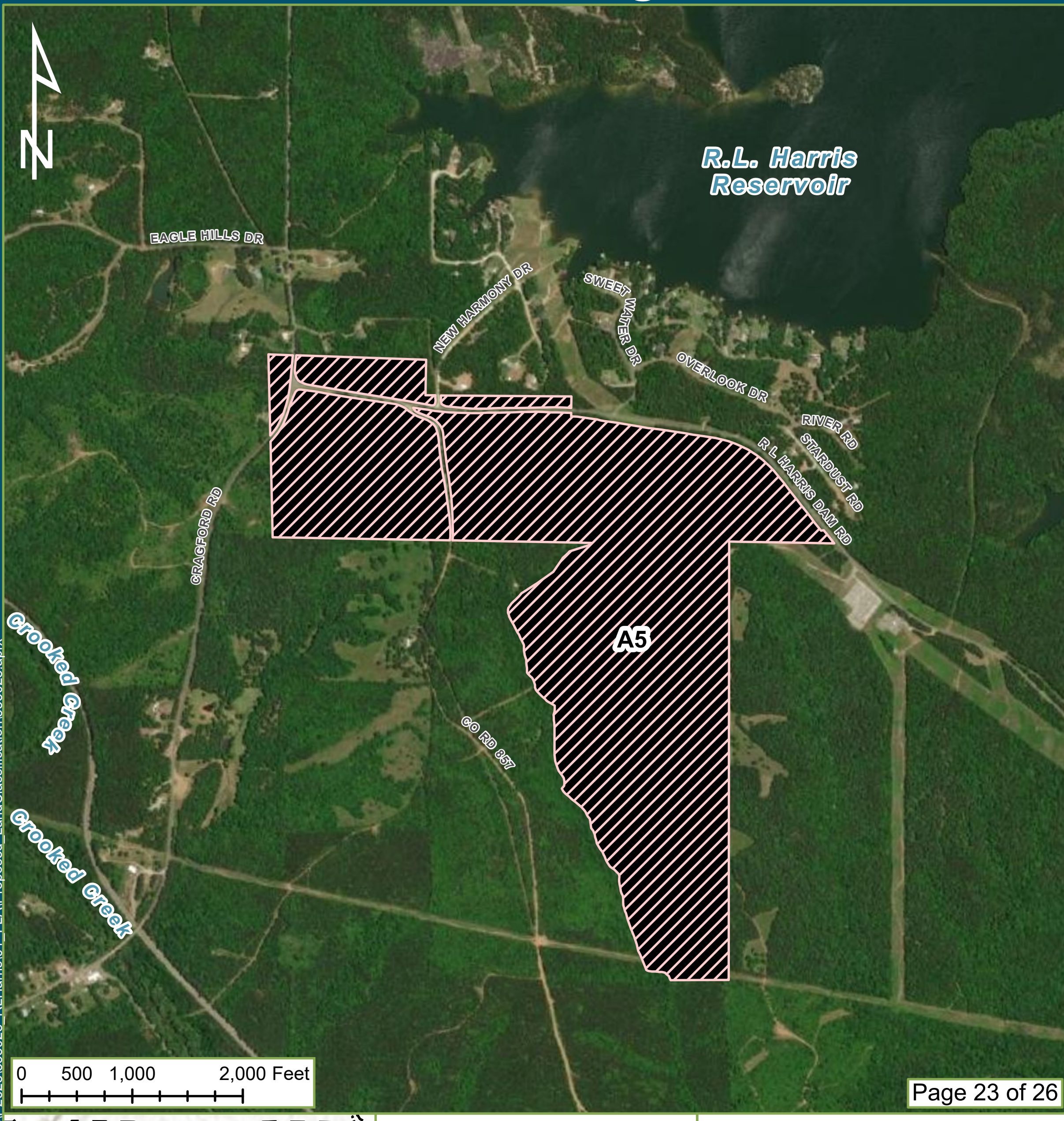
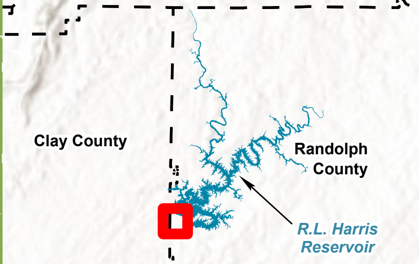
A5 - Add 261 Acres





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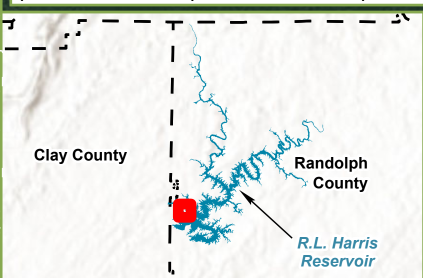
A6



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Date Printed: 11/11/2022

Source: APC 2021, ESRI 2021, NTD 2021

PN: 535028.01

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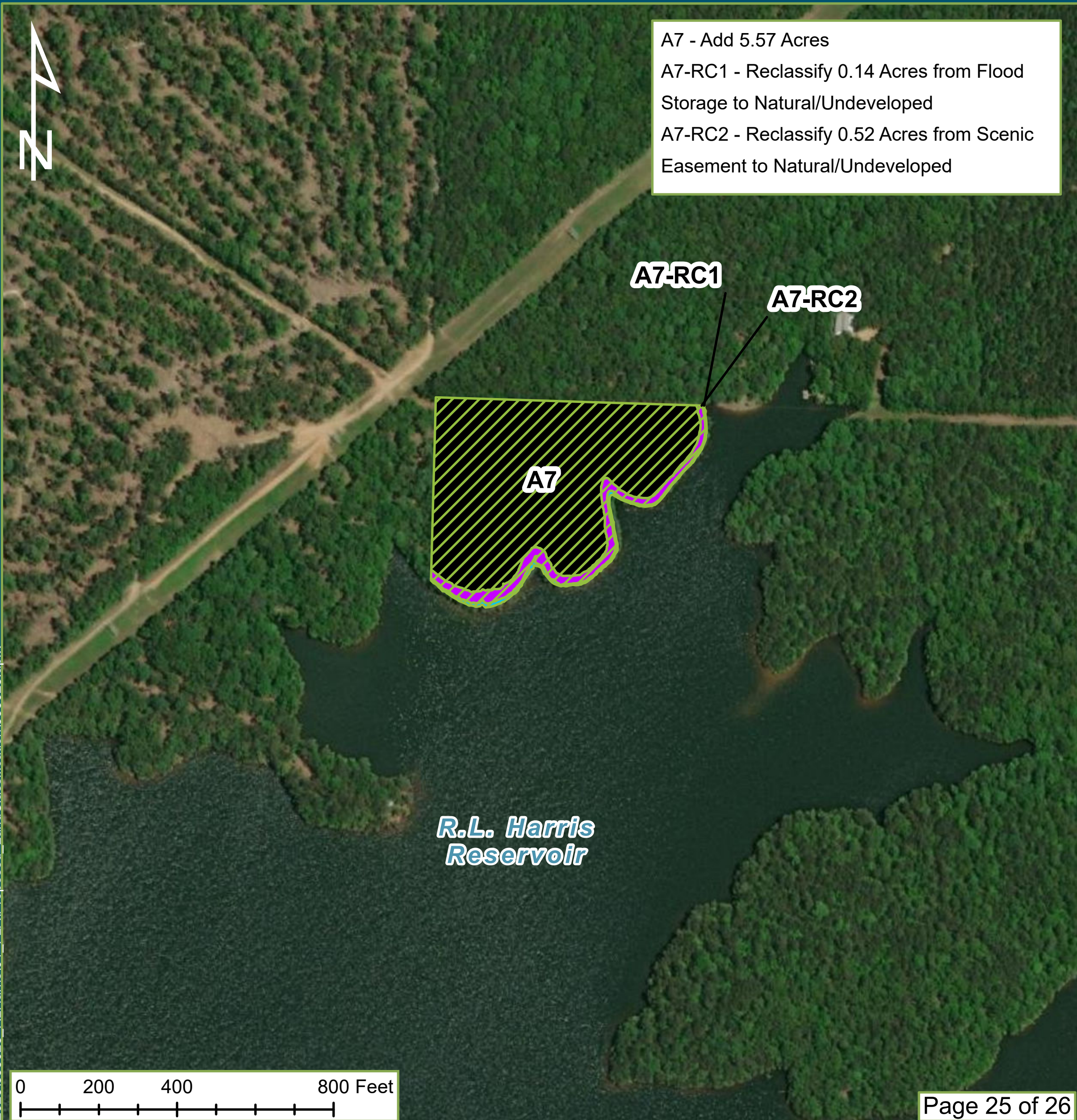

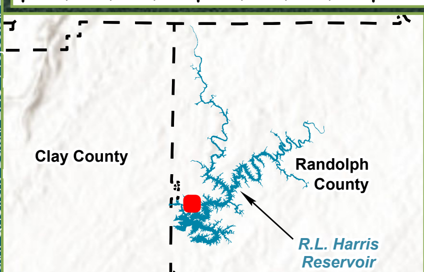

Legend

Baseline Classification Land Class	Proposed Classification Land Class
Flood Storage	Commercial Recreation
Hunting Lands	Flood Storage
Natural Undeveloped	Hunting
Non-Project Lands	Natural Undeveloped
Prohibited Access	Non-Project Lands
Recreation	Recreation
Scenic Easement	Scenic Easement

Alabama Power

FERC No. 2628

Drawn By:	Date Drawn:	Checked By:	Date Checked:
HNG	04-20-2022	KPN	04-20-2022

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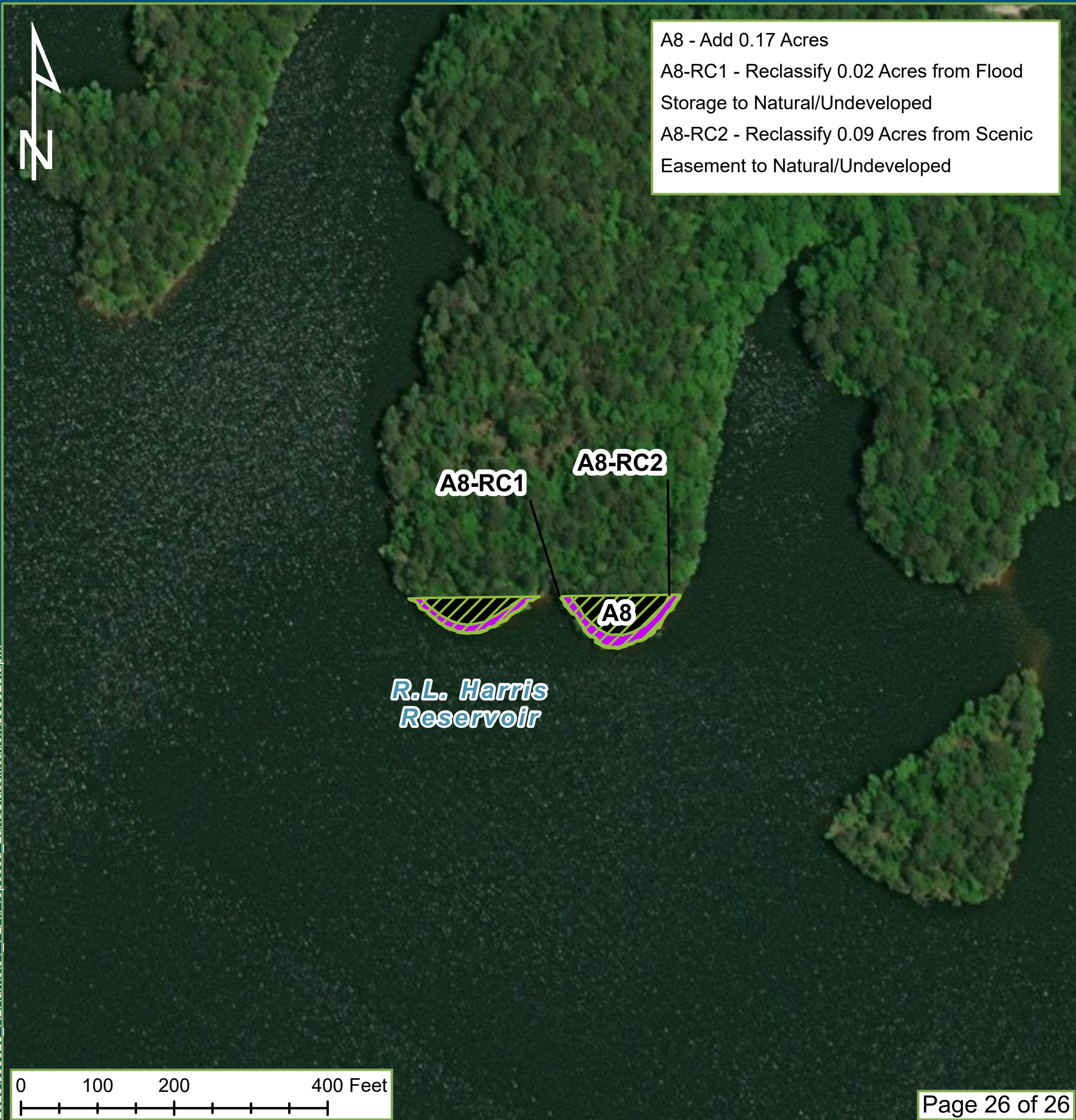

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APPENDIX H

AQUATIC RESOURCES

1. DESKTOP FISH ENTRAINMENT & TURBINE MORTALITY ASSESSMENT FOR PROPOSED MININUM FLOW UNIT

1. DESKTOP FISH ENTRAINMENT & TURBINE MORTALITY ASSESSMENT FOR PROPOSED MININUM FLOW UNIT

Desktop Fish Entrainment & Turbine Mortality Assessment for Proposed Minimum Flow Unit

R. L. HARRIS HYDROELECTRIC PROJECT

HARRIS DAM RELICENSING

Prepared for:

Alabama Power Company

Prepared by:

Kleinschmidt Associates

Kleinschmidt

June 2022

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1.0 INTRODUCTION

Alabama Power Company (Alabama Power) filed an application for a new license for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628) with the Federal Energy Regulatory Commission (FERC) on November 23, 2021. As part of its application, Alabama Power proposed to install a new turbine generator system to provide a continuous minimum flow from Harris Dam. In a December 23, 2021 letter, FERC requested that Alabama Power evaluate the potential for turbine mortality through the proposed minimum flow unit.

Alabama Power included a Desktop Entrainment and Turbine Mortality Study Report (ETM Report) as Appendix M of the Pre-Application Document (PAD) filed on June 1, 2018. That study employed widely accepted methods to estimate fish entrainment and turbine mortality through the existing units at the Harris Project using results from previous field studies performed at similar projects. These same methods were used to evaluate potential turbine mortality through the proposed minimum flow unit in satisfaction of FERC's request. This document provides the details and results of that evaluation.

2.0 METHODS

The ETM report utilized volume-based rates to estimate the number of fish entrained through the existing units at the Harris Project. Estimates of fish potentially entrained through the proposed minimum flow unit were extrapolated from the estimates for the existing units. For instance, in the ETM study, given a monthly flow rate for December of 6,361 million cubic feet (mcf), 6,998 fish were estimated to be entrained through the existing units. For the same period, the minimum flow unit would be expected to pass 804 mcf or 13 percent of the volume the existing units would pass. Therefore, the entrainment estimate for the proposed unit would be 13 percent of 6,998, or 884 fish.

The composition of fish entrained by family/genus group and size was estimated for the proposed unit using the same percent composition from the ETM study.

Mortality was determined by reviewing the same database of turbine survival studies utilized in the ETM study and aggregating data from studies with turbine characteristics similar to those of the proposed minimum flow unit. Data from each study was grouped and averaged to determine percent mortality for each family/genus group and size class. The mortality rates were then applied to the fish entrainment estimates to determine estimated potential losses due to turbine mortality associated with the proposed minimum flow unit.

3.0 RESULTS

3.1 Entrainment

Based on results extrapolated from the ETM study, the proposed minimum flow unit could potentially entrain 37,353 of the 294,427 total fish entrained annually (Table 3-1). The majority of fish would be entrained during the winter months and would be dominated by species in the family Clupeidae (shads and herrings) (Table 3-2).

TABLE 3-1 SUMMARY OF FISH ENTRAINMENT ESTIMATES FOR EXISTING UNITS AND PROPOSED MINIMUM FLOW UNIT

Month	Estimated Number of Fish Entrained through Existing Units[1]	Estimated Number of Fish Entrained through Proposed Min Flow Unit
December	6,998	884
January	44,972	5,464
February	211,878	24,385
March	7,747	804
April	5,717	933
May	2,109	402
June	730	233
July	1,080	402
August	1,904	1,044
September	863	459
October	1,092	337
November	9,337	2,006
Totals	**294,427**	**37,353**

[1] After implementation of the proposed minimum flow unit, these numbers would represent the sum of entrainment from all turbines.

TABLE 3-2 SUMMARY OF FISH ENTRAINMENT ESTIMATE BY FAMILY/GENUS GROUP FOR THE PROPOSED MINIMUM FLOW UNIT

Family/Genus Group	Winter	Spring	Summer	Fall	Total
Catostomidae	3	1	1	0	5
Sunfish	55	203	211	39	509
Bass	0	7	1	1	9
Clupeidae	29,556	1,874	1,406	2,215	35,051
Cyprinidae	34	21	10	17	82
Ictaluridae	1,085	31	51	530	1,697
Total	**30,733**	**2,138**	**1,680**	**2,802**	**37,353**

3.2 Turbine Mortality

A review of the turbine mortality dataset yielded data from three sites with turbine characteristics similar to those of the Harris proposed minimum flow unit (Table 3-3). Studies at these sites included members of the catostomid, centrarchid, clupeid, cyprinids, and ictalurid genera. Mortality data for suckers were used as a surrogate for catfish.

TABLE 3-3 COMPARISON OF TURBINE CHARACTERISTICS AT HARRIS AND SELECTED MORTALITY STUDY SITES

Site Name	Turbine Type	Head (ft)	Power (MW)	Flow (cfs)	Speed (rpm)	Diameter (in)	Runner Blades
Harris Dam Project	**Francis (vert)**	**121**	**67.5**	**8,000**	**105.9**	**209**	**13**
Proposed Minimum Flow Unit	**Francis (horiz)**	**115**	**3**	**300**	**360**	**46**	**15**
Colton	Francis (vert)	258	11.2	450	360	59	19
High Falls	Francis (horiz)	83	1.4	275	359	39	-
Higley	Francis (horiz)	45	2.1	695	257	48	13

There were no available studies that included shad/herring from sites with turbines similar to the proposed minimum flow unit at Harris. The ETM study utilized mortality rates of approximately five percent for shad/herring for the existing units. However, the existing units are much larger and rotate at a slower speed. As seen in Table 3-4, most of the mortality rates for the proposed minimum flow unit are higher than those for the existing units. As such, conservative mortality rates of 25 and 75 percent were used to estimate the mortality of small and large shad/herring through the proposed minimum flow unit, respectively.

TABLE 3-4 MORTALITY RATES FOR EXISTING UNITS AND PROPOSED MINIMUM FLOW UNIT AT THE HARRIS PROJECT

Species	Size	Existing Units Turbine Mortality (%)	Proposed Minimum Flow Unit Turbine Mortality (%)
Catostomidae	Small	26	28
	Large	23	68
	Average	**24**	**48**
Sunfish	Small	34	36
	Large	20	42
	Average	**27**	**39**
Bass	Small	20	95
	Large	33	93
	Average	**27**	**94**
Clupeidae	Small	5	25
	Large	6	75
	Average	**6**	**50**
Cyprinidae	Small	17	35
	Large	5	70
	Average	**11**	**53**
Ictaluridae	Small	26	33
	Large	23	64
	Average	**24**	**49**

After application of the mortality rates to entrainment estimates for the proposed minimum flow unit, an estimated 12,691 fish would be lost annually due to turbine mortality (Table 3-5). Approximately 93 percent of fish lost to turbine mortality would consist of shad/herring.

TABLE 3-5 SUMMARY OF ESTIMATED ANNUAL FISH MORTALITY FOR HARRIS PROPOSED MINIMUM FLOW UNIT

Family/Genus Group	Size[1]	Winter	Spring	Summer	Fall	Total
Catostomidae	Small	0	0	0	0	**0**
Catostomidae	Large	1	1	0	0	**2**
Sunfish	Small	14	61	19	4	**99**
Sunfish	Large	8	7	2	4	**21**
Bass	Small	0	1	0	0	**1**
Bass	Large	1	5	0	1	**6**
Clupeidae	Small	6,793	347	68	164	**7,372**
Clupeidae	Large	3,765	259	91	358	**4,473**
Cyprinidae	Small	11	6	1	2	**20**
Cyprinidae	Large	3	1	1	2	**7**
Ictaluridae	Small	216	3	2	65	**286**
Ictaluridae	Large	338	12	5	48	**403**
	Total	**11,151**	**704**	**189**	**647**	**12,691**

[1] Small = <150 mm; Large = >150 mm

4.0 SUMMARY AND CONCLUSIONS

The number of fish potentially entrained through the proposed minimum flow unit at the Harris Project was extrapolated from estimates of fish entrainment through the existing units. Compared to an estimated 294,427 entrained annually through the existing units, 37,353 fish may be entrained annually through the proposed minimum flow unit. However, the estimated total number of fish entrained annually for the Harris Project would remain 294,427 because the existing units and proposed minimum flow unit would draw from the same penstock.

Results of turbine mortality studies at sites with turbines similar to the proposed minimum flow unit were evaluated to generate estimated fish mortality rates by family/genus and size group. Application of these mortality rates to estimates of fish entrainment resulted in an estimated 12,691 fish lost to turbine mortality through the proposed minimum flow unit.

The ETM Study estimated total losses due to turbine mortality through the existing units of 18,808 fish annually. The proportionally higher estimated mortality of fish passing through the proposed minimum flow unit is due to the smaller size and higher rotational speed of the proposed unit compared to the existing units at Harris.

The large majority (93 percent) of fish loss is comprised of shad/herring. The mortality rates for shad/herring employed in this estimate due to lack of data from comparable sites may be somewhat higher than what may actually occur. Also, the majority of shad/herring entrainment occurs during winter months when these fish can become stressed by low water temperatures (Griffith 1978).

It is also notable that intake velocities during minimum flow-only operations (300 cfs) would be very low (0.11 feet per second) compared to operations of a single existing unit at best gate (6,500 cfs; 2.41 feet per second). This factor would likely result in a lower magnitude of fish entrainment during minimum flow-only operations.

5.0 REFERENCES

Griffith, J.S. 1978. Effects of Low Temperature on the Survival and Behavior of Threadfin Shad, *Dorosoma petenense*. Transactions of the American Fisheries Society, 107:63-70.

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